FLORA
OF
PACHMARHI & BORI RESERVES

DR A.K. MUKHERJEE

BOTANICAL SURVEY OF INDIA
FLORA OF
PACHMARHI & BORI RESERVES
FOREWORD

Pachmarhi in Madhya Pradesh is Darjeeling of Bengal, Abu of Rajasthan or Nainital and Mussorie of Uttar Pradesh. The hills of Pachmarhi are the highest mountains in Central India, and their flora is botanically and phytogeographically unique.

The present work provides a systematic account of over 750 flowering plants belonging to 101 families. Representation of over one hundred families in even part of a political district is indicative of richness and diversity of flora.

Treatment of the flora of Bori Valley provides an opportunity of comparison and contrast between the flora of hills and valleys.

Several works are available on the flora of the plains regions of Madhya Pradesh, e.g. the recent work on Bhopal by Gomachan and several papers of Tiwari on grasses and other groups.

Mukherjee’s work on Pachmarhi and Bori Valley will, therefore, fill a significant gap in our knowledge of the plants of the Central Indian region.

Above all, it will provide a handy manual for comparison of the floras of Himalayan mountains in north and northeast, the western ghat and Nilgiris in South with the Central Indian mountain flora.

Botanical Survey of India
S.K. Jain
Howrah
18-4-1984.
PREFACE

Pachmarhi and Bori forest ranges are very interesting botanically. University students often visit the area for plant collections. Some check-lists have been published on the area, but they lack proper treatment of nomenclature and reference to other Indian floras. There is no detailed flora for the area which can be consulted by the students and forest officials to assess the natural plant wealth and identify the plants of the area.

The main objective of this flora are (i) to provide a census of the rich resources and a means of identifying the plants of the area; (ii) to give up to date nomenclature; (iii) to record ecological conditions responsible for different types of forest vegetation; (iv) to aid the conservation of flora.

The introductory section gives a brief resume of geographical features and topography, geology and soil, climate, survey of previous explorations and effects of biotic factors.

The flora deals with the systematic analysis of 778 species belonging to 452 genera and 101 families. In addition, data are provided on forest types, phytogeographical and statistical analysis.

The author expresses his deep sense of gratitude to Dr. S. K. Jain, Director; Dr. A. S. Rao, former Joint Director and Dr. N. P. Balakrishnan, Deputy Director, Botanical survey of India for guidance and facilities.

He is also indebted to the research scholars, officers and staff of the Central Circle, Botanical Survey of India, Allahabad for providing all types of help during the preparation of this work.

Botanical Survey of India
Allahabad
26th March, 1984

A. K. Mukherjee
Systematic Botanist
INTRODUCTION

Satpura National Park consists of two forest ranges namely, Pachmarhi Forest Range and Bori Forest Range.

Pachmarhi Forest Range is situated in the Pachmarhi Plateau of the Mahadev hills of Madhya Pradesh. Pachmarhi town is the only hill station of Madhya Pradesh which attracts tourists and students, being an excellent place for botanizing.

The Bori Forest Range lies in the valley of Bori River, which flows west from Dhubgarh, the highest point in the Madhya Pradesh, for a distance of about 20 km to join the Sonbhadra River. The valley is more or less wedge-shaped; the point starts from the foot of the Mahadev hills among whose peaks lies the Pachmarhi Plateau and gradually widens as it extends westwards to the Sonbhadra River where the base of the wedge is about 12 km wide. The valley is bounded on the north by the precipitous sandstone escarp of a long spur running west from the main massif of the Mahadeo Range, and rising up to a height of 1150 m like a vast wall. The average elevation of the bottom of the valley is about 430 m. To the west of the valley the country is a flat plateau. Thus, Bori forest range lies in a long funnel-shaped depression of about 100 sq. km. and provides contrast with the Pachmarhi forest range which lies on a Plateau of about 60 sq. km at an elevation of about 1,000 m surrounded by prominent peaks like Mahadeo (1,328m) on the south, Chauradeo (1,312 m) on the south-east and Dhubgarh (1,350 m) on the South-west. The remarkable feature in the configuration of the Plateau is the vast and unexpected ravines in the solid rock. The Pachmarhi and Bori forest ranges are situated between 22°15'-22°28' N latitude and 78°13'-78°26' E longitude. Pachmarhi town is about 51 km from Pipariya, the nearest railway station and Bori forest range is about 65 km from Sohagpur, the nearest railway station on Calcutta Bombay railway lines in the Hosangabad district of Madhya Pradesh.

GEOLOGY AND SOIL

The rocks of Pachmarhi and Bori forest ranges belong to Upper and Lower Gondwana series. In Pachmarhi hills these rocks consist chiefly of coarse sandstones and conglomerates while in Bori valley these consist of sandstones and large masses of extruded or inter-beded trap besides sandy shales.
CLIMATE

It is well known that the type of vegetation depends on climatic, edaphic and biotic factors. Thus high annual rainfall, high relative humidity, high temperature and small variations in these factors characterise the rather monotonous environment of the rich and luxuriant tropical flora.

Pachmarhi and Bori forest ranges because of their altitudinal and latitudinal location are much away from the dust storms and heat waves of the Indo-Gangetic Plains. The climate is comparatively cooler than the northern districts of the Vindhyan Plateau, with rainfall mainly confined to S.W. monsoon.

TEMPERATURE

The hottest months are May and June with 40°C as the average maximum and 22°C as the average minimum temperature. January and February are the coldest months with 8°C as the average minimum temperature.

RAINFALL

The pre-monsoon showers are usually experienced as early as the end of May and the heaviest rain come in July and August after which there is a gradual diminution till the monsoon ends in October. In most years there are occasional storms from December to February.

The peculiar configuration of the Bori valley, open as it is to the west and to some extent to the south and with abrupt obstacle to the S.W. monsoon winds by the Dhupgarh ranges accounts for the heavy rainfall received.

The average rainfall at Pachmarhi is about 200 cm and at Bori 250 cm. Due to the peculiar configuration of the valley heavy dew continue frequently up to March so that the forest remains green in Bori valley for a considerably longer period than does the ordinary teak forest of the Madhya Pradesh.

RELATIVE HUMIDITY

The relative humidity is highest during July and August and the lowest in April and May. The Bori valley, owing to its peculiar configuration, remains naturally more humid than that of the Pachmarhi plateau.
Thus, the combined favourable factors of high rainfall, high relative humidity coupled with moderate temperature characterize the Pachmarhi and Bori forest ranges where the vegetation assumes tropical luxuriance. The Bori forest range where the soil derived from the trap is very fertile and which enjoys a long growing season harbours one of the finest teak forests in India.

PREVIOUS EXPLORATIONS


EFFECTS OF BIOTIC FACTORS

Before 1859 the Pachmarhi and Bori forest areas had been subjected to continuous shifting cultivation or dhaya by the then considerable local population of Gouds and Korkus. In the dhayas some of the larger trees were left standing after pollarding and the rest of the forest ruthlessly cut down and burnt. In 1862 when the forests were taken over by the newly formed Forest Department, the dhaya cultivation was rigorously suppressed and systematic fire protection was introduced in 1884. In 1865, the Bori forest was notified as a Reserve under the Forest Act (first in India). The local population were induced to settle elsewhere and only two villages were settled in the Reserve. Thus Bori range has remained undisturbed by normal biotic factors for over one hundred years.

But biotic factors are more and more active in the Pachmarhi forest range owing to the establishment of the township and other development projects.
(iv)

THE FLORA

GENERAL

Present Studies


The plan

The families are arranged according to a modified system of Bentham & Hooker (1862-1883) as adopted by Kew and British Museum (N.H.) and reflected by the reorganisation of the Central National Herbarium (CAL) (See Table 1).

The genera within families and species within genera are arranged in alphabetical sequence and numbered serially. The keys are constructed for easy identification of the plants of Pachmarhi and Bori forest ranges.

The nomenclature contains the correct name with full reference of author(s), basionym, if any, and reference to the names accepted in the “Flora of British India” and to the local flora or monographs and taxonomic revisions, if any. Abbreviations of periodicals are according to the present usage.

Area of collection with approximate altitude, habitat with abundance, flowering and fruiting time follows the concise description of each species.

Forest types

There are broadly two types of forests in Pachmarhi and Bori forest ranges namely, I. Sub-tropical Hill Forests and II. Tropical Moist Deciduous Forests.
The first type is localised at high elevations around Pachmarhi receiving high rainfall over 175 cm. The forest is characterised by larger proportion of evergreen species like Syzygium cumini (L.) Skeels, Rhododendron ellipticum J.F. Smith, Melastoma malabathricum L., Murraya paniculata (L.) Jack., Dillenista pentagyna Roxb., Sterculia villosa Roxb., Mangifera indica L., Salix tetrasperma Roxb. etc.

Flemingia bracteata (Roxb.) Wt. F. macrophylla (Wild.) Prain, Sophora interrupta Bedd. are common in the undergrowth. The important climbers are Acacia torta (Roxb.) Craib, Clematis triloba Hayne, C. roylii Rehder, Millettia auriculata Baker, Butea superba Roxb. etc.

Tree ferns namely, Cyathia gigantea (Wall.) Holt. and C. latebrosa (Wall.) Copel. are found in the deep gorges with perennial waters.

In lower elevations around Pachmarhi the second type of forest is found. This type occurs in locations having annual rainfall of 100 to 170 cm. The species which are characteristic of these forests are Shorea robusta Gaertn. f., Kedia calvina Roxb., Lagerstroemia parviflora Roxb., Pterocarpus marsupium Roxb., Bridelia retusa Spr. along with common forest species of Madhya Pradesh like Terminalia alata Hayne ex Roxb., Bombax ceiba L., Emblica officinalis Gaertn., Hymenodictyon excelsum (Roxb.) Wall., Buchanania lanzan Spr., Diospyros melanoxylon Roxb., Ouagenia ooeinensis Benth. etc.

Indigofera pulchella Roxb., Desmodium spp., Crotonaria spp., Flemingia bracteata (Roxb.) Wt. etc. are found as the undergrowth.

In Bori forest range Tectona grandis L.f. is the dominant species. The forest is well stocked and the height of the stand is over 25 meters. Pterocarpus marsupium Roxb., Terminalia alata Hayne ex Roth, Ouagenia ooeinensis Benth., Aegle marmelos Correa, Adina cordifolia Hook. f. Anogeissus latifolia (DC.) Wall. ex Bedd. are commonly found along with the common species of Madhya Pradesh. Bauhinia variflora Wt. & Arn., Butea superba Roxb. and Acacia pennata (L.) Wild. are common climbers.

There are a number of interesting plants which do not occur elsewhere in Madhya Pradesh, except in Pachmarhi namely, Malastoma malabathricum L., Murraya paniculata (L.) Jack., Holmskioldia sanguinea Retz., Blumea lanceolata (Roxb.) Druce and Sophora interrupta Bedd.

It is interesting to note that Shorea robusta Gaertn. f. is the dominant species of Pachmarhi, and apparently this is the western limit of distribution of the species in the midst of the teak areas of Madhya Pradesh, while teak (Tectona grandis L. f.) is absent from this plateau.
On the contrary the teak is the dominant tree in the Bori valley. It flourishes on trap soil but is invariably poor and stunted on sandstones. The alluvial soil along the banks of the large streams and of the Bori river produces some exceptionally fine teak forest also but the low hills along both sides of the valley which have trap soil produces the best teak stands.

The above facts indicate that the teak is a moisture loving species and grows well in heavy soil usually up to an altitude of 900 m. On the other hand ‘Sal’ (Shorea robusta Gaertn. f.) favours well drained soil derived from sand stones and conglomerates as found at Pachmarhi and can grow at higher altitudes than that of teak. Moreover, Shorea being an element of a primitive family than that of Tectona (Takhtajan, 1969), it cannot compete with teak in the habitat suitable for teak. On the other hand soil moisture becomes the limiting factor for the growth of teak at Pachmarhi ‘Sal’ forest. Therefore, the distribution of ‘Sal’ and teak is so markedly distinct in Pachmarhi and Bori forest ranges and proves that the edaphic factor is very important for the distribution of certain plants.
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TABLE 2. ARRANGEMENT OF TAXA OF PACHMARHI AND BORI
FOREST RANGES ACCORDING TO PHYLOGENETIC
CLASSIFICATION OF TAKHTAJAN, 1969.

Class Magnoliatae
Sub-class A-G; Super orders 1—XV; Orders 1—74.

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Class - Liliaceae
Sub-class A-D; Super order I-V; Orders 75-94.

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<th>Occurrence</th>
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<td>93</td>
<td>B II 82. Orchidaceae</td>
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<td>94</td>
<td>C III 84. Cyperaceae</td>
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<td>C IV 87. Eriocaulaceae</td>
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<td>C V 90. Arecaceae</td>
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Gymnosperms

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<td>Cupressaceae</td>
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### TABLE 3. ANALYSIS OF TAXA OF PACHMARHI AND BORI FOREST RANGES.

<table>
<thead>
<tr>
<th>No. of families</th>
<th>No. of genera</th>
<th>No. of species</th>
<th>Trees &amp; Shrubs</th>
<th>Herbs</th>
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<tr>
<td>101</td>
<td>452</td>
<td>778</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Shrubs 247</td>
<td>Herbs 531</td>
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#### Ten dominant families

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<th>No. of genera</th>
<th>No. of species</th>
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<tr>
<td>1.</td>
<td>Poaceae</td>
<td>57</td>
<td>102</td>
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<td>2.</td>
<td>Fabaceae (Papilionaceae Cassalpinioideae &amp; Mimosaceae)</td>
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<td>3.</td>
<td>Asteraceae</td>
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<td>Euphorbiaceae</td>
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<td>7.</td>
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<td>8.</td>
<td>Rubiaceae</td>
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<td><strong>325</strong></td>
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<td><strong>Percentage of total:</strong></td>
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<td><strong>49.5</strong></td>
<td><strong>41.7</strong></td>
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</table>
Statistics

The flora of Pachmarhi and Bori forest ranges is made up of 101 families consisting of 452 genera and 778 species. The species consist of 247 trees and shrubs and 531 herbs (Table-3).

The 3rd position of Asteraceae and 7th position of Lamiaceae, which are more temperate in nature, indicates the semi-temperate nature of the vegetation. The monocotyledonous families namely, Poaceae, Cyperaceae and Orchidaceae account 50% species under the ten dominant families of the area. It indicates the dominance of monocotyledonous plants in the area (Table-3).

The flora of Pachmarhi and Bori forest ranges represent all the Subclasses and Super orders of Magnoliidae except Super order XIII Protaracnac, (mostly Southern Hemispheric plants) and all the Subclasses and Super orders of Lithiaceae except Subclass A-Arisidae (mostly aquatic plants) according to phylogenetic classification of Takhtajan, 1962 (Table-2).

According to Jaccard (1912), the generic coefficient of a flora, i.e. the number of genera expressed as a percentage of the number of species provides information on the variety of habitats, or on the relative intensity of intergeneric and intrageneric competition in the area. The higher the generic coefficient the more varied are the habitats and intergeneric and intragenetic competition in the area.

The generic coefficient for the Flora of Pachmarhi and Bori Forest Ranges (Table-3) is \[ G = \frac{452 \times 100}{778} = 58.0\% \]. This high percentage of generic coefficient indicates that the present composition of the area is the result of intense intergeneric and intrageneric competition in varied types of microclimates which may be utilised for the introduction of species growing in similar microclimates elsewhere in the country. It is supported by the fact that these microclimates are naturally supporting both the tropical and temperate elements.

Out of 101 families of the flora of Pachmarhi and Bori forest ranges, 36 are restricted to Pachmarhi range and 4 to Bori range. Out of 36 families restricted to Pachmarhi range, 17 families are represented by only 1 genus (Table-2).

In the flora, out of 101 families, 31 are represented by 1 species, 13 by 2 species and 11 by 3 species. In case of genera, 43 families are represented by 1 genus, 13 by 2 genera and 12 by 3 genera (Table-2).

Such a low number of species and genera in more than 50% families of the flora indicate its relict nature.
Darwin (On the Origin of species, 6th ed. 1876, p. 403) concluded that as a general rule, the number of species of each group gradually increases towards the maximum, and then, sooner or later, a gradual decrease of the species number occurs.

The area of Pachmarhi and Bori forest ranges is existing from the Gondwana time. The flora had undergone many changes during the past ages owing to migration to and fro during the past periods of glaciation, climatic changes, pressure of succession and intense biotic interference in the recent times. All the above factors together contributed to the relict nature of the flora.

Bews, J. W. (Studies in the Ecological Evolution of the Angiosperms: Wheldon & Wesley Ltd. London, 70, 1927) observed that while the species which appear relatively late in the plant succession are usually very rigid in their requirement and show a small range of variation in their physiological processes, the species which act as pioneers or appear early in the plant succession are much more plastic physiologically. But the climax species belong to more primitive types of plant form than the pioneer species. An increase of physiological plasticity, therefore, has been one of the trends of evolutionary development.

Out of 86 dicot families having 568 species the primitive 32 families have only 100 species (i.e. 37% primitive families having only 18% species). This indicates that the flora of the area is heavily disturbed by human interference and the primitive families are represented by relict species only.

The presence of many temperate elements of the area, common with the Himalayas, poses the problems of migration across the gangetic plain. W. T. Blanford, one of the greatest workers in the field of Indian geology and natural history, as quoted by Wadia (Geology of India 1957; P-179) says that a great portion of the temperate fauna and flora of the South Indian hills has inhabited the country from a much more distant epoch than the glacial period may be considered as almost certain, there being so many peculiar forms. It is possible that the species common to Ceylon, the Nilgiris and the Anamalai may have migrated at a time when the country was damper without the temperature being lower.

Bews (loc. cit. P. 289) says that the tropical rain forests has existed in certain tropical regions ever since the rise of the Angiosperms, when the climate of the world during Jurassic times, and at least until the close of the Cretaceous, was far more uniformly warm and moist than it is now, and the land surfaces were mostly reduced nearly to sea level, such conditions must have been much more widespread. With increasing climatic differentiation, however, with the advent of pronounced dry seasons, with
a general lowering of temperatures as the land surfaces of the world became uplifted into great mountain ranges, the moist tropical belt became more and more contracted.

The distribution of fossil Cretaceous reptiles points to unrestricted inter-migration of land animals over Mesozoic Indo-African-American continent or archipelago. The northern frontier of this continent was washed by the waters of the Tethys. This southern continent persisted till the commencement of the Cainozoic age, when, collaterally with other physical revolution in India, (volcanic activities) large segments of it drifted away, or subsided, permanently, under the ocean, to form what are now the Bay of Bengal, the Arabian Sea, etc., thus isolating the Peninsula of India, with sea on all sides (Wadia, loc. cit. p. 173).

The angiosperms undoubtedly originated long before the Cretaceous period. The specialised character and astonishingly modern facies of many cretaceous angiosperms confirm the belief that they might have originated in the lower Mesozoic. (Takhtajan, 1969, P. 122).

Owing to higher evolutionary plasticity the angiosperms could adapt themselves to the sudden changes in physico geographical conditions of upper cretaceous period (continental drift and volcanic activities) and were able to colonise not only mountains but also extensive areas of lowlands (Takhtajan, loc. cit. P. 131).

The present distribution of the more primitive living angiosperms leads to the conclusion that the original centre of distribution of the angiosperms was situated somewhere between eastern India and Polynesia, i.e. the south-east Asia of to-day (Takhtajan, loc. cit. p. 156).

The presence of entire phylogenetic series linking temperate forms with subtropical and tropical ones in the eastern Himalayas, Assam, Yunnan, Upper Burma, North Vietnam and Eastern Asia is evidence that this part of the Asian continent is the primary centre of origin of the temperate flora of the northern hemisphere (Takhtajan, loc. cit. p. 171).

The Rajmahal Assam gap is of recent origin, the two being connected underground at a small depth. The downwarp which produced the Gangetic geosyncline must have started as a concomitant of the Himalayan elevation to the north somewhere in the mid-Eocene (Wadia, loc. cit. p. 391).

The Assam plateau must be regarded as a plateau of erosion, a detached outlying fragment of the Peninsula, connected with it through the intermittent Rajmahal hills (Wadia, loc. cit. P. 434).

The foregoing facts indicate that the present temperate elements of South India and Ceylon migrated from their place of origin in the South-
East Asia of to day, i.e. the north east portion of the Gondwana land of Cretaceous epoch, much earlier than the Pleistocene glaciation.

It is probable that they migrated in the Cretaceous period when Peninsular India and the adjacent areas were damper without the temperature being lower and were covered with tropical rain forest. With increasing climate differentiation with the advent of pronounced dry seasons, with a general lowering of temperatures as the land surfaces of the world became upraised into great mountain ranges, the moist tropical belt became more and more contracted in the Tertiary period when the temperate elements of the moist tropical forest had to take refuge to the hill tops of the Peninsular India and Ceylon. Thus it created a serious problem for the present phytogeographers to correlate the occurrence of these temperate elements both in the Himalayas and on the hill tops of Peninsular India and Ceylon.

Key to Groups of Seed Plants from Pachmarhi and Bori forest ranges.

1a. Seeds and ovules enclosed in megasporophyll (Carpel).
   Stigma present:

   2a. Flowers usually 4-5 merous. Venation usually reticulate. Stem with central pith and or surrounded by concentric rings of woody tissue, bark separable. Cotyledons usually 2:

   3a. Perianth absent (achlamydeous) or unisepiaete (achlamydeous)

Group 1

3b. Perianth bisepiaete or multisepiaete:

4a. Petals all united, at least at base
   Group 2

4b. Petals free or only some united:

5a. Ovary inferior or half-inferior
   Group 3

5b. Ovary superior:

   6a. Stamens more than twice as many as petals
      Group 4

   6b. Stamens twice as many as petals or fewer
      Group 5


Group 6

1b. Seeds and ovules borne on surface of megasporophylls
   Stigma none

Group 7
GROUP I. ACHLAMYDOUS AND MONOCHLAMYDOUS DICOTS

Key To Families

1a. Perianth none:
   2a. Flowers in cyathia
   ... EUPHORBIACEAE 82
   2b. Flowers in spikes
   ... SALICACEAE 86

1b. Perianth present:
   3a. Ovary inferior or apparently so, being tightly invested by persistent perianth:
      4a. Plants herbaceous:
         5a. Leaves alternate. Flowers unisexual. Ovary truly inferior
         ... BEGONIACEAE 45
         5b. Leaves opposite. Flowers bisexual, ovary appearing to be inferior
         ... LYTHRACEAE 41

4b. Plants woody:
   6a. Plants parasitic
   ... LORANTHACEAE 80
   6b. Plants not parasitic:
      7a. Stamens 10, twice as many as calyx lobes
      ... COMBRETACEAE 37
      7b. Stamens 3–5, as many as calyx lobes
      ... SANTALACEAE 81

3b. Ovary superior:
   8a. Anthers dehiscing by 2 or 4 upcurled lids
   ... LAURACEAE 79
   8b. Anthers not dehiscing by lids:
      9a. Pistils 2 or more (carpels free):
         10a. Trees
         ... STERCULIACEAE 17
         10b. Herbs
      9b. Pistils solitary (carpels 1 or united):
         11a. Ovary 2–5 locular:
            12a. Ovary axile
            ... EUPHORBIACEAE 82
            12b. Ovules all or mostly basal:
               13a. Herbs. Capsule circumscissile
               ... ATZIACEAE 47
13b. Woody. Capsule not circumscribed:

14a. Plants armed. Leaves simple, triplinerved ... **Rhamnaceae 27**
    *(Ziziphus)*

14b. Plants unarmed. Leaves compound, or if simple then not triplinerved ... **Sapindaceae 30**

11b. Ovary 1-locular:

15a. Plants twining. (single petal in female flower; corolline cupule in male) ... **Menispermaceae 4**
    *(Cissampelos)*

15b. Plants not twining:

16a. Herbs:

17a. Stipules ochraceae ... **Polygonaceae 78**

17b. Stipules absent or not ochraceae:

18a. Perianth and bracts scarious. Stamens often connate below ... **Amaranthaceae 76**

18b. Perianth and bracts not scarious. Stamens free:

19a. Flowers unisexual. Style undivided. Leaves triplinerved ... **Urticaceae 84**

19b. Flowers bisexual. Style 2 - more-branched. Leaves pinnately veined ... **Chenopodiaceae 77**

16b. Woody plants:

20a. Leaves compound:

21a. Flowers regular ... **Mimosaceae 34**

21b. Flowers zygomorphic:

22a. Corolla papilionaceous ... **Papilionaceae 32**

22b. Corolla not papilionaceous ... **Caesalpiniaceae 33**

20b. Leaves simple:

23a. Stipules present:

24a. Style branched.
25a. Anthers inflexed and reversed in bud. Ovule 1, apical ... Moraceae 85

25b. Anthers erect in bud:

26a. Ovule solitary, apical ... Ulmaceae 83

26b. Ovules 2, basal ... Euphorbiaceae 82

(Antidesma)

24b. Style undivided:

27a. Placentation partial ... Flacourtiaceae 10

(Casearia)

27b. Placentation not so:

28a. Ovule apical ... Moraceae 85

28b. Ovule basal ... Urticaceae 84

23b. Stipules none ... Flacourtiaceae 10

(Flacourtia)

GROUP 2. SYNPETALOID DICOCTS

1a. Stamens more than corolla lobes:

2a. Ovary inferior ... Cactaceae 46

2b. Ovary superior:

3a. Leaves compound:

4a. Flowers regular ... Mimosaceae 34

4b. Flowers zygomorphic:

5a. Corolla papilionaceous ... Papilionaceae 32

5b. Corolla not papilionaceous ... Casalpiniaceae 33

3b. Leaves simple:

6a. Corolla white, Flowers usually unisexual ... Edenhaceae 58
6b. Corolla rotate to campanulate, Flowers bisexual  

1b. Stamens as many as petals or fewer:
  
7a. Ovary partly or wholly inferior:
  
8a. Tendril-bearing vines  

8b. Plants not tendriliferous:
  
9a. Anthers syngenesious:
  
10a. Stamens 2  

10b. Stamens more than 2:
  
11a. Flowers in involucral heads. Ovary 1-locular  

11b. Flowers not in heads. Ovary 2-locular  

9b. Anthers free:
  
12a. Leaves opposite  

12b. Leaves alternate  

7b. Ovary superior:
  
13a. Stamens opposite the petals:
  
14a. Ovary 2-many-locular. Placentation axile:
  
15a. Leaves compound. Stamens united by filaments  

15b. Leaves simple. Stamens free from each other:
  
16a. Corolla urceolate. Stamens free from petals. Flowers usually unisexual  

16b. Corolla rotate, Stamens epipetalous. Flowers bisexual  

14b. Ovary 1-locular. Placentation free-central:
  
17a. Styles 5. Flowers long-tubular. Calyx with stalked glands  

17b. Style 1. Flowers rotate. Calyx not glandular:
  
18a. Herbs. Leaves usually opposite. Perianth not gland-dotted. Fruit circumsessile  

18b. Shrubs. Leaves alternate. Perianth gland-dotted. Fruit fleshy
13b. Stamens alternate with the petals:

19a. Corolla irregular. Stamens 4 or 2:
   20a. Fruit elastically dehiscent. Seeds often on upcurved processes. Inflorescence usually with conspicuous bracts. ... **Acanthaceae 73**

20b. Not as above:
   21a. Ovules and seeds few:
      22a. Ovary 4-lobed. Style arising from between the lobes of the ovary ... **Lamiaceae 75**
      22b. Ovary entire. Style apical:
         23a. Plants viscid-pubescent ... **Pedaliaceae 72**
         23b. Plants not viscid-pubescent ... **Verbenaceae 74**

21b. Ovules and seeds many:
   24a. Leaves compound. Seeds winged ... **Bignoniaceae 71**
   24b. Leaves simple. Seeds not winged:
      25a. Placentation free-central. Plants aquatic or of wet places, typically with small insectivorous bladders ... **Lentibulariaceae 69**
      25b. Placentation parietal or axile. Plants not insectivorous:
         26a. Placentation axillary, solid and unbranched ... **Scrophulariaceae 68**
      26b. Placentation parietal, often intruded and meeting below middle of locule but branched or winged:
         27a. Perianth 4–5 merous. Corolla ... **Gentianaceae 63**
27b. Perianth 5-merous.
   Corolla
   imbricate or valvate ...
   Gesneriaceae 70

19b. Corolla regular. Stamens usually 5:

28a. Leaves alternate:

29a. Ovules and seeds many:

30a. Plants aquatic. Placentation
   parietal ...
   Menyanthaceae 64

30b. Plants terrestrial. Placentation
   axile ...
   Solanaceae 67

31a. Fruits capsular, Corolla
   usually plicate.
   Plants usually climbing...
   Convolvulaceae 66

31b. Fruits dry with 4 nutlets or drupaceous with
   1-4-locular pyrene ...
   Boraginaceae 65

28b. Leaves opposite:

32a. Stamens 2, fewer than corolla
   lobes ...
   Olacaceae 59

32b. Stamens 4 or more, as many as
   the corolla lobes:

33a. Carpels free at base. Sap
   usually milky:

34a. Carpels united only at
   stigmatic disk. Pollen
   aggregated into masses
   which are connected
   in pairs to stigmatic
   glands ...
   Asclepiadaceae 61

34b. Carpels united by sty-  
   les. Pollen not aggre-  
   gate into pollinia ...
   Apocynaceae 60

33b. Carpels entirely united:

35a. Sap milky ...
   Apocynaceae 60

35b. Sap clear:

36a. Herbs:

37a. Plants hispid.
   Ovary 4-10-locular, 4-ovulate ...
   Boraginaceae 65
37b. Plants glabrous. Ovary 1 locular, many - ovulate ... Gentianaceae 63

36b. Plants woody:

38a. Ovules pendulous. Seeds or pyrene solitary. Fruit drupaceous with persistent calyx ... Verbenaceae 74

38b. Ovules axile. Seeds 2 or more ... Loganiaceae 62

GROUP 3. POLYPELALOID DICOTS WITH INFERIOR OVARY

1a. Stamens many, more than twice as many as petals :

2a. Styles more than one. Flowers unisexual ... Begoniaceae 45

2b. Style 1, Flowers bisexual:

3a. Petals many. Plants armed, succulent, virtually leafless ... Cactaceae 46

3b. Petals few. Plants unarmed, woody, leafy :

4a. Leaves opposite, gland-dotted ... Myrtaceae 38

4b. Leaves alternate, not gland-dotted ... Leguminosae 39

1b. Stamens few, twice as many as petals or fewer :

5a. Styles more than 1 :

6a. Herbs. Fruits of two mericarps ... Apiaceae 48

6b. Woody plants. Fruit drupaceous or capsular ... Araliaceae 49

5b. Style 1 :

7a. Herbs :

8a. Leaves cauline, alternate; venation pinnate. Anthers longitudinally dehiscent ... Orchidaceae 42
GROUP 4. POLYPETALOID DICOTS WITH SUPERIOR OVARY AND MANY STAMENS

1a. Pistils more than 1:
   2a. Stamens monadelphous
   2b. Stamens free:
      3a. Stamens perigynous (arising from hypanthium)
      3b. Stamens hypogynous (arising from receptacle):
         4a. Perianth multiseriate
         4b. Perianth 2-3-seriate

1b. Pistil 1:
   5a. Stamens perigynous (arising from hypanthium):
      6a. Leaves opposite. Fruit a capsule
      6b. Leaves alternate. Fruit a drupe
   5b. Stamens hypogynous (arising from receptacle):
      7a. Stamens monadelphous:
         8a. Leaves digitately compound
         8b. Leaves simple
      7b. Stamens free or polyadelphous:
         9a. Ovary stipitate (on gyrophere):
            10a. Stamens in 5 phalanges of 3 stamens each. Venation palmate
            10b. Stamens free. Venation pinnate
      9b. Ovary sessile:
         11a. Flowers unisexual
         11b. Flowers bisexual:
            12a. Venation palmate:
               13a. Flowers axillary. Placentation axile
13b. Flowers terminal, Placenta parietal

12b. Venation pinnate:

14a. Sepals 2, caducous. Leaves lacerate. Herbs

14b. Sepals 5, persistent. Leaves entire-separate, Woody

14. Papaveraceae 6

Dipterocarpaceae 14

GROUP 5. POLYPETALOID DICOTS WITH SUPERIOR OVARY AND FEW STAMENS

1a. Ovary 1-locular:

2a. Leaves compound:

3a. Styles 3-4. Ovule 1

3b. Style 1. Ovules more than 1:

4a. Flowers regular

4b. Flowers zygomorphic:

5a. Corolla papilionaceous

5b. Corolla not papilionaceous

Papilionaceae 32

Caesalpiniaceae 33

2b. Leaves simple:

6a. Ovules 1-2:

7a. Flowers 3-merous, unisexual. Climbers

7b. Flowers 4-6-merous, bisexual. Plants erect

6b. Ovules 5-many:

8a. Placentaation free-central:

9a. Stamens alternate with petals

10b. Herbs. Leaves opposite not gland-dotted

Papilionaceae 32

Caesalpiniaceae 33

Menispermaeae 4

Berberidaceae 5

4

Caryophyllaceae 13

Myrsinaceae (Embelia) 56

Primulaceae 55
8b. Placentation parietal or marginal:

11a. Ovules marginal, on 1 ventral placenta:

12a. Flowers regular: ... MIRABILIDEEAE 34

12b. Flowers zygomorphic:

13a. Corolla papilionaceous ... PAPILIONACEAE 32

13b. Corolla not papilionaceous ... CAESALPINIAEAE 33

11b. Ovules parietal on 2 or more placentas:

14a. Plants insectivorous, covered with glandular hairs: ... DROSERACEAE 36

14b. Plants not insectivorous, not covered with glandular hairs:

15a. Plants with tendrils. Leaves cordate ... PASSIFLORACEAE 43

15b. Plants not climbing. Leaves cuneate:

16a. Ovary on elongate gynophore ... CAPPARACEAE 9

16b. Ovary subsessile:

17a. Anther connectives produced beyond cells ... VIOLACEAE 9

17b. Anther connectives not produced ... FLACOURTIACEAE 10

1b. Ovary 2-more-locular:

18a. Herbs:

19a. Stamens tetradynamous, 4 long and 2 short ... BRASSICACEAE 7

19b. Stamens not tetradynamous:

20a. Leaves compound:

21a. Stamens monadelphous ... OXALIDACEAE 21

21b. Stamens free ... GERANIACEAE 20

20b. Leaves simple:

27a. Flowers irregular:

23a. Anthers sessile. Ovary 5-locular. Ovules many ... BALSAVINACEAE 22

23b. Anthers on split sheath. Ovary 2-locular. Ovule 1 per locale ... POLYGALACEAE 12
22b. Flowers regular:
   24a. Leaves opposite ... **LYTHRACEAE 41**

24b. Leaves alternate:
   25a. Flowers unisexual ... **EUPHORBIEAE 52**
   25b. Flowers bisexual:
      26a. Plants glabrous ... **LINACEAE 19**
      26b. Plants pubescent ... **STERCULIACEAE 17**

18b. Woody plants:
   27a. Leaves opposite ... **CNEASTEACEAE 26**
   27b. Leaves alternate:
      28a. Stamens as many as and opposite petals or fewer:
         29a. Style short or none. Plants with tendril. Leaves compound or cordate. Petals thickened at apex. ... **VITACEAE 28**
         29b. Styles as many as locules. Plants without tendril. Leaves simple. ... **RHAMNAICEAE 27**
      28b. Stamens as many as and alternate with petals or twice as many as petals:
         30a. Leaves pellucidly glandular-punctate ... **RUTACEAE 23**
         30b. Leaves not pellucid-punctate:
            31a. Leaves compound:
               32a. Disc extrastaminial. Flower often irregular ... **SAPIRACEAE 30**
               32b. Disc intrastaminial. Flower regular:
                  33a. Filaments of stamens bifid at anther, often united beyond anthers ... **MELIACEAE 25**
                  33b. Filaments of stamens not bifid, never united up to anthers:
                     34a. Stamens as many as petals ... **MELIACEAE 25** (Footnote)
                     34b. Stamens twice as many as petals ... **BUPHERACEAE 24**
GROUP 6. MONOCOTS

1a. Perianth not petaloid, reduced to scales or bristles or absent:

2a. Plants woody:

3a. Leaves pinnately divided

3b. Leaves entire

2b. Plants herbaceous:

4a. Inflorescence of heads or spikelets of florets in the axils of glumaceous bracts:

5a. Inflorescence a solitary head on spirally ribbed peduncle

5b. Inflorescence various but not as above:

6a. Style 1. Seeds 2 + 3-sheathed

6b. Style 2. Seeds round

4b. Inflorescence not in heads nor in glumaceous spikelets

1b. Perianth petaloid, at least in part:

7a. Flowers staminate:

8a. Plants climbing

8b. Plants not climbing, herbaceous

GROUP 6. MONOCOTS

1a. Perianth not petaloid, reduced to scales or bristles or absent:

2a. Plants woody:

3a. Leaves pinnately divided

3b. Leaves entire

2b. Plants herbaceous:

4a. Inflorescence of heads or spikelets of florets in the axils of glumaceous bracts:

5a. Inflorescence a solitary head on spirally ribbed peduncle

5b. Inflorescence various but not as above:

6a. Style 1. Seeds 2 + 3-sheathed

6b. Style 2. Seeds round

4b. Inflorescence not in heads nor in glumaceous spikelets

1b. Perianth petaloid, at least in part:

7a. Flowers staminate:

8a. Plants climbing

8b. Plants not climbing, herbaceous
FLORA OF PACHMARHI

7b. Flowers pistillate or bisexual :

9a. Ovary superior :
   10a. Perianth with 3 petaloid parts  
   Commelinaceae 96

10b. Perianth with 6 petaloid parts :
   11a. Perianth in 1 series  
   Hyponidaceae 93
   11b. Perianth in 2 series of 3 each  
   Liliaceae 95

9b. Ovary inferior :

12a. Plants climbing  
   Dioscoreaceae 94

12b. Plants not climbing :
   13a. Perianth tubular, split on one side. 
   Leaves over 2 m long  
   Musaceae 92

13b. Perianth parts variously united but not in a split tube  
   Leaves less than 1 m long. Flowers regular :

14a. Fertile stamens 6 :
   15a. Perianth in 1 series  
   Hyponidaceae 93
   15b. Perianth in 2 series of 3 each  
   Liliaceae 95

14b. Fertile stamens 1(2), flowers irregular :

16a. Stamiodia not petaloid. Stamen and style united in a column  
   Orchidaceae 89

16b. Stamiodia petaloid. Stamen and style separate :

17a. Aerial stem straight. 
   Leaves 2-ranked; sheaths open  
   Zingiberaceae 90

17b. Aerial stem twisting. 
   Leaves spirally arranged; sheaths closed  
   Costaceae 91

GROUP 7. GYMNOSPERMS

1a. Leaves scale-like, less than 5 mm  
   Cupressaceae 88

1b. Leaves needle-like, more than 100 mm  
   Pinaceae 87
FAMILIES

1. RANUNCULACEAE Juss.

1a. Leaves alternate. Petiole with stipule-like auricles. Erect herbs

Thalictrum 3

1b. Leaves opposite. Petiole without basal auricle. Climbers:

2a. Terminal leaflet modified into a tendril. Petaloid staminode present

Naravelia 2

2b. Terminal leaflet normal. Staminode absent

Clematis 1

1. Clematis L.

1a. Sepals erect with recurved tips. Filaments hairy

C. royi 1

1b. Sepals spreading from the base. Filaments glabrous

C. triloba 2


Slender, petiolar climber. Leaves 3 foliolate to bipinnately compound, 10 - 20 cm long; leaflets 2 - 3 cm long on twining petiolules, ovate - lanceolate, with a rounded or often oblique base, acute acuminate or 3 - 3 lobulate, glabrous or villous. Flowers white, in axillary pubescent or villous panicles; pedicels up to 3 cm long. Sepals broadly oblong, tomentose outside. Filaments 1.5 - 2 cm long; anthers mucronate. Achenes ovoid, ellipsoidal, silky; styles plumose.

PACHMARHI: Rorighat (1000 m). In shady rocky places. Occasional.

Fl. & Fr.: December - April.


An extensive climber, villous or tomentose. Stems articulated. Leaves opposite, simple or once ternate or lobed, ovate, acute or orbicular, base rounded, cuneate or cordate, 3 - nervé; petioles slender, twining, 2 - 8 cm long. Panicles many - flowered. Flowers white, 2 - 2.5 cm; bracts leafy. Sepals 4 - 6, oblong or obovate, cuspidate. Stamens many, filaments ligulate, glabrous. Carpels many. Fruit a head of ovoid, compressed, villous achenes with long feathery styles.
PACHMARHI : Dhupgarh (1200 m). BORI : Reserve forest (460 m). On hill slopes as climber on shrubs. Common.

Fl. & Fr. : October December.

2. Naravelia Adams. mut. DC.


Scandent or climbing woody shrubs. Roots tuberous. Leaves 3 foliolate, two opposite leaflets ovate cordate and the terminal one modified into 3 branched tendril. Flowers in panicles. Petaloid staminodes 10 - 14. Stamens many; anthers with prominent connectives. Achenes red with long feathery styles.

PACHMARHI : Dhupgarh (1200 m). On hill slopes as climber on shrubs. Common.

Fl. & Fr. : November February.

3. Thalictrum L.


Erect, rigid, perennial herbs, up to 2.4 m tall. Rootstocks fibrous. Leaves pinnately decomposed; leaflets 4 - 6 mm; sub - orbicular. Flowers pale green or dingy purple, polygamous, in branched panicles. Filaments filiform; anthers beaked. Achenes 2 - 3.5 cm long, acute at both ends and sharply ribbed.

PACHMARHI : Mahedoo hills. (1100 m). 27 7 64, Pantgrahi 4565 (BSA). On slopes of ravines. Rare.

Fl. & Fr. : July September.

It is a Himalayan species.
2. DILLENIACEAE Salisb.

Dillenia L.


A large deciduous tree, 10 - 15 m, with a straight cylindrical bole. Leaves up to 60 × 20 cm, oblong lanceolate with acute tip and narrow base, strongly serrate, densely hairy when young; veins 40 - 50 pairs; petiole 2.5 - 5 cm, winged at base. Flowers yellow, fragrant, 2.5 cm in diam. borne in umbels along thick leafless branches; pedicels 3 - 5 cm, red. Sepals 5, orbicular, brown, thick, accrescent. Petals 5, obovate, bright yellow. 10 innermost stamens longer than the rest, recurved. Carpels 5, unilocular. Fruit indehiscent, covered with fleshy, yellow sepals.

PACHMARHI: Around (1000 m). On sandy loam in the sal forest. Occasional.

Fl. & Fr.: January - April.

3. MAGNOLIACEAE Juss.

Michelia L.


Tall evergreen trees, up to 30 m in height. Bark grey or brownish. Leaves ovate lanceolate, acute to acuminate, coriaceous, 15 - 20 × 7 - 9 cm. Flowers usually axillary, solitary, golden yellow or orange, fragrant. Perianth segments 9 or more, oblong, fleshy. Fruits 5 - 10 cm long; ripe carpels ovoid or ellipsoid, woody. Seeds brown, angular, with pink fleshy aril.

PACHMARHI: Mahadev hill (1200 m).

Fl. & Fr.: March - August.

Cultivated for the fragrant flowers which are sold in the flower market.
4. MENISPERMACÉAE Juss.

Cissampelos L.


Slender, twining, softly tomentose, perennial, herbaceous climbers. Leaves ovate to orbicular, apiculate, peltate - cordate at base, 2.5 - 5.5 x 2.5 - 4 cm, densely hairy beneath; venation obscure; petiole equalling the leaf - blade or longer. Female inflorescence longer than the male, with many conspicuous, imbricate bracts. Flowers greenish white. Drupes ovoid subglobose, red, pilose, with sub basal persistent stylar scars.

PACHMARHI: Mahadev hills (1200 m); BORI: Dhain (462 m). Climbers on hedges along the edges of forests. Abundant.

Fl. & Fr.: June - November.

5. BERBERIDACEAE Juss.

Berberis L.

1a. Anthers truncate at apex, Leaves obovate, oblong - obovate or elliptic

B. asiatica 1

1b. Anthers apiculate, Leaves lanceolate or oblanceolate

B. lyceum 2


Spinescent shrubs with terete stem. Spines 1 - 3 cm long. Leaves thick, rigid, acute, mucronate. Inflorescence 15 - 20 flowered. Pedicels glabrous, red, 1.5 - 2.5 cm long. Outer sepals smaller than the inner. Petals obovate; glands obovate. Berries oblong - ovoid, black.

PACHMARHI: Vicinity (1050 m), Growing on hill slopes. Occasional.

Spinose, bushy under-shrubs; stem subterete, internodes 2-2.5 cm long. Spines in clusters of 3, middle one longer, lateral ones 0.7-1.2 cm long. Leaves subsessile, obovate oblanceolate. Flowers yellow in axillary, subsessile, 5-7 cm long racemes. Pedicels 1-1.5 cm long. Outer sepals ovate, subobtuse, inner oblong, rounded, obtuse. Petals obovate with a pair of glands inside. Berries ovoid, black.

PACHMARHI : Dhapgarh (1300 m). On hill slopes. Abundant.

Fl. & Fr. : April - June.

6. PAPAVERACEAE Juss.

ARGEMONE L.


Erect, prickly annual herbs with yellow and milky juice. Leaves sinuate, pinnatifid, spinulose dentate, prickly on both surfaces, lower ones petioled, upper sessile, with base semi amplexicaule. Flowers terminal; solitary, shortly pedicellate; bract leafy. Sepals 3, oblong, apex horned, back prickly. Petals obovate. Stigma sub sessile, 3-6 lobed, dark red. Capsule oblong ellipsoid, 3-6 valued, spiny; seeds numerous, reticulate ribbed.

PACHMARHI : Ansara Behar, Dowrasa, Jawaharkar, Rajat Prapat. (900-1050 m). In waste places along road side. common.

Fl. & Fr. : January - December.


Erect, prickly, glaucous, annual herbs. Leaves simple, spinulose, dentate, prickly on the nerves. Flowers sessile, stigma 5 lobed, spreading, dark red. Capsule ovate, lanceolate or lanceolate, clothed with spines.

*Bori*: Reserve forest (450 m). In waste places along road side. Occasional.

*Fl. & Fr.*: January December.

### 7. BRASSICACEAE Burn.

1a. Fruit a silicle:

2a. Silicle 2-seeded

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2b. Silicle many seeded

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1b. Fruit a silique:

3a. Silique beaked. Lateral sepals saccate at base. Seeds 2-seriate in each cell

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3b. Silique not beaked. Lateral sepals not saccate at base. Seeds 1-seriate or 2-seriate in each cell:

4a. Silique turgid. Seeds 2-seriate or irregularly

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4b. Silique compressed. Seeds 1-seriate in each cell

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### 1. BRASSICA L.


Erect, glaucous, annual herbs. Basal leaves irrate pinnatifid; upper ones entire, dentate. Flowers yellow. Pods up to 10 cm long (incl. up to 2.5 cm, long beak).

*PACHMARHI*: Vicinity (1050 m). Cultivated as winter crop.
2. Cardamine L.


Annual herbs with variable habit, size, shape and number of leaflets. Basal leaves orbicular-rounded, sinuate dentate to lobed leaflets; upper ones ovate rounded to lanceolate, entire or emarginate leaflets. Flowers in racemes. Pedicels erectopatent. Petals white, truncate. Stamens 4, rarely with 2 staminodes. Pods 2.5 cm long.

BORI: Reserve forest. (500 m). In moist localities among grasses. Abundant.

Fl. & Fr.: February April.

3. Cochlearia L.


BORI: Dham (450 m), 22 12 62, Panighati 6284 (B.S.A). Along the bank of streams. Rare.

Fl. & Fr.: December February.

4. Coronopus Zinn.


**PACHMARHI**: Vicinity (1000 m). Among the grasses, roadside. Occasional.

**Fl. & Fr.:** November - June.

Native of South America; naturalised.

5. **RORIPPA Scop.**


Erect, glabrous, annual biennial herbs. Leaves lyrate pinnatifid or pinnatipartite; lower ones petiolate, upper sessile with amplexicaul base, often lanceolate oblong. Flowers yellow in elongate racemes. Petals oblongate. Stigma subsessile. Pods erect or erecto patent, slightly curved, 1.25 cm. long. Seeds subreniform, minutely granulate.

**BORI**: Reserve forest (450 m). Along roadside, among the grasses. Occasional.

**Fl. & Fr.:** December - July.

8. **CAPPARACEAE** Juss.

**CLEOME L.**

1a. Stamens 5

1b. Stamens more than 10


BORFI: Reserve forest (450 m). A roadside weed in the forest. Occasional.

Fl. & Fr.: May – August.


Much branched annuals. Stems angled. Leaves elliptic or obovate, hirsute. Flowers pink or purple, solitary, axillary. Capsule 2–2.5 cm long. Seeds muricate.

PACHMARHI: Town (1000 m). In waste places along the roads. Occasional.

Fl. & Fr.: June – September.

9. VIOLACEAE Batsch.

Ia. Petals unequal in size. Sepals not produced below their insertion

1b. Petals equal in size. Sepals produced below their insertion

HYBANTHUS L.


PACHMARHI: Around (1000 m). In open grassy meadows and in the crevices of rocks. Common.

*Fl. & Fr.:* July December.

2. **Viola L.**


Perennial herbs with woody rhizome. Leaves in a rosette, ovate triangular to lanceolate, oblong, base cuneate to hastate, apex acute or obtuse, crenate; petiole long, winged. Flowers lilac or blue. Sepals ovate lanceolate, acute or acuminate, short spurred, saccate. Stigma 3 lobed. Capsule ellipsoid. Seeds small.

PACHMARHI: Down fall (900 m), Saxena 8168. In damp shady valley. Rare.

*Fl. & Fr.:* March November.

10. **FLACOURTIACEAE DC.**

1a. Flowers bisexual. Fruit a capsule. Plants unarmed with pinnately veined leaves

1b. Flowers unisexual. Fruit a berry. Plants often armed, with subpalmately veined leaves

C. **CASEARIA Jacq.**

Shrubs or small trees, glabrous. Leaves elliptic, often narrower, little acuminate, rounded at the base; petiole short. Flowers green, numerous with disagreeable odour; pedicels joined, pubescent below the articulation. Calyx pubescent at the base. Capsule ellipsoid, shining, 3 valved.

**PACHMARHI** : Mahadev hill (1200 m). **BORI** : Reserve forest (450 m). Common.

*Fl. & Fr. : April August.*

Fruits used as fish poison.

### 2. Flacourtia Cordata ex L’ Herit.


Shrubs or small trees, usually armed; spines often branched at the base of the trunk. Leaves obovate-oblong, acute, acuminate or sometimes emarginate, crenate-serrate. Sepals 4, connate below. Anthers versatile. Berry fleshy, globose, red when ripe.

**PACHMARHI** : Dhupgarh (1200 m). Along the margin of the forest. Common.

*Fl. & Fr. : March September.*

### 11. COCHLOSPERMACEAE Planch.

**Cochlospermum Kunth**

Deciduous trees. Leaves alternate, long petioled, palmately 5 lobed, cordate at base, 7 veined; lobes acute. Flowers in terminal panicle, up to 8 cm across; petals golden yellow. Pedicels with grey pubescence. Anthers linear, falcate. Capsule up to 10 x 8 cm, obovoid, 5 valved. Seeds reniform, brown, woolly.

PACHMARHI: Karanjia (1000 m), Saxena 83510. On rocky slopes in sal forest. Rare.

Fl. & Fr.: January March.

Leafless at the time of flowering. Leaves appear in May.

12. POLYGALACEAE Juss.

POLYGALA L.

1a. Raceme much longer than leaves: ...  
P. elongata 2

1b. Raceme shorter than or slightly longer than the leaves:

2a. Petaloid sepals falcate. Caruncle with three appendages  
P. arvensis 1

2b. Petaloid sepals obovate, symmetrical. Caruncle without appendages ...  
P. persicariaefolia 3


PACHMARHI: Jatashankar, Jambudeep (1000 m). On hill slopes and among the grasses along road side. Common.

Fl. & Fr.: July November.


Fl. & Fr.: August November.


Erect, slender, annual herbs. Leaves sessile, linear lanceolate, shortly acute, hairy. Flowers in slender, terminal and axillary racemes, pink or rose. Petaloid sepal obovate, symmetrical. Seeds villous; caruncle minute.

PACHMARHI: Vicinity (1000 m). Growing among the grasses along roadsides. Occasional.

Fl. & Fr.: October November.

13. CARYOPHYLLACEAE Juss.

1a. Sepals united into a distinct calyx tube. Petals long-clawed, inserted together with the stamens on a short gynophore

Vaccaria 3

1b. Sepals free or connate at the base only. Petals sub-sessile, inserted together with the stamens on a disk:

2a. Sepals thin, scarious throughout. Style 3 - 5id ...

Polycarpaea 1

2b. Sepals keeled, scarious only on margins. Style 3 - toothed ...

Polycarpodon 2

1. POLYCARPAEA LAMK.

Tomentose, branching annual or perennial herbs. Leaves fascicled at nodes, up to 1.1 x 0.1 cm, linear, with a small mucro at tip. Stipules fimbriate. Cymes terminal and axillary. Sepals scarious, silvery. Petals entire or cros, completely enclosed in calyx.

BORI: Reserve forest (550 m). On moist hill slopes. Occasional.

Fl. & Fr.: August December.

2. POLYCARPON L.


Decumbent or prostrate, annual biennial herbs. Stem subpubescent or clothed with simple and branched hairs. Leaves opposite; lower ones crowded to simulate whors of 4, obovate oblanceolate to spatulate. Flowers greenish white in dense, repeatedly forked cymes. Stamens 5. Capsule ovoid. Seeds reticulate.


Fl. & Fr.: April June.

3. VICCARIA Medik.


 Erect, glabrous, annual herbs. Stems corymbose branched in the upper part. Leaves sessile, upper ones much smaller passing into bracts. Flowers pink or red in axillary and terminal corymbose cymes. Stamens
10; alternate filaments shorter. Style 2, bearded above the middle.
Capsule ovoid globose, concealed within the calyx. Seeds blackish, somewhat angicled.

PACHMARHI: Vicinity (900 m), Feb., 78, Punt 27228 (RSA).
Along roadside. Rare.

Fl. & Fr.: February March.

14. DIPTEROCARPACEAE Bl.

SHOREA Roxb., ex Gaertn.

1972. "Sul".

Semideciduous trees with longitudinally fissured, reddish brown or
grey barks. Leaves 10—30 × 5—18 cm, ovate oblong, coriaceous, shining
when mature. Flower in lax, axillary or terminal panicles, yellowish,
small. Fruits 10—15 mm long, ovoid, reddish to pale yellowish green,
indehiscent, one-seeded with five, some what unequal, 5—7 cm long,
wing-like persistent sepals. Seeds ovoid, with fleshy, unequal coryleasors.

PACHMARHI: Mahadeo hill (1200 m). On gravelly soil derived
from sand stone. Common.

Fl. & Fr.: November June.

Available only around Pachmarhi range but completely absent in
Bori forest range.

15. MALVACEAE Juss.

1a. Style simple .... Theopasia 5
1b. Style branched :

2a. Trees. Flowers polymamous, stamens pentadephous,
each phalline with united anthers. .... Xyelia 3
2b. Shrubs or Herbs. Flowers bisexual. Stamens usually monadelphous. Anthers always free:

3a. Antheriferous filaments apical on column:

4a. Ovules 2 - many per locule. Coeci 2 - many seeded

Abutilon 1

4b. Ovule 1 per locule. Coeci 1 seeded

Sida 4

3b. Antheriferous filaments lateral on column:

5a. Styles twice the number of carpels

Urena 6

5b. Styles as many as carpels

Hibiscus 2

1. Abutilon Mill.


Perennial herbs, leaves rounded cordate, long acuminate, dentate, pubescent. Flowers in terminal racemes. Staminial tube with a ring of hairs at apex; filaments free throughout. Mericarps hispidly hairy with erect awns.

Pachmarhi: Bee fall (1300 m). On hill slopes. Occasional.

Fl. & Fr. November - June.

2. Hibiscus L.

1a. Epicalyx absent or minute

H. lobatus 1

1b. Epicalyx present and conspicuous:

2a. Stem prickly

H. sabdariffa 3

2b. Stem hairy:

3a. Involucral bracts connate at base

H. panduriformis 2

3b. Involucral bracts free

H. vitifolius 4

Erect annual herbs, 30-40 cm tall. Leaves dimorphic; lower ones orbicular-ovate, 1-5 cm in diam; upper ones often palmately 3 lobed. Flowers white, solitary or in racemes, 1-1.5 cm across. Pedicels articulate. Capsule ovoid, shortly beaked.


*Pl. & Fr.: September November.*


Erect herbs. Stem and branches covered with rigid spreading hairs. Leaves ovate cordate, 5-9 x 3-7 cm. Petiole shorter than the blade. Flowers axillary, solitary, yellow with purple centre, 4-5 cm across. Capsules ovoid, densely bristly.

BORI: Reserve forest (500 m), 23 12 62. *Panigarhi* 6367 (BSA). Under shade of forest trees. Rare.

*Pl. & Fr.: October February.*


PACHMARHI: Vicinity (1000 m). In waste places. Occasional.

*Pl. & Fr.: April November.*

Escape from cultivation, calyx edible.


*Pl. & Fr.: April November.*

Small trees. Leaves up to 15 x 15 cm, ovate orbicular, 7 ribbed, stellately pubescent above, glaucous below, distantly crenate or with angular lobes. Flowers in axillary or terminal panicles, with dense corymbose clusters. Epicalyx persistent with 4-5 spathulate oblong segments. Calyx lobes broadly triangular, acute. Petals obovate, emarginate, subulate along margin, clawed and hairy below, white.

PACHMARHI: Rorighat (1000 m). In sal forest on gravelly soil. Common.

Fl. & Fr.: September-January.

4. SIDA L.

1a. Coccil arista:

2a. Arista retrorsely ciliate ... S. cordifolia 3

2b. Arista not retrorsely ciliate ... S. spinosa 5

1b. Coccis acute:

3a. Pedicels jointed below middle ... S. rhombifolia 4

3b. Pedicels jointed above middle:

4a. Pedicels longer than leaves ... S. cordata 2

4b. Pedicels shorter than leaves ... S. acuta 1


Erect, woody, glabrous herbs. Leaves up to 5 x 1 cm, ovate to linear, subcordate at base, serrate, cuneate. Stipules of the pair dissimilar. Pedicels as long as the petiole or longer. Coccis 7, glabrous.

Fl. & Fr.: September January


Erect or trailing herbs; branches covered with hairs. Leaves orbicular, cordate at base, crenate serrate, sparsely hairy. Pedicel jointed near the tip. Coccii 5, mucronate.

PACHMARHI: Jambudheep (1000 m). BORI. Reserve Forest (550 m). On rocky shaded places in forests and along waysides. Common.

Fl. & Fr.: April December.


Tomentose herbs. Leaves 1.5 x 4 cm, ovate, acute, cordate at base, crenate serrate. Pedicel jointed above middle. Coccii 12, aristate; arista retrorsely ciliate.

PACHMARHI: Mahadev Hill (1250 m). Along the paths in the forest. Common.

Fl. & Fr.: July October.


Woody annual herbs. Leaves alternate, 2.5 x 2 cm, variable, obovate, rhomboid, occasionally lanceolate. Pedicel jointed below the middle. Coccii 8, acute.

PACHMARHI: Vicinity (1000 m). In the sal forest and along road side. Common.

Fl. & Fr.: April November.

Diffuse herbs, branches often with spiny tubercles below the leaves. Leaves lanceolate, acute, nearly truncate at base, serrate. Pedicel jointed above middle. Coccii 5, aristate, not hairy.

BORI: Reserve forest (550m). Along the pathways and waste places. Abundant.

Fl. & Fr.: July December

5. Thespesia Soland. ex Correa


Shrubs covered with stellate hairs. Leaves ovate, acute, cordate at base, 3-5 ribbed. Flowers solitary. Corolla bright yellow with purple base.

PACHMARHI: Vicinity (1000m). BORI: Reserve forest (450 m). Churna (430 m). In forest and waste lands. Abundant.

Fl. & Fr.: October December.

6. Urena L.

1a. Mericarps smooth, unarmed ... U. repanda 2
1b. Mericarps armed with hooked bristles ... U. lobata 1


Erect annual herbs or undershrubs, pubescent to tomentose. Leaves up to 5 x 6 cm, distantly sinuate, not lobed, acute at apex, truncate at base. Epicalyx cupular in fruit. Corolla pink. Capsule densely clothed with hooked bristles and stellate hairs.

Fl. & Fr.: July December.


Stellate pubescent undershrubs. Leaves rounded cordate, 5-7-palmatifolied, repand serrate. Flowers in clusters, pink with a dark centre. Epicalyx bracteoles as long as the calyx. Seeds smooth.

BORI: Reserve forest (500 m). In open spaces near the forest. Common.

Fl. & Fr.: July December.

16. BOMBACACEAE, Kurth

BOMBAX L.


Spreading trees. Leaves palmately compound. Petiole 12-16 cm, pulvinate; leaflets 8-16 x 3-7 cm, elliptic, acute, narrowly below, entire; petiolule, 5-7 cm. Flowers 5-7 cm, dark red. Calyx woolly within. Petals oblong, acute, hairy externally. Capsule velvety.

PACHMARHI: Dhupgarch (1200 m). On the edge of the forest. Abundant.

Fl. & Fr.: February June.

17. STERCULIACEAE Vent.

1a. Herbs

1b. Shrubs or trees:

2a. Petals present

... Helicteres 2
2b. Petals absent:
   3a. Follicles membranous, inflorescence covered with orange - red tomentum... *Firmiana* 1
   3b. Follicles woody, inflorescence not covered with orange - red tomentum... *Sterculia* 3

1. **Firmiana Marsili**


   Medium deciduous trees. Leaves alternate, palmately 3 lobed, pilose. Flowers unisexual, regular in bright red panicles. Calyx up to 2 cm long with 5 triangular acute lobes, with red tomentum outside; bearded inside at base or stellately hairy. Stamens with sessile anthers borne at the tip of an elongate black gynandrophere. Carpels 5, free; each 2 locular, with 2 ovules per locule. Fruit of 5, free, follicles.

   **PACHMARHI**: Dhupgarh (1300 m). Near the top of the hill. Occasional.

   *Fl. & Fr.* : January March.

2. **Helicteres L.**


   Stellately tomentose arborescent shrubs. Leaves alternate, up to 11 x 8 cm, oblong-obovate, shallowly cordate and unequal, acute-acuminate, crenate-serrate. 3-5 ribbed. Flowers up to 5 cm long. Calyx with brown tomentum. Petals reflexing, glandular on the inside. Stamens 10 on the gynandrophere. Carpels 3, each many ovuled; styles 5. Fruit of spirally twisted follicles.
PACHMARHI: Dhupgarh (1280m). DORI: Dhaain (462 m). In the forest along the way side. Common.

Fl. & Fr.: October. February

3. Sterculia L.

(a) Leaves 3 - 5 lobed. Panicles erect.
   Foliaces bristly
   ... S. urens 1

(b) Leaves 5 - 7 lobed. Panicles pendulous.
   Foliaces not bristly
   ... S. villosa 2


   Large trees. Bark peeling. Leaves 20 - 25 cm, orbicular, digitately 3 - 5 lobed, glaucous below. Calyx hairy. Foliaces 4 - 6, ovoid oblong, up to 2.5 cm diam., coriaceous, red, covered with stinging hairs. Seeds 3 - 6, oblong, black.

PACHMARHI: Apsara Bihar (1000 m). In the forest. Occasional.

Fl. & Fr.: October. March.


   Moderate sized, spreading trees. Bark grey, somewhat warty. Leaves 30 - 45 cm, orbicular, digitately 5 - 7 lobed. Foliaces 2 - 5, spreading, oblong, 3.5 - 7.5 cm long, scarlet, coriaceous. Seeds oblong, black, shining.

PACHMARHI: Vicinity (1000 m). On the hill slopes in the forest. Occasional.

Fl. & Fr.: November. April.

4. Waltheria L.

Erect or procumbent, pubescent herbs. Leaves 5 x 3 cm, crenate serrate, ovate, cordate at base, tip rounded. Calyx tube long. Petals spatulate, long clawed. Capsule 1 seeded, enclosed in the hairy calyx.

PACHMARHI: Mahadev hill (1300 m). As weed in forests. Common.

Fl. & Fr. July - December.

The species is claimed to be an indicator of the presence of copper, lead or zinc in the soil.

18. TILIACEAE Juss.

1a. Fruits echinate or bristly ... Triumfetta 3
1b. Fruits not echinate, nor bristly:
   2a. Petals glandular at base. Fruit capsular, elongate ... Corchorus 1
   2b. Petals glandular at base. Fruit drupaceous, often 2-4 lobed. ... Grewia 2

1. CORCHORUS L.


Fl. & Fr.: September - February.
2. Grewia L.

1a. Leaves 4-5-ribbed:

2a. Peduncles nearly twice longer than petioles. Gland large:

3a. Leaves orbicular-ovate, stellate pubescent. Stipules linear, lanceolate

3b. Leaves ovate, sparsely pubescent. Stipules sub-elliptic or oblong, auricled

G. subinæqualis 5

G. tiliifolia 6

2b. Peduncles shorter or just longer than petiole. Gland small:

4a. Leaves obliquely cordate, obscurely 3-lobed. Stipules linear

4b. Leaves oblong-obtuse or lanceolate. Stipules linear-ligulate

G. elástica 1

G. rothii 4

1b. Leaves 3-ribbed:

5a. Peduncles as long as or shorter than pedicels. Buds cylindrical

5b. Peduncles longer than pedicels, buds ovoid

G. flavescens 2

G. helleriifolia 3


Deciduous trees. Bark greyish white. Leaves obliquely cordate, ovate or elliptic, acuminate, crenate-serrate. Flowers yellow in axillary cymes. Drupe globose, indistinctly lobed, black when ripe, edible.

PACHMARHI: Dhupgarh (1250 m). In the forests on hill slopes. Occasional.

Fl. & Fr.: February April.


Small trees or shrubs. Leaves 7 × 5 cm, oblong, acute, cordate below, serrate, glaucescent, stellate hairy beneath; harshly stellate hairy above. Peduncles shorter than petioles and pedicels. Sepals linear-lanceolate, densely stellate hairy outside. Petals yellow, spathulate. Drupes entire or slightly lobed, edible.
PACHMARHI: Vicinity (1000 m). In the sal forest. Occasional.

Fl. & Fr.: August - December.


Shrubs or small trees with spreading branches and small rounded crown. Young shoots densely hirsute. Leaves narrowly lanceolate or lanceolate, 3-7 × 0.5-1.2 cm, oblique-obtuse at the base, serrulate, acute. Stipules setose, deciduous. Flowers polygamous, small, white, becoming yellowish. Sepals linear-oblong, acute, densely hairy outside. Petals oblong, claw hairy outside. Ovary densely hairy. Drupe somewhat 4 lobed, subglobose, fleshy, sparsely stellate hairy, shining brown.

BORI: Reserve forest (550 m). Growing in the teak forest. Occasional.

Fl. & Fr.: July - December.


Shrubs. Leaves ovate oblong or lanceolate, acuminate, serrulate, base rounded. Flowers small. Sepals linear. Petals oblong, half the length of the sepals. Drupe very small, unlobed, edible.

PACHMARHI: Gahra Nala (900 m) BORI: Reserve forest (550 m). In teak bamboo mixed evergreen forest. Common.

Fl. & Fr.: August - December.


Small trees or large straggling shrubs. Leaves variable in shape, broadly cordate to ovate with oblique base, irregularly toothed. Flowers yellow in mostly 3 flowered cymes, 2 & together in axillary clusters. Sepals oblong, hairy outside. Petals oblong with a ring of hairs around the gland. Ovary globose, strigose; stigma 4 - lobed. Drupe: dark purple, edible.

PACHMARHI: Dhupgarh (1300 m). In sal forest. Occasional.

Fl. & Fr.: March - August.

Trees, up to 8 m. Leaves orbicular-ovate, acute, cordate and oblique at base, serrate, pubescent, glabrous with age. Cymes clustered, usually 3 flowered. Buds globose. Sepals lanceolate, acute, hairy outside. Petals yellow. Drupes globose, glabrous with age, turning black, edible.

**BORTI**: Reserve forest (556 m). In the mixed forest. Occasional.

**Fl. & Fr.**: March - August.

3. **Triumphetta** J.

1a. Fruits ovoid:

2a. Flowers 1 cm or more across. Capsules less than 1 cm across

2b. Flowers 0.6 cm or less. Capsules less than 1 cm across:

3a. Capsules covered with hairs and hooked spines. Inflorescence terminal or axillary:

4a. Inflorescence of terminal racemes. Bristles of fruits puberulous

T. rataulisia 5

4b. Inflorescence of axillary clusters. Bristles of fruits glabrous

T. thiocnaria 4

3b. Capsules covered with only hooked spines. Inflorescence of amphiophyllous cymes

T. annua 1

1b. Fruits oblong

T. pentandra 2


Annual herbs. Stems glabrous except a line of crispy hairs. Leaves membranous, ovate or ovate-lanceolate, 5 - 7 x 2 - 5 cm, acuminate - acute, coarsely serrate. Stipules subulate, lustrate. Cymes 3 - flowered. Flowers orange. Sepals lanceate, cuculate and awned at the apex. Petals spatulate, obtuse. Stamens twice as many as petals. Carpels 4; ovary globose, 4 loculed, hairy; stigma 4; lobed. Capsule globose.

**PACHMARHI**: Vicinity (1000 m). In waste lands along waysides. Common.

**Fl. & Fr.**: August - September.


**Pachmarhi**: Down Fall (950 m). **Bori**: Reserve forest (550 m). Roadside waste places. Abundant.

*Fl. & Fr.*: July December.


**Pachmarhi**: Dhupgarh (1200 m). **Bori**: Reserve forest (500 m). In waste lands and along roadsides. Common.

*Fl. & Fr.*: July December.


Much branched, tall herb or undershrub. Leaves generally rhomboid ovate, variable, 3-9 x 2.5-7 cm, hairy or glabroscent, acute at apex, cuneate cordate at base, irregularly serrate. Cymes axillary. Flowers golden yellow. Buds obovate, constricted in the middle. Petals obovate, obovate. Stamens 15, rarely fewer. Carpels 2-3, syncarpous, ovary subglobose, 2-3 loculed; stigma 2-3 lobed. Capsules ovoid, indehiscent, tomentose.

**Pachmarhi**: Vicinity (1000 m). Along the edges of forests and along road sides. Common.
Fl. & Fr.: August November.


Woody shrubs or undershrubs. Leaves thick, very broadly obovate to orbicular, sparsely hairy, cuneate or obtuse at the base, irregularly and unequally serrated. Inflorescence of terminal racemes. Flowers yellow. Petals spatulate, emarginate at the apex. Stamens 10. 25. Capsule ovoid, subglobose.

BORI: Reserve forest (500 m). Along path ways in the forest among the grasses. Abundant.

Fl. & Fr.: July December.

19. LINACEAE S. F. Gray

1a. Small herbs. Leaves faintly 3-nerved. Styles 5
1b. Undershrubs. Leaves penninerved. Styles 3

... Linum l

... Reinwardtia l

1. LINUM L.


Erect, slender herbs, branched at the top appearing corymbose. Leaves sessile, linear, acute, faintly 3-nerved. Flowers usually solitary. Sepals oblong or narrowly ovate, sulcate. Petals obovate, obtuse, 4-6 mm long, yellow. Capsule globose, glabrous. Seeds 10, compressed, ovoid.

PACHMARHI: Jambudeep (1000 m). BORI: Bori Pachmarhi Road (900 m). In open flat forest clearings. Occasional.

Fl. & Fr.: September December.
2. Reinwardtia Dumort.

"Basanthi"

Capsule globose, glabrous; seeds reniform.

PACHMARHI: Kanjighat (900 m). In forests. Occasional.

Fl. & Fr.: September - November.

20. GERANIACEAE Juss.

Geranium L.


PACHMARHI: Mahadev hill (1200 m), 27°12'62'. Panigrahi 6607 (RSA). On the hill slopes in humid condition. Rare.

Fl. & Fr.: October - December.

21. OXALIDACEAE R. Br.

1a. Leaves pinnately many-foliolate

1b. Leaves palmately 3-foliolate

... Biophyllum 1

... Oxalis 2
1. **Biophytum DC.**

1a. Sepals exceeding the capsule. Pedicels shorter than flowers:

2a. Leaflets in 10 - 14 pairs. Seeds with transverse tubercled ridges

... *B. sensitivum* 3

2b. Leaflets in 5 - 7 pairs. Seeds with simple tubercles

... *B. petersianum* 1

1b. Sepals not exceeding the capsule

Pedicels as long as or longer than flowers

... *B. reinwardtii* 2


Annual erect herbs. Leaves with 5 - 7 pairs of leaflets. Petiole puberulous. Pedicels very short or 0. Sepals exceeding the pedicels. Seeds simply tubercled.

**PACHMARHI**: Bexfall (1000 m), Saxena 1060 (SRFI). In sheltered places on wayside. Rare.

**Fl. & Fr.**: July - November.


Erect, hairy, annual herbs, 4 - 12 cm tall. Leaves even pinnate, rachis 5 - 6 cm long; leaflets 3 - 10 pairs, subsessile. Flowers pseudo umbellate, clustered on 2 - 5 cm long peduncles. Sepals lanceolate, acute. Petals yellow, spathulate, obtuse. Stamens 10. Styles 5. Capsule globose. Seeds with spiral warts.

**PACHMARHI**: Down fall (900 m). **BORI**: Reserve forest (550 m). In shaded locations of ravines and river banks. Common.

**Fl. & Fr.**: August - December.


PACHMARHI : Vicinity (1000 m). BORI : Reserve forest (500 m). On rocky soil in shady places and along waysides. Common.

Fl. & Fr. : May October.

2. OXALLIS L.

1a. Plants caulescent with creeping stems. Flowers yellow. Leaves obovate

... O. corniculata 1

1b. Plants caulescent with an underground, bulbous rootstock. Flowers purplish. Leaves not obovate:

2a. Pedicels and calyces glabrous. Leaves oblong-obovate

... O. richardiana 3

2b. Pedicels and calyces hairy. Leaves obovate

... O. corymbosa 2


PACHMARHI : Mahadev hill (1200m). Along waysides and forest edges. Common.

Fl. & Fr. : January December.


Perennial, caulescent herbs with bulbous rootstock. Leaves erect; petioles 8-30 cm long with dilated base, leaflets cuneate at base, deeply notched with rounded lobes. Flowers 2 many in subumbellate.
corymbs. Peduncles 5 25 cm long; pedicels 3 4 cm long. Sepals with two orange dots at apices. Petals with dark purplish streaks. Ovary glabrous; styles pubescent.

**PACHMARHI**: Vicinity (1067 m). On the margins of cultivated fields. Common.

*Fl. & Fr.*: December May.


**PACHMARHI**: Jata Shankar (1050 m). At the margins of cultivated fields. Common.

*Fl. & Fr.*: July November.

22. **BALSAMINACEAE DC.**

**Impatiens L.**

1a. Leaves all alternate

1b. Leaves opposite and or whorled:

2a. Lip short - spurred (1/3 of lip or less)

2b. Lip long - spurred (more than 1/3 of lip)


Annual herbs. Leaves 4 10 × 1.2–1.5 cm, alternate, elliptic, acute at both ends; petioles glandular. Flowers pink, in axillary 1 3-flowered fascicles. Lateral sepals ovate; lip saccate, with a short spur. Standard broad, rounded, aristate; wing unequally 2 lobed. Capsule tomentose. Seeds smooth.
PACHMARHI: Vicinity (1000 m). BORI: Boripachmarchi Road (900 m). In shaded locations along roadsides and waste lands. Common.

Fl. & Fr.: July October.


Slender annual herbs. Leaves opposite, 1 \( 5 \times 0.5 \) 1.5 cm. ovate lanceolate, glaucous beneath. Flowers pink in axillary fascicles of 2–3. Sepals subulate; lip saccate, shortly spurred or spur obscure. Standard ovate, mucronate; wing obtuse, entire with ovate, acuminate basal lobes.

PACHMARHI: Dhupgarh (1200m). Among grasses and rock crevices on hill slopes. Occasional.

Fl. & Fr.: August September.


Slender annuals. Leaves 2-5 \( 5 \times 0.7-2 \) cm. ovate oblong, sometimes linear; petiole glandular. Flowers usually solitary, pink, purple or white. Sepals subulate; lip carinate, saccate, long spurred. Standard ovate, dorsally winged; wing stipitate, obovate, rounded. Capsule glabrous.

PACHMARHI: Mahadev hill (1250 m). Growing gregariously on forest floors. Common.

Fl. & Fr.: July October.

23. RUTACEAE Juss.

1a. Plants armed. Leaves 1-foliate

1b. Plants unarmed. Leaves pinnate:

2a. Leaves even-pinnate. Fruit a capsule

2b. Leaves odd-pinnate. Fruit a berry
1. Chloroxylon DC.


    Tetra. Leaves paripinnate ; leaflets 12 – 15 pairs, oblong lanceolate, abruse with oblique base, up to 3 x 1 cm long, membranous. Peduncles 6 - 10 cm long with short branches. Flowers white. Capsule ovoid or oblong, 3 x 1.5 cm long.

    PACHMARHI : Vicinity (1000 m). In the forest. Common.

    F1. & Fr. : March - July.

2. Citrus L.


    Shrub or small tree. Leaflets 5 – 12 cm long, ellipticovate or ovate lanceolate ; petiole naked or winged. Flowers 5 - 10 in racemes. Stamens 20 – 60. Ovary many celled. Berry large, oblong or globose, rind leathery.

    PACHMARHI : Tridhara (1000m), Feb. 78, Pant 27171 (BSA). At the edge of the forest. Rare.

    F1. & Fr. : January – December.

    New record for the area.

3. Murraya L.

   1a. Petals 5 mm long. Leaflets 10 – 20. Tree
   1b. Petals 12 mm long. Leaflets 3 – 8. Bush

   ...  M. koeenigii 1
   ...  M. paniculata 2

Small trees, strong smelling. Leaves up to 30 cm long; leaflets 10-20, usually oblique ovate, obtuse acuminate, tip notched, crenulate. Flowers white, in many flowered corymbs. Sepals acute. Petals linear oblong, obtuse. Ovary 2-celled, style cylindric; stigma capititate, grooved. Fruit ovoid or subglobose, black.

**BORI**: Churna (413m), 26-4-61. Joseph 12422 (BSA). In the forest. Rare.

**Fl. & Fr.**: March-June.


**PACHMARHI**: Vicinity (1000 m) **BORI**: Reserve forest (500 m). On slopes. Common.

**Fl. & Fr.**: May-August.

### 24. BURSERACEAE: Kunth

1a. Bark peeling off in thin flakes. Fruit a 3-lobed drupe. Hypothalamus absent...  

   **Boswelha** 1

1b. Bark not peeling off. Fruit entire. Hypothalamus present...  

   **Gurjara** 2

1. **Boswellia** Roxb. ex Colebr.


PACHMARHI: Kanjighat (900 m). In mixed deciduous forest. Occasional.

*Fl. & Fr.*: January March.

2. **Garuga Roxb.**


PACHMARHI: Mahadev hill (1200 m). In the forest. Occasional.

*Fl. & Fr.*: February.

25. **MELIAEAE** Juss.

1a. Stamens connate in a tube;

2a. Seeds not winged

2b. Seeds winged

1a. **Melia** L.


PACHMARHI: Vicinity (1000 m). Along roadside and in compounds and gardens. Abundant.

Fl. & Fr.: May - December.

2. SOYMIDA A. Juss.


Tall deciduous tree. Leaves 20 cm long, paripinnate; leaflets 3 - 6, elliptic or oblong, obtuse, entire, base oblique. Flowers greenish white in large terminal panicles. Capsule black, woody. Seeds winged.

PACHMARHI: Kanjighat (900 m). In sal forest. Occasional.

Fl. & Fr.: March - December.

3. TOONA M. Roem.


PACHMARHI: Vicinity (1000 m). Planted in avenues.

Fl. & Fr.: March - August.
26. CELASTRACEAE R. Br.

1a. Leaves opposite, Disc flat. Seeds not arillate  ...  Cassine 1
1b. Leaves alternate, Disc cupular, Seeds arillate  ...  Celastrus 2

1. Cassine L.


Trees. Leaves 5-10 x 5 cm, crenate serrate, orbicular-elliptic, acuminate with acumen often folded. Inflorescence branched. Flowers greenish-white. Ovary 2 locular. Drupe obovoid. Seed one.

PACHMARHI: Dhupgarh (1250 m). In mixed deciduous forest. Common.

Fl. & Fr.: February January.

2. Celastrus L.


PACHMARHI: Vicinity (1000 m). In the forests. Common.

Fl. & Fr.: April July.
27. RHAMNACEAE Juss.

1a. Fruit inferior, enclosed in the persistent calyx-tube ... \textit{Helinus} 1

1b. Fruit superior or partly enclosed in the calyx-tube:

2a. Fruit 1-seeded. Styles enlarged into wing ... \textit{Ventilago} 3

2b. Fruit 1-4-seeded. Styles not enlarged into wing:

3a. Leaves pinnately veined ... \textit{Ziziphus} 4

3b. Leaves pinnately veined ... \textit{Rhamnus} 2

1. \textit{Helinus} E. Mey. ex Endl.


PACHMARHI: Dhupgarh (1200 m). In shady moist places in the forest. Common.

\textit{Fl. & Fr.}: November April.

2. \textit{Rhamnus} L.

1a. Pubescent. Young parts not drying black ... \textit{R. triqueter} 1

1b. Glabrous. Young parts drying black ... \textit{K. wightii} 2


Unarmed shrubs with pubescent young branches. Leaves elliptic-obovate to oblong-lanceolate, acute or subacuminate, finely serrate, 7—14 × 2.5—6 cm. Flowers shortly pedicelled, fascicled on leafless branches, puberulous. Petals broadly obovate, emarginate. Fruit obovoid, 3 lobed.
PACHMARHI : Fraser nala (900 m); Dhupgarh (1200 m). In moist situations near streams. Occasional.

**Fl. & Fr. : November March.**


Large unarmed, glabrous shrubs with young parts drying black. Leaves 6–12 × 2.5–5 cm, elliptic or narrowly elliptic, shortly acuminate, closely serrate, subcoriaceous. Pedicels much shorter than the petiole. Petals 5, cuneate-ovate, with a short apiculus. Styles 3–4, diverging.

**PACHMARHI : Dhupgarh (1200 m), In shady places in the forest. Occasional.**

**Fl. & Fr. : November March.**


Large climbing shrubs. Leaves pubescent, ovate or ovate elliptic, crenate serrate, 8–15 × 1.5–6 cm. Flowers in densely pubescent paniculate spikes. Calyx densely pubescent outside and hairy inside. Styles long, diverging. Nut subglobose, gritty about the middle by the rim of the adnate calyx; wings linear, 6 cm long, terminated by the remains of the bifid style.

**BORI : Reserve forest (350 m), Churna (414 m). Near roadside streams and in the forest. Common.**

**Fl. & Fr. : October March.**

4. *Ziziphus Mill.*

1a. Petals absent ...

1b. Petals present:

2a. Styles 2. Fruit less than 1 cm across. Leaves ovate, acute, hairy beneath ...

2b. Styles 3. Fruit more than 1 cm across. Leaves orbicular, rounded, glabrous.

Ferruginous straggling or climbing shrubs. Leaves 6 × 3 cm, ovate, subcordate, slightly oblique at base, hairy beneath. Petals obtangular, white. Ovary 2 locular; styles 2, united to above the middle. Drupes less than 1 cm across.

PACHMARHI: Kanjighat (900 m). In mixed forest on drier habitat. Common.

Fl. & Fr.: September January.


Straggling, evergreen, large shrubs, often climbing, pubescent. Leaves broadly elliptic, subcordate at base, pubescent beneath, up to 8 × 5 cm. Calyx lobes ovate. Petals absent. Ovary globose, villous, 2 locular. Drupe fleshy, oblong, up to 1.5 × 1 cm., white.

BORI: Reserve forest (550 m). On rocky slopes in the open forests. Common.

Fl. & Fr.: January April.


Shrubs or small trees. Leaves rounded, slightly oblique, 5–7 × 3–4 cm. Calyx lobes obconic, acute. Petals white. Ovary glabrous, 3 locular. Drupes globose, hard, up to 1.5 × 1.5 cm.

PACHMARHI: Vicinity (1000 m). In the mixed sal forest and open fields. Common.

Fl. & Fr.: April October.

28. VITACEAE Juss.

1a. Inflorescence tendril -bearing ... Ampelocissus l

1b. Inflorescence not tendril - bearing ;
1. *Ampeleoissus* Planch.

1a. Plant covered with woolly tomentum ... *A. tomentosa* 2
1b. Plant not covered with woolly tomentum ... *A. latifolia* 1


Weak climbers, usually glabrous. Leaves 15-20 cm across, rounded cordate, 3-7 lobed, glossy. Flowers reddish brown. Berry black.

**PACHMARHI**: Vicinity (1000 m). In mixed forest. Occasional.

*Fl. & Fr.*: August - November


Climbers covered with woolly tomentum. Leaves orbicular, cordate, often 3-5-lobed, serrate, drying brown below. Flowers red. Berry black, round.

**PACHMARHI**: Mahadev hill (1200 m). In forests and sheltered places. Occasional.

*Fl. & Fr.*: August - November

2. *Cayratia* Juss.


**BOKE** : Reserve forest (500 m). In the forest and shady places. Common.

**Fl. & Fr.** : July November

3. Cissus L.


Woody climbing shrubs. Leaves wide, cordate, crenate, sublobate, often repand, hairy beneath, up to 10 × 7.5 - 15 cm. Fruits tipped with the persistent style. Seeds pyriform.

**PACHMARNHI** : Vicinity (1000 m). In the mixed forest, Occasional.

**Fl. & Fr.** : October December

The stem contains large quantity of potable water.

29 I. FEOGR (DC.) Dum.

*Leaba* Royen ex L.

1a. Leaves with distinct, fewer primary nerves; bipinnate or upper ones simple pinnate... *L. bracteata* 1

1b. Leaves with close, numerous primary nerves, unipinnate... *L. crispa* 2

Large straggling shrubs. Leaves 2 pinnate or the upper simple pinnate; leaflets large, ovate lanceolate, shortly caudate; primary nerves distant. Flowers green. Berries brownish yellow when ripe.

**PACHMARHI**: Vicinity (1000 m). In the mixed forest. Occasional.

*Fl.* & *Fr.*: September - November


Rigid shrubs. Leaves 1 pinnate, 5-7 foliolate; leaflets oblong, acute, acuminate, truncate-cordate. Flowers greenish white. Berries globose, 3 mm.

**PACHMARHI**: Dhupgath (1200 m). In the mixed forest. Occasional.

*Fl.* & *Fr.*: July - September

30. **SAPINDACEAE** Juss.

1a. Leaves simple. Fruit winged  

1b. Leaves compound. Fruit apiculate  

*... Dodonaea 1*  
*... Schleicheria 2*

1. **Dodonaea** Mill.

Flora of Pachmarhi

Shrubs or small trees. Leaves simple, elliptic-oblong or obovate, shining, sub coriaceous, up to 8 x 1.8 cm. Inflorescence shorter than the leaves. Capsule 2-3 winged.

PACHMARHI: Mahadev hill (1250 m). In mixed forest. Abundant.

Fl. & Fr.: November January and June August.

2. Schleichera Willd.


Trees. Leaves bright red when young; even pinnate; leaflets in 3 pairs, oblong-lanceolate, truncate at base, coriaceous, shining above, up to 16 x 7 cm. Flowers greenish white. Fruits up to 15 x 1 cm, apiculate, rough.

PACHMARHI: Apsara Bihar (1000 m). In the mixed forest. Common

Fl. & Fr.: February May.

31. Anacardiaceae Lindl.

1a. Leaves compound:

2a. Leaflets 3, coarsely serrate. Plants armed ... Rhus 4

2b. Leaflets 5 or more, entire. Plants unarmed ... Lannea 2

1b. Leaves simple:

3a. Styles 3 or more:

4a. Flowers unisexual. Stamens as many as petals. Styles 3 ... Semecarpus 5
4b. Flowers bisexual. Stamens twice as many as petals. Styles 5 - 6  ...  Buchanania 1

3b. Style 1.  ...  Mangifera 3

1. Buchanania Spreng.


PACHMARHI : Mahadev hill (1200 m). In sal forest. Common.

Fl. & Fr.: December - April.

2. Lannea A. Rich.


Deciduous trees. Leaflets usually 7, ovate, rounded truncate, 6 - 9 × 4 - 5 cm, drying reddish beneath. Inflorescence stellate - hairy, Sepals rounded. Petals yellow, rounded. Drupe fleshy.

PACHMARHI : Vicinity (1000 m). In sal forests. Common.

Fl. & Fr.: February - May.
3. *Mangifera L.*


**PACHMARHI:** Vicinity (950 m). In mixed forests on the hill slopes. Occasional.

*Fl. & fr.: January - July.*

4. *Rhus L.*


**PACHMARHI:** Vicinity (1000 m). **BORI:** Reserve forest (900 m). In mixed forest. Common.

*Fl. & fr.: May - July.*

5. *Semecarpus L. f.*


PACHMARHI: Apseara Bihar (1000 m), Gabra Nala (900 m). In sal forest. Occasional.

Fl. & Fr. : June  September.

32. PAPILIONACEAE Giseke

1a. Trees:

2a. Leaves 3 - foliulate :

3a. Leaves present at the time of flowering. Pods thin, strap - shaped, indesiccant ... Dalbergia 8

3b. Leaves more or less absent at the time of flowering. Pods not as above :

4a. Fruit joined ... Ougeinia 19

4b. Fruit not joined :

5a. Keel petal much shorter than the vexillum. Flowers red ... Erythrina 10

5b. Keel petal longer than or equal to the vexillum. Flowers red, tinged with orange ... Butea 4

2b. Leaves with more than 3 leaflets :

6a. Leaves paripinnate ... Sesbania 24

6b. Leaves imparipinnate :

7a. Leaflets 18 - 35. Fruit moniliform ... Calpurnia 5

7b. Leaflets 5 - 9. Fruit not moniliform :

8a. Fruit nearly circular, flat ... Pterocarpus 22

8b. Fruit ovoid - oblong, beaked ... Pongamia 20

1b. Shrubs, herbs or climbers :

9a. Plants climbing or prostrate :
10a. Woody climbers:

11a. Leaflets 3:

12a. Anthers dimorphic

12b. Anthers uniform:

13a. Corolla exerted, standard spurred

13b. Corolla not exerted, standard not spurred

11b. Leaflets more than 3:

14a. Bracts reniform

14b. Bracts not as above

10b. Herbs, prostrate or climbing:

15a. Hairs medifixed. Stamens apiculate

15b. Hairs basifixed. Stamens not apiculate:

16a. Stamens 9, monadelphous. Seeds with black spot at hilum

16b. Stamens and seeds not as above:

17a. Leaflets glabular punctate or with scattered resinous dots:

18a. Leaves 2 - foliolate

18b. Leaves 3 - foliolate

17b. Leaflets not glabular punctate and not with resinous dots:

19a. Fruit segments terete or subterete

19b. Fruit segments flat or nearly so

20a. Leaves pinnate, rachis ending in a tendril or bristle:

21a. Leaflets serrate.
   Style glabrous

21b. Leaflets serrate.
   Style usually hairy

20b. Leaves imparipinnate or trifoliate:

22a. Anthers dimorphic
22b. Anthers uniform:

23a. Style divided
into a thin
basal part
and a thick
upper part ... *Vigna* 30

23b. Style uni
formly thick,
not divided
into two dis-
tinct parts ... *Lablab* 14

9b. Plants crest (herbs or shrubs):

24a. Leaves compound:

25a. Leaves paripinnate or palmately 2-foliolate:

26a. Stamens didelphous (5) + (5).
Fruits jointed ... *Smithia* 25

26b. Stamens didelphous (9) + (1).
Fruits not jointed ... *Lens* 16

25b. Leaves imparipinnate or unifoliolate:

27a. Leaflets 1—9:

28a. Fruit jointed, segments flat or nearly
so, enclosed in calyx, not moniliform ... *Bacopa* 29

28b. Fruit not jointed or enclosed in
calyx, moniliform ... *Sphorina* 26

27b. Leaflets 9—21 ... *(Tephrosia* 27

24b. Leaves simple:

29a. Stamens monadelphous ... *Crotalaria* 7

29b. Stamens didelphous ... *Psoraliya* 21

1. *Abrus* Adans.

"Ghumchhi".

**PACHMARHI**: Vicinity (900 m). On hedges in clay loam under shade. Common.

*Fl. & Fr.*: September - January

2. **Alysicarpus Desv.**

1a. Calyx-segments not overlapping at base. Corolla exceeding the calyx. Calyx much shorter than the 2 lowermost joints of the pod:

2a. Pod compressed. Stem hirsute ... *A. hamosus* 2

2b. Pod turgid. Stem glabrous or with a single line of hairs ... *A. vaginella* 3

1b. Calyx-segments distinctly overlapping at base. Corolla hardly exceeding the calyx. Calyx much longer than the 2 lowermost joints of the pod. ... *A. glumaeus* 1


**BORI**: Reserve forest (500 m). In hedges on waste lands. Abundant.

*Fl. & Fr.*: July - December

Prostrate, much-branched, hirsute, annual herbs. Leaves suborbicular, obtuse, cordate. Flowers bluish or purplish in lax racemes. Pods falcate oblong, 4-7-jointed.

BORI: Dhain (430 m). Among grasses along waysides. Common.  
Fl. & Fr.: August November.


Prostrate, annual herbs. Stem glabrate. Leaves ovate-rounded to oblong; upper ones ovate-lanceolate with subcordate base and acute apex, hairy beneath. Flowers in lax racemes, red in colour. Pods 5-8-jointed, turgid.

Fl. & Fl.: August December.

3. Atylosia Wt. & Arn.


Climbing or trailing perennial herbs with rusty pubescence. Leaves trifoliate; leaflets elliptic, elliptic obovate, velvety pubescent, gland-dotted. Racemes with 2-6 flowers clustered on short axillary peduncles. Corolla yellow, crimson externally. Pods 3-6 seeded, densely grey pubescent and glandular.

Fl. & Fr.: August December.


1a. Tree. Lower calyx-teeth deltoid  ...  B. monosperma 1
1b. Climber. Lower calyx-teeth lanceolate  ...  B. superba 2

Tomentose, deciduous trees. Leaves pinnately 3 foliolate, long petiolated; leaflets rhomboid, retuse, rounded at base. Racemes 8-12 cm long. Flowers showy, flame-colored. Stamens 9+1. Pods stalked, rounded at base, 1 seeded.

**PACHMARHI**: Apsara Fall (900 m); **BOKI**: Reserve forest (500 m). In sal forests and mixed teak forests. Common.

*Fl. & Fr.* : January - May.


Strong woody climbers. Leaves pinnately 3-foliolate, long petiolated; leaflets rhomboid, retuse, rounded at base. Racemes up to 30 cm. Flowers showy, flame-colored. Stamens 9+1. Pods stalked, rounded at base, 1 seeded.

**PACHMARHI**: Vicinity (1000 m). In mixed forests. Occasional.

*Fl. & Fr.* : January - May.

5. *Calpurnia E. Mey.*


Small trees. Leaves imparipinnate; leaflets 13-21, membranous, oblong, obtuse, glabrous. Flowers yellow; petals equal in length. Stamens free. Pods pliable, 7-10 cm long, glabrous, 5-6 seeded.

**PACHMARHI**: Vicinity (1000 m). In waste lands. Occasional.

*Fl. & Fr.* : August - October.
6. *Cicer L.*


**BORI**: Reserve forest (500 m). Escape from cultivated fields.

**Fl. & Fr.**: November - January.

7. *Crotalaria L.*

1a. Leaves digitately 3-foliate

1b. Leaves simple:

2a. Inflorescence a terminal umbel or capitate, often with axillary flowers below:

3a. Plant much branched. Inflorescence a terminal umbel

3b. Plant unbranched. Inflorescence capitate

2b. Inflorescence a raceme or flowers solitary:

4a. Stipule absent:

5a. Pods as long as the calyx

5b. Pods longer than the calyx:

6a. Pods hairy. Leaves elliptic-lanceolate, sparsely pubescent beneath

6b. Pods glabrous. Leaves oblanceolate, densely pubescent beneath

4b. Stipule present:

7a. Bracts linear, subulate, 6 mm or less long

7b. Bracts ovate, 10 mm or more long

Much branched herbs with silky pubescence. Leaves obovate, obtuse or emarginate, cuneate, glabrous above. Raceme terminal. Corolla equal to the calyx, glabrous. Pods glabrous, 2-5 seeded.

PACHMARHI: Dhuqgarh (1250 m). On sandstone on the edges of forest. Common.

*Fl. & Fr.: September*  December.


Erect herbs; branches white-hairy. Leaves oblong-linear to oblanceolate. Flowers in terminal racemes, yellow. Pod quadrato, as long as the calyx. Seeds often 4.

PACHMARHI: Mahadev hill (1200 m). BORI: Churna (430 m). On wayside and waste places in the forest. Common.

*Fl. & Fr.: July*  November.


PACHMARHI: Vicinity (1000 m). Saxena s.n. (*SRF*). In forest under growth. Rare.

*Fl. & Fr.: September*  December.


Robust undershrubs with furrowed, hairy branches. Leaves obovate, cuneate, up to 20 x 3 cm, chartaceous. Flowers in racemes. Corolla w; glabrous. Pods up to 4 x 1.2 cm, many-seeded.

Fl. & Fr.: January, December.

New record for the area.


PACHMARHI: Apsara Falls (900 m). On sandy or black moist soil near streams. Abundant.

Fl. & Fr.: October, December.


BORI: Dhain (462 m). On black moist soil in the forest. Common.

Fl. & Fr.: October, December.


BORI: Dhain (462 m). In moist situations in the forest. Common.

Fl. & Fr.: October - February.


Erect, dark brown villous herbs. Leaves oblong, obtuse, membranous, sparsely hairy above, densely below. Inflorescence 8-12 flowered umbel. Upper two calyx lobes nearly connate. Corolla equal to calyx, glabrous. Pods equaling the calyx, globose, glabrous, few-seeded.

PACHMARHI: Vicinity (1000 m), *Saxena s.n.* (SFRI). In forest undergrowth. Rare.

Fl. & Fr.: September - November.

8. *Dalbergia* L. f.

1a. Stamens 9, monadelphous

1b. Stamens 10, isodiadelphous (5 + 5):

2a. Standard longer than broad

2b. Standard as long as broad:

3a. Trees. Flowers in loose panicles

3b. Woody climber. Flowers in dense panicles

... *D. sissa* 3

... *D. paniculata* 2

... *D. lanceolata* 1

... *D. volubilis* 4


Large trees with smooth bark and glabrous branches. Leaflets 11-17, ovate, obovate or elliptic, glabrous, glaucous. Inflorescence large, terminal or axillary panicles having unilaterally arranged flowers. Calyx silky pubescent, upper teeth obtuse, lower three acute and longer. Corolla dull white or pinkish, standard as long as broad. Stamens 10 in groups of 5. Pods narrowed at both ends, glabrous, usually 1-seeded, stipitate.
PACHMARHI: Dhupgarh (1200 m). On the edge of the forest. Abundant.  
Fl. & Fr.: May July.


Deciduous trees. Leaflets 13 - 15, oblong or obovate. Corolla brown; petals clawed except the standard. Stamens 5 + 5. Pods 7 × 1 cm. glabrous.

PACHMARHI: Vicinity (1000 m). In the mixed forest. Occasional. Fl. & Fr.: April - September.


PACHMARHI: Vicinity (1000 m). In mixed forests and on roadsides. Common. Fl. & Fr.: March - May.


PACHMARHI: Dhupgarh (1250 m). In mixed forest near moist situations. Common. Fl. & Fr.: December March.

1a. Leaves 1 foliolate:

2a. Annual herb. Racemes lax ... D. rotundifolium 5

2b. Perennial undershrub. Racemes dense D. velutinum 6

1b. Leaves pinnately 3-foliolate:

3a. Lateral leaflets much smaller than terminal one ... D. dermatioides 4

3b. Leaflets subequal:

4a. Stipules foliaceous, subamplexicaul. Pods indented on both sutures ... D. dichotomum 1

4b. Stipules linear, scariosus. Pods straight on one suture:

5a. Terminal leaflet more than 3 cm broad. Joints of pod indehiscent ... D. laxiflorum 3

5b. Terminal leaflet less than 2 cm broad. Joints of pod dehiscent ... D. heterocarpum 3


Much-branched, 30-70 cm tall herbs; stems deeply furrowed, hairy. Leaves 3-foliolate; leaflets elliptic, broadly ovate. Flowers in racemes, pink. Pods 3-6-jointed; joints clothed with hooked hairs.


Fl. & Fr.: September - January.


Subscandent herbs or undershrubs. Leaf rachis 2-3 cm; terminal leaflet less than 2 cm broad, elliptic-ovate to obovate, cuneate, pubescent
beneath; side leaflets smaller. Raceme 4. 10 cm long; flowers 1 - 2 per bract. Corolla blue. Pod linear, pubescent on both the sutures, 6 - 8 jointed.

**BORI**: Reserve forest (550 m), Dhain (460 m). Amidst grass on slopes. Abundant.

*Fl. & Fr.*: September January.


Pubescent undershrubs with quadrangular branches. Leaf rachis 7 cm long; terminal leaflet 3 cm or more broad. Racemes long, with 2 - 5 flowers per bract. Standard white, other petals blue. Pod linear, sutures straight, 6 - 10 - jointed, joints indehiscent with hooked hairs.

**BORI**: Reserve forest (550 m), Dhain (462 m). In forest undergrowth. Common.

*Fl. & Fr.*: September November.


Erect undershrubs. Leaf rachis 2 cm long; lateral leaflets much smaller than the terminal one. Inflorescence in terminal and axillary racemes. Bracts large, concealing the bud. Calyx teeth shorter than the tube. Petals pink. Pods 3 - 4 cm long, slightly falcate, dehiscing along the ventral suture.

**PACHMARHI**: Mahadev hill (1250 cm). In forest undergrowth. Common.

*Fl. & Fr.*: August - October.


Prostrate annual herbs, 10 - 30 cm long, covered with white pubescence, often tinged with red. Leaves orbicular. Racemes lax. Flowers pink. Pods compressed, slightly curved, 3 - 5 - jointed, glabrescent.
PACHMARHI: Vicinity (1000 m). In forest undergrowth and roadside. Common.

Fl. & Fr.: August October.


Erect or scandent undershrubs, all parts clothed with fulvous hairs. Leaves 1-foliolate, broadly ovate. Racemes dense. Flowers pink. Pods densely clothed with hooked hairs, 4-6-jointed.

BORI: Reserve forests (500 m). At the edges of teak forests in shade near streams. Common.

Fl. & Fr.: October January.

10. ERYTHRINA L.

1a. Calyx spathaceous, not at all 2-lipped, split halfway down
   on one side
   ... E. stricta 1

1b. Calyx campanulate, more or less distinctly 2-lipped, not split
   ... E. suberacea 2

1. Erythrina stricta Roxb. Fl. Ind. 3: 251. 1832; Baker in Hook. f.
   1976.

Deciduous trees armed with prickles. Leaf trifoliolate; leaflets roundish. Calyx split halfway down on one side. Corolla red. Pods sub-turgid, 2-3 seeded.

PACHMARHI: Vicinity (1000 m). In mixed forest. Occasional.

Fl. & Fr.: January May.

Erect trees; branches armed with prickles. Leaves sometimes armed, trifoliolate; terminal leaflet rhomboid-ovate, the laterals obliquely deltoid, glabrous above, densely pubescent below. Racemes 1 – 4, near the branch tip. Flowers in fascicles of 1 – 3. Calyx pubescent, becoming bilabiate. Corolla scarlet. Pods stipitate, 1.2 – 1.5 cm long, 2 – 3-seeded.

**PACHMARHI**: Vicinity (1000 m). In mixed forest. Occasional.

*Fl. & Fr.*: March – April.

1. **FLEMINGIA** Roxb. ex Ait.

1a. Leaves unfoliolate. Bracts enlarged, hiding the flowers:

2a. Plants erect. Leaf acute or acuminate

... *F. bracteata* 1

2b. Plants trailing. Leaf blunt, obtuse (rarely subacute).

... *F. fruticulosa* 2

1b. Leaves trifoliolate. Bracts not hiding the flowers:

3a. Inflorescence smaller than the petiole. Leaflets ovate-oblong

... *F. macrophylla* 3

3b. Inflorescence equal to or longer than the petiole.

Leaflets broadly lanceolate

... *F. semiplatata* 4


Erect undershrub; branches pubescent. Leaves unfoliolate, ovate or oblong lanceolate, acute or acuminate, glabrous above, pubescent on the nerves below. Inflorescence in axillary and terminal branched racemes. Flowers in clusters hidden by distichously arranged bracts. Bracts reniform, broader than long, hirsute. Calyx pubescent, teeth exceeding the tube. Pods 7 – 12 cm long, pubescent, 2 – seeded.
PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). In mixed forests. Common.

*Fl. & Fr.*: October December.


Trailing undershrubs; young branches tomentose. Leaf unifoliolate, elliptic, ovate or suborbicular, obtuse, rarely subacute, pubescent on the nerves and gland dotted on the under surface. Inflorescence a terminal raceme; flowers in clusters, hidden by distichously arranged bracts. Bracts reniform, folded, broader than long. Calyx teeth exceeding the tube. Pods small, pubescent.

PACHMARHI: Vicinity (1000 m). In the forest under shade. Common.

*Fl. & Fr.*: August October.


Erect shrubs. Young branches pubescent. Leaf trifoliolate; petiole 4-7 cm long; leaflets ovate oblong, acute to obtuse. Inflorescence in dense axillary racemes, shorter than petiole. Bracts small, not hiding the flowers. Calyx pubescent, dotted with black glands, teeth much longer than the tube. Pods finely brown pubescent, eglandular, 2 seeded.


*Fl. & Fr.*: October December

Erect shrubs. Young branches densely hairy. Leaf trifoliolate; leaflets broadly lanceolate, acuminate, lateral ones oblique. Inflorescence axillary or terminal racemes, often branched, equal to or longer than pedicel. Calyx densely hairy, teeth much longer than the tube. Pods pubescent, 2 seeded.

PACHMARHI: Vicinity (1600 m). In forest under shade. Common.

Fl. & Fr.: August September.

12. GALACTIA P. BR.


PACHMARHI-Latashankar (950 m), JambudEEP (1000 m) In sal forests. Occasional.

Fl. & Fr.: July - August.

13. INDIGOPERA L.

1a. Leaves 1 - foliolute. Pods 1 - seeded ... 1. limifolia 2

1b. Leaves 3 - many - foliolute. Pods 2 - many - seeded:

2a. Flowers in dense racemes. Pods 2 - seeded ... 1. limnaea 4
2b. Flowers in lax racemes. Pods more than 2-seeded:

3a. Pods densely hairy. Flowers 5 mm long. Plants annual herbs

      \[I. \textit{astragalin}a\] 1

3b. Pods glabrous. Flowers 1 cm long. Plants perennial undershrubs

      \[I. \textit{cassioide}\]s 2


Erect, much branched, annual herbs covered with brown hairs. Stems quadrangular. Leaflets 7-9, obovate-rounded to oblong, obtuse, retuse, terminal one larger. Flowers in dense racemes. Corolla twice as long as the calyx. Pods 4-6 seeded.

**BORI:** Reserve forest (500 m). Amongst the grasses in the forest. Common.

**Fl. & Fr.:** September - December.


**PACHMARHI:** Dhupgarh (1200 m), vicinity (1000 m).

**BORI:** Rohatgaon (500 m). In mixed forests on rocky hill slopes. Abundant.

**Fl. & Fr.:** July - December.


PACHMARHI : Vicinity (1000 m). BORI : Dhaín (430 m). In the forest under shades. Abundant.

*Fl. & Fr.* : July December.


Leaves obovate, obtuse, 6 10 x 2 3 mm, mucronate, glaucous. Flowers axillary, solitary.

BORI : Dhaín (430 m). On loamy soil under shade in ditches and dry river bed. Abundant.

*Fl. & Fr.* : July December.


PACHMARHI : Vicinity (1000 m). Along the pathways in the forest. Common.

*Fl. & Fr.* : July October.

14. **LABLAB ADAMS.**


Climbing perennial or annual (under cultivation) herbs. Leaves stipulate, pinnately trifoliolate. Inflorescence axillary. Calyx bilipped, upper entire, lower 3 - lobed. Corolla reddish - purple. Stamens 9 + 1. Pods up to 10 cm long, up to 4 cm broad, 2 - 5 seeded.

BORI Reserve forest (550 m). An escape from cultivation.

*Fl. & Fr.* : November - June.
15. **Lathyrus L.**


Glabrous annuals with winged stem. Leaves pinnatifid; leaflets narrowly lanceolate to linear; median and upper leaves with 3-5 sec. tendrils. Flowers axillary, solitary. Calyx teeth subequal. Corolla blue. Pods 3-5 seeded; upper suture broadly winged.

BORI: Reserve forest (500 m). Cultivated.

*Fl. & Fr.*: December March.

16. **Lens Mill.**


BORI: Reserve forest (500 m). Cultivated.

*Fl. & Fr.*: December March.

17. **Milletia Wt. & Arn.**


Woody climbers. Leaves pinnatifid; leaflets 7-9, ovate, oblong, shortly acuminate, silky on both sides. Flowers in racemes. Calyx densely hairy, teeth small. Corolla greenish yellow, pubescent. Pods up to 15 cm long, 3 cm broad, velvety when young, 6-8 seeded.
18. **Mucuna Adams.**


Large twiners, hairy in young stage. Leaves trifoliate. Leaflets ovate, lateral ones oblique, acute or acuminate, pubescent on both sides. Flowers in axillary, drooping racemes, dark-purple. Pods ‘S’ shaped, densely covered with irritant bristles.

**BORI**: Reserve forest (550 m). In clayey soil in the forest. Common.

*Fl. & Fr.*: October January.

19. **Ougeinia Benth.**


Deciduous trees with thin grey or light brown bark. Leaves pinnately trifoliate; leaflets broadly elliptic or obliquely ovate, acute. Inflorescence fascicled racemes at older nodes. Calyx pubescent, lobes shorter than the tube. Pods flat, jointed; joints reticulately veined.

**PACHMARHI**: Mahadev hill (1250 m). In mixed forest on hill slopes. Common.

*Fl. & Fr.*: February May.
20. **Pongamia Vent.**


Glabrous trees with spreading branches. Leaves imparipinnate; leaflets 5–9, elliptic, ovate oblong, acute-acuminate. Racemes shorter than the leaves. Calyx pubescent, obscurely toothed. Corolla white, tinged violet or pinkish. Pods obliquely oblong, woody, indehiscent, 1-seeded.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). In mixed forest and roadside. Common.

*Fl. & Fr.*: April May.

21. **Psoralea L.**


Erect, pubescent annual herbs. Leaves alternate, unifoliolate, cordate, rarely ovate, margin dentate, obtuse, subtruncate, mucronate, pubescent on both sides. Inflorescence a raceme of 3 flowers in the axil of each bract. Calyx bilabiate, upper lip formed of 4 teeth, lower 1. Petals all clawed. Pods ovoid, glabrous, black, 1-seeded.

**BORI**: Reserve forest (550 m). On black clayey soil in the forest. Abundant.

*Fl. & Fr.*: August December.

22. **Pterocarpus Jacq.**

Tall trees. Leaves imparipinnate; leaflets elliptic-ovate, cuneate-cuneate. Panicles terminal. Flowers with dark brown calyx and yellow corolla. Pods orbicular, winged all around, inflated, biconvex.

**PACHMARHI**: Vicinity (1800 m). **BORI**: Reserve forest (550 m). In mixed forest. Abundant.

*Fl. & Fr.*: July January.

### 23. **Pueraria DC.**


Perennial (winters; roots tuberous; young branches pubescent. Leaves pinnately trifoliate; terminal leaflet broadly ovate, equal sided, acuminate; the laterals ovate oblong, very oblique, acuminate, silky pubescent beneath. Flowers in axillary or terminal racemose or panicles. Calyx densely silky, teeth shorter than the tube, 2 upper teeth connate. Corolla blue. Pods constricted between the seeds, densely hairy, 3-6 seeded.

**PACHMARHI**: Mahadev hill (1250 m). In the mixed forest. Occasional.

*Fl. & Fr.*: March April.

### 24. **Sesbania Adams. Mut. Scop.**


BORI: Reserve forest (350 m). In moist situations among the grasses. Common.

Fl. & Fr.: October - December.

20. Smithia Ait.

1a. Calyx-lips not very densely parallel-veined with nerves branched near their ends. Flowers in terminal heads or panicles:

2a. Flowers in terminal globose heads. Bracteoles minute. Corolla half as long as the calyx. ... S. pyramantha 3

2b. Flowers in terminal panicles. Bracteoles half as long as the calyx. Corolla twice as long as the calyx. ... S. blanda 1

1b. Calyx-lips densely parallel-veined with unbranched free nerves. Flowers axillary. ... S. conferta 2


Perennial, suffrutescent, bristly herbs. Leaves paripinnate; leaflets 6 - 10, obtuse, bristle tipped. Racemes terminal, forming a panicle. Calyx densely bristled; lips equal, upper broad, truncate. Corolla twice the calyx. Lomenta 5 - 6 jointed.

BORI: Reserve forest (900 m). In the forest undergrowth. Common.

Fl. & Fr.: September - November.


Prostrate annual herbs. Leaf rachis up to 3 cm long; leaflets 4 - 6 pairs. Calyx rigid, lips entire, subequal. Flowers in leaf axils. Lomenta with turgid joints, round, papillose.

PACHMARHI: Jambudeep (900 m). BORI: Reserve forest (430 m). In moist situations along water courses. Abundant.

Erect, bristly annual herbs. Leaves paripinnate; rachis 1–1.2 cm long; leaflets 6–8, linear. Flowers in globose heads formed of congested racemes. Calyx with black glands, lips equal, truncate. Corolla half as long as calyx. Lomenta ± 6–jointed.

**PACHMARHI**: On way to Dhupgarh (1030 m), Saxena 1042 (SFRI). Along road sides. Rare.

*Fl. & Fr.*: September November.

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20. **Sophora L.**


Erect shrubs. Leaves imparipinnate; leaflets 19–29, obtuse, emarginate, a few hairs beneath. Racemes axillary, peduncled, shorter than the leaves. Flowers large, yellow, developing together with the leaves; pedicels twice the length of the calyx. Calyx oblique. Pods 7–10 cm long, glabrous, 5–6–jointed; joints with four distinct wings.

**PACHMARHI**: Dhupgarh (1200 m), vicinity (1000 m). **BORI**: Reserve forest (900 m). In the forest on hill slopes. Common.

*Fl. & Fr.*: June February.

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27. **Tephrosia Pers.**


**PACHMARHI**: Vicinity (1000 m). In the mixed forest. Occasional.

*Fl. & Fr.*: July December.

1a. Stem and pod clothed with a few short hairs. Calyx teeth as long as the tube ... T. labialis 1

1b. Stem and pod clothed with long hairs. Calyx teeth shorter than the tube ... T. mollis 2


Woody twiner clothed with short appressed white hairs. Leaves 3 - foliolate; leaflets elliptic. Flowers in axillary lax racemes, white when fresh turning to pale red on withering. Pods linear, flat, 3 - 12 seeded.

Bori: Reserve forest (450 m). Along roadside among the grasses. Occasional.

Fl. & Fr.: September November.


Climbing herbs. Leaves 3 foliulate; rachis 4 cm, clothed with long hairs; leaflets subequal, elliptic ovate, subacute, truncate at base, hairy on nerves above, appressed hairy beneath, membranous. Racemes up to 10 cm long. Corolla reddish. Pods linear, flat, clothed with long hairs, 3 - 12 seeded.


Fl. & Fr.: July December.

29. Uraria Desv.

1a. Upper leaves 3 - 9 - foliolate. Pods glabrous ... U. pecta 1

1b. All leaves 1 - 3 - foliolate. Pods hairy ... U. rufaseens 2


Erect perennial undershrubs; branches pubescent. Lower leaves 1 - 3 - foliolate, upper 5 - 9 foliolate; leaflets linear - lanceolate. Stipules
lanceolate. Corolla exerted, purple. Pods glabrous, 3 - 6 - jointed, folded on one another.

**BORI:** Dhain (436 m). In the open forest on hillocks among the grasses. Common.

**Fl. & Fr.** : September - November.


Prostrate perennial herbs, branches hairy. Leaves 1 - 3 foliolate; leaflets ovate - obovate, obtuse. Racemes lax, combined into a terminal panicle. Corolla bluish - violet. Pods 3 - 6 - jointed, glandular hairy.

**BORI:** Reserve forest (430 m). On river bank. Occasional.

**Fl. & Fr.** : September - December.

30. **Vigna Savi**

1a. Leaflets definitely lobed

1b. Leaflets entire or slightly lobed :

   2a. Stipules not produced below the point of attachment. Fruits covered with dark brown hairs

   2b. Stipules produced below the point of attachment. Fruits covered with black hairs or glabrous :

   3a. Fruits with black hairs :

   4a. Pods 4 - 5 cm long; rim aril round the hilum of the seed distinctly raised. Colour of the seeds dirty green

   4b. Pods 4 - 9 cm long; rim aril round the hilum of the seed less raised. Colour of the seeds light green :

   5a. Stem mostly erect. Leaflets usually entire. Fruits and seeds usually longer

   5b. Stem twining or prostrate. Leaflets frequently lobed. Fruits and seeds usually smaller

   *V. trilobata* 4

   *V. vexillata* 7

   *V. mango* 2

   *V. radiata* 3

   (a) var. *radiata* 3

   (b) var. *subintenta* 3
3b. Fruits glabrous, subglabrous or minutely hairy:

6a. Fruits 10 cm or more long

6b. Fruits less than 10 cm long

7a. Stipules 4 mm or less long. Flowers 5 - 6 mm long

7b. Stipules 5 mm or more long. Flowers 9 - 12 mm long


Twining or creeping herbs with glabrous stems. Leaves trifoliolate; lateral leaflets oblique, ovate or rhomboid ovate, sometimes lobed, pubescent. Stipules produced below the point of attachment. Inflorescence capitate racemes. Calyx glabrous; teeth shorter than the tube, the upper two mostly connate. Corolla yellow. Pods 3 - 5 cm long, beaked, glabrous, 8 - 10 - seeded.

**BORI**: Dhain (462 m). Along pathways amongst the grasses. Common.

**Fl. & Fr.**: September - October.


Climbing or erect, pubescent herbs, hairs brown, stiff, spreading. Stipules peltate produced below the point of attachment. Leaves trifoliolate; leaflets elliptic-ovate. Peduncles many-flowered. Corolla yellow. Pods covered with long hairs; the rim-aryl distinctly raised around the hilum of the seeds which are dirty green in colour.

**PACHMARHI**: Vicinity (1000 m). Roadside, as an escape. Common.

**Fl. & Fr.**: October - November.

Twining or suberect, hairy herbs. Stipules deltate, ovate, produced below the point of attachment. Leaves trifoliolate; leaflets elliptic-ovate. Peduncles many flowered. Corolla yellow; keel curled upwards. Pods 4-9 cm long, linear-cylindrical, 8-14 seeded.

(a) var. radiata

Stem mostly erect. Leaflets usually entire. Pods and seeds usually larger towards the upper limit of the range.

PACHMARHI: Vicinity (1000 m). Found as escape.

Fl. & Fr.: September - December.


Stem twining or prostrate. Leaflets frequently lobed. Pods and seeds usually smaller, towards the lower limit of the range.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (450 m). Found as escape in the forest and wastelands.

Fl. & Fr.: September - December.


Trailing or prostrate, annual or perennial herbs. Leaves trifoliolate; leaflets usually 3-lobed; the middle lobe bigger, oblong, broadly spatulate, obtuse; lateral lobes oblong, broadly spatulate, obtuse or subacute, Peduncle few-flowered. Calyx glabrous; teeth minute. Corolla yellow. Pods cylindrical, sparingly pubescent, 6-12-seeded.

PACHMARHI: Vicinity (1000 m). Along roadside moist places. Occasional.

Fl. & Fr.: October - December.


PACHMARHI: Vicinity (1000 m). Along roadsides in moist places. Occasional.

Fl. & Fr.: September November.


Twining or suberect, glabrous, annual herbs. Stems angular, often tuberculate. Leaf trifoliolate; leaflets ovate rhomboid to oblong, acuminate. Stipules ovate lanceolate. Flowers in 2–12 flowered axillary peduncles. Calyx segments lanceolate, acuminate. Stipules ovate lanceolate. Corolla white, greenish yellow or purple. Pods 2–6, 30 cm long, glabrous, 6–8 seeded.

PACHMARHI: vicinity (1000 m). Along the roadsides in moist situations as escape. Common.

Fl. & Fr.: September December.


Climbing or trailing, glabrescent, perennial herbs. Leaves trifoliolate; leaflets ovate to lanceolate, acute or acuminate. Inflorescence 2–12-flowered, axillary, sub-umbellate. Calyx pubescent, upper pair of teeth partially connate. Corolla yellow, pink or purple, glabrous. Pods 4–14 cm long, covered with stiff, dark brown hairs; 10–18 seeded.

PACHMARHI: Mahadev hill (1200 m). In sal forest along the edges. Common.

Fl. & Fr.: September October.


Prostrate or ascending, glabrous or pubescent annual herbs. Leaves bifoliolate; leaflets lanceolate with black glands. Racemes 3-12-flowered. Corolla yellow; standard cordate. Pods 1-6 jointed, indehiscent, echinate.

Pachmarhi: Mahadev hill (1250 m). Bori: Dhanin (450 m). In sandy soil. Common.

Fl. & Fr.: September October.

32. Caesalpiniaeae R. Br.

1a. Leaves bipinnate. Leaf rachis armed

1b. Leaves unipinnate or simple. Leaf rachis not armed:
   2a. Leaves simple, 2-jobed

2b. Leaves unipinnate:
   3b. Petals present. Anthers mostly basifixed. Pods more than 1-seeded

33. Bauhinia L.

1a. Fertile stamens 10:
   2a. Calyx spathaceous. Flowers in lax racemes. Pods not long-beaked
   2b. Calyx 5-cleft. Flowers in short corymb. Pods long-beaked
1b. Fertile stamens 3 – 5:

3a. Petals densely silky. Climbers with tendrils ... B. vahlii 3
3b. Petals glabrous. Erect trees ... B. variegata 4


PACHMARHI: Kanjiqhar (950 m). BOR: Reserves forest (550 m); Dhain (430 m). In the forest on hill slopes. Common.

Fl. & Fr.: October – May.


PACHMARHI: Vicinity (1000 m). BOR: Reserve forest (550 m). In mixed and sal forests. Common.

Fl. & Fr.: March – February.


Huge climbers, branches densely hairy, tendrils cirrate, opposite to leaves. Leaves alternate, long-petioled, lobed at apex, cordate at base, orbicular in shape, densely hairy beneath. Flowers in terminal subcorymbose racemes. Petals white, turning to buff. Fertile stamens 3. Pods woody, 20 – 30 cm long, rusty velvety.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1200 m). BOR: Reserve forest (550 m). In sal forest and mixed teak forest. Common.

Fl. & Fr.: April June.


PACHMARHI: Vicinity (1000 m). In mixed forests on slopes. Occasional.

Fl. & Fr.: February–April.

2 Caesalpinia L.


Scandent or scrambling shrub; branches and leaf rachises armed with recurved prickles. Stipules ovate, acute, deciduous. Leaflets 8–10 pairs, obtuse at both ends. Racemes simple. Pods falcate-oblong, smooth, brown, 6–8 seeded.

PACHMARHI: Vicinity (900 m). At the edges of forests and on roadsides. Occasional.

Fl. & Fr.: All seasons.

3 Cassia L.

3a. Sepals broad, obtuse:
   2a. Pods indehiscent ... C. fistula 1
   2b. Pods dehiscent:
      3a. Leaf petiole with one large gland at the base ... C. occidentalis 4
      3b. Leaf rachis with 1 or 2 glands:
4a. Leaf rachis with one gland between the lowest pair of leaflets. ... C. obtusifolia 3
4b. Leaf rachis with two glands, one between each of the lower pairs of leaflets ... C. tora 6

1b. Sepals narrow, acute:
5a. Gland of petiole stipitate ... C. pumila 5
5b. Gland of petiole sessile ... C. mimosoides 2


Medium sized trees. Leaves 20 - 40 cm long; leaflets 4 - 8 pairs, ovate or ovate-oblong. Flowers golden-yellow in long, large, drooping racemes. Pods cylindric, 30 - 50 cm long, many-seeded, indehiscent.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1200 m). BORI: Reserve forest (550 m). In mixed and sal forests. Common.

Fl. & Fr.: March July.


Variable annual-biennial, prostrate herbs. Leaves linear to linear-oblong; gland usually at or near top of petiole, sessile; leaflets sessile, 30 - 60 pairs, obliquely oblong or linear-oblong. Inflorescence 1 - 3-flowered, supra-axillary or axillary. Petals yellow. Pods linear appressed hairy.

PACHMARHI: Vicinity (1000 m). Dhupgarh (1100 m). In moist situations. Occasional.

Fl. & Fr.: September November.


Erect undershrubs. Leaves 3 - 8 cm long; rachis with one gland between the lowest pair of leaflets; leaflets 3 pairs, obovate-oblong. Flowers in axillary subsessile pairs, yellow. Pods tetragonal, beaked, many seeded.

BORI: Reserve forest (550 m). In forest undergrowth. Common.

Fl. & Fr.: August October.

Erect undershrubs. Leaves 10 - 20 cm long; petiole with one large gland at the base; leaflets 3 - 5 pairs, oblong-lanceolate, long acuminate. Racemes 1 - 2 flowered, axillary. Petals yellow, clawed. Pods flat, 20 - 30 seeded.

**Pachmarhi :** Vicinity (1000 m). **Bori :** Reserve forest (550 m); Dhain (430 m). In forest undergrowth and in open waste lands. Common.

*Fl. & Fr.* : July - December.


Prostrate woody annuals, 15 - 20 cm long. Leaves 1 - 3 cm long, gland on petiole stipitate, leaflets 9 - 15 pairs. Flowers extraaxillary, solitary, yellow. Pods flat, 6 - 12-seeded.

**Pachmarhi :** Vicinity (1000 m). In forests and waste places amongst grasses. Common.

*Fl. & Fr.* : August - December.


Undershrubs 30 - 60 cm tall. Leaves 4 - 12 cm long; rachis with one gland each between the two lower pairs of leaflets; leaflets 3 pairs, orbicular to obovate. Flowers in subsessile axillary pairs, yellow. Pods sub-tetragonal, 20 - 30-seeded.

**Bori :** Reserve forest (550 m). Along roadsides and under tree shades. Abundant.

*Fl. & Fr.* : August - December.

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4. **Hardwickia Roxb.**

Large deciduous trees. Leaves alternate, bifoliolate; leaflets sessile, obliquely ovate, obtuse, coriaceous, glabrous. Flowers in long, slender racemes in terminal panicles. Calyx with distinct sepals, ovate or orbicular, petaloid, yellowish-green. Petals absent. Stamens 10; anthers versatile. Pods strap-shaped, narrowed at both ends, 1 seeded.

**PACHMARHI**: Vicinity (1000 m). In mixed forest. Occasional.

*Fl. & Fr.*: October - April.

34. **MIMOSACEAE R. Br.**

1a. Anthers gland-tipped. Inflorescence bicoloured ... *Dichrostachys* 1

1b. Anthers not gland-tipped. Inflorescence unicoloured:

2a. Filaments free. Plants armed:

3a. Stamens definite ... *Mimosa* 2

3b. Stamens indefinite ... *Acacia* 1

2b. Filaments more or less connate at the base. Plants unarmed ...

*Acacia* 2

1. **Acacia** Mill.

1a. Stem with prickles but without any stipular spines:

2a. Leaflets more than 2 mm broad, truncate at base. Petiolar gland conical ... *A. torta* 4

2b. Leaflets less than 2 mm broad, semitruncate at base. Petiolar gland not conical ... *A. pennata* 3

1b. Stem with stipular spines, but without prickles:

3a. Flowers in elongate, cylindrical spikes. ... *A. catechu* 1

3b. Flowers in heads ... *A. leucophloea* 2

Deciduous small trees. Leaves bipinnate; stipules spiny; pinnae 10-30 pairs; leaflets 16-50 pairs, linear, base oblique, tip obtuse. Flowers in axillary, elongate, cylindrical spikes. Pods flat, dehiscent, 3-10-seeded.

**PACHMARHI**: Vicinity (1000 m). In mixed forests. Occasional.

**Fl. & Fr.**: May-August.


Deciduous trees, hispid; stipular spines slightly hooked. Leaves bipinnate; pinnae 6-10 pairs; leaflets 20-25 pairs. Flowers in heads. Corolla yellowish-white, twice as long as calyx. Pods slightly turgescent, tomentose, 10-12-seeded.

**PACHMARHI**: Vicinity (1000 m). In mixed forests. Abundant.

**Fl. & Fr.**: July-February.


**BORI**: Reserve forest (550 m). In the forest, climbing on trees. Abundant.

**Fl. & Fr.**: June-December.


Shrubs or small trees, prickly. Leaf rachis with glands between upper pinnate; pinnae 8-12 pairs; leaflets 25-30 pairs, truncate at base; petiolular gland conical. Corolla white, twice as long as calyx. Pods glabrescent, 5-7-seeded.

**PACHMARHI**: Vicinity (1000 m). On hill slopes amongst grasses. Common.

**Fl. & Fr.**: March-February.
2. **Albizia Durazz**.

1a. Leaflets more than 13 mm broad, at least towards the end of the pinnae. Calyx teeth distinct:

2a. Flowers pedicellate. Pods pale straw-coloured ... *A. lebbeck* 1

2b. Flowers sessile, Pods brown ... *A. procera* 3

1b. Leaflets less than 13 mm broad. Calyx teeth obsolete ... *A. odoratissima* 2


Large trees with young parts hairy. Leaves bipinnate with a large gland near the base of the petiole and one below the uppermost pinnae; pinnae usually 2 pairs; leaflets 3-4 pairs, obliquely oblong, with eccentric midrib. Heads of few-fascicled; flowers sessile. Corolla white, twice as long as calyx. Pods thin, pale straw-coloured. Seeds 6-12, compressed.

**PACHMARHI**: Vicinity (1600 m). In mixed forests. Occasional.

*Fl. & Fr.*: April - November.


Almost evergreen trees with brown hairy young parts. Leaves alternate, pubescent; rachis with a large black gland near the base and another between the uppermost pair of pinnae; pinnae 4 pairs; leaflets 12-18 pairs, obliquely oblong with midrib near the margin. Flowers sessile in solitary heads or in panicles. Corolla covered with grey hairs outside. Pods reddish brown, 8-12 seeded.

**PACHMARHI**: Dhupgarh (1250 m); Mahadev hill (1200 m). **BORI**: Dhain (413 m). In mixed forest. Common.

*Fl. & Fr.*: July - January.

Large deciduous trees. Leaves bipinnate; rachis with a large gland near the base of the petiole; pinnae 2-6 pairs; a gland present between the uppermost pair of leaflets; leaflets 4-16 pairs, obliquely oblong, ovate. Heads fascicled or in axillary or terminal panicles. Pods linear, 8-12 seeded.

PACHMARHI: Vicinity (1000 m). In mixed forest. Occasional.

Fl. & Fr.: June - January

3. Dichrostachys Wt. & Arn.


PACHMARHI: Vicinity (1000 m). In mixed forest. Occasional.

Fl. & Fr.: May - December

4. Mimosa L.


Large straggling deciduous shrubs; branches ribbed, densely hairy, prickly. Leaves bipinnate; rachis 10-20 cm long, prickly; pinnae 5-12 pairs; leaflets 6-15 pairs. Heads in terminal panicles. Flowers pink, fading to white. Corolla 4-lobed. Stamens 8, exerted. Pods 6-10 cm long, strap-shaped, glabrous, with 4-10, one-seeded joints.
BORI. Reserve forest (550 m) ; Dhin (430 m). At the edge of Teak bamboo forest and way sides. Common.

Fl. & Fr. : June - September.

35. ROSACEAE Juss.

1a. Plants unarmed :
   2a. Leaves simple. Trees .................................. Prunus 2
   2b. Leaves compound. Herbs ................................ Potentilla 1
1b. Plants armed .............................................. Rubus 3

1. POTENTILLA L.


Prostrate annual herbs. Basal and lower leaves larger, with more leaflets; upper cauline leaves nearly sessile, smaller with fewer leaflets; leaflets 3 - 9, sub sessile, obovate, cuneate, serrate dentate, hairy. Calyx divided halfway down. Petals obtuse. Achenes ovoid, smooth.

BORI: Kobra nullah (430 m), February, 78, Pnt.-27244 (RSA). On rocky substratum. Rare.

Fl. & Fr. : February - May.

New record for the area.

2. PRUNUS L.

Medium sized, deciduous trees. Leaves simple, oblong lanceolate, serrate; stipules subulate, fimbriate. Flowers rose-coloured, sessile on previous year's wood. Calyx campanulate. Drupe with succulent pericarp; the stone deep, irregularly furrowed; cotyledons large, plano-convex.

PACHMARHI: Vicinity (1000 m); Mahadev hill (1250 m). Cultivated on hill slopes.

Fl. & Fr: May - December.

3. RUBUS L.


Straggling shrubs with stiff red bristles and short prickles. Leaves usually pinnately trifoliate, except the young shoots; stipules linear; leaflets serrate, obovate, pubescent beneath. Flowers in corymbose panicles. Sepals lanceolate, acuminate, tomentose. Petals white, longer than sepals. Druplets globose, orange.

PACHMARHI: Kua Khad (900 m), Saxena 1003 (SHRI). Along the valley, Rare.

Fl. & Fr: December - January.

36. DROSERAEEAE Salisb

DROSERA L.

1a. All leaves in basal rosette

1b. Some leaves cauline

Acaulescent herbs with a basal rosette of obovate or orbicular, stipulate leaves. Scapes terminal, circinate, few to many - flowered. Flowers white. Calyx 5 lobed; lobes elliptic, acute. Petals 5, obovate.

PACHMARHI: Vicinity (1000 m); Jambudeep (950 m). In moist soil and on rocks along streams. Occasional.

Fl. & Fr.: August March.


PACHMARHI: Jambudeep (950 m). Among rocks along streams. Occasional.

Fl. & Fr.: August October.

37. COMBRETACEAE R. Br.

1a. Inflorescence capitulate. Fruit 2-winged ... Anogeissus 1
1b. Inflorescence spicate. Fruit not winged or 3 or 5-winged ... Terminatis 2

1. Anogeissus (DC.) Guillem. & Perr.

1a. Leaves ovate or ovate-lanceolate. Peak as long as or longer than fruit ... A. latifolia 1
1b. Leaves obovate. Peak shorter than fruit ... A. pendula 2

Deciduous trees. Leaves ovate or ovate lanceolate, obtuse acute, rounded cordate, glabrous. Heads solitary or in short cymes. Calyx yellow or pinkish yellow; lobes reflexed. Fruit beak long.

**BORI**: Reserve forest (550 m). In mixed forest. Abundant.

**Fl. & Fr.**: August January.


Small trees with pendulous branches. Leaves alternate and sub-opposite, obovate, obtuse or mucronate, pubescent. Flower heads small. Calyx tube short, lobes short, pubescent. Fruits with beaks shorter than the fruits.

**PACHMARHI**: Vicinity (1000 m). In sal forest, sometimes in pure patches. Abundant.

**Fl. & Fl.**: August - January.

2. **Terminalia** L.

1a. Leaves clustered at ends of branchlets, eglandular. Upper flowers often staminate ... *T. bellirica* 2

1b. Leaves not clustered, glandular. Flowers bisexual ;

2a. Fruits almost entire. Spike usually simple ... *T. chebula* 3

2b. Fruit distinctly winged. Spike branched ... *T. alata* 1


Trees with ash-white bark; branchlets silky pubescent. Leaves opposite or subopposite, elliptic - lanceolate, acute, truncate cordate, coriaceous; glands at the base of midrib. Spikes branched. Fruits elliptic, woody, dark - brown, glabrous, 5 winged.
PACHMARHI : Vicinity (1000 m). In sai forest. Abundant.

Fl. & Fr. : May January.


Large trees. Leaves alternate, clustered towards the ends of branchlets, eglandular; blade broadly obovate, cuneate. Spikes clustered towards apex of branchlets, simple. Flowers yellowish white. Fruits ovoid, slightly 5 ridged, brown pubescent.

PACHMARHI : Vicinity (1000 m). In sal forest. Common.

Fl. & Fr. : February August.


Large trees with young parts tomentose. Leaves alternate or subopposite, glands at the apex of petiole, sessile; blade elliptic-oblong, rounded at both ends. Spikes short, usually simple. Flowers yellowish white. Fruit ovoid-oblong, almost entire, glabrous, yellow when ripe.

PACHMARHI : Vicinity (1000 m); Dhupgarh (1200 m). In Sal forest. Abundant.

Fl. & Fr. : January September.

38. MYRTACEAE Juss.

SYZYGIUM Gaertn.

Large trees; bark ash-white; branches terete, glabrous. Leaves opposite, oblong-lanceolate. Flowers white in cymes arising from old leaf-scars. Fruit subglobose, ovate, dark purple, smooth, juicy when ripe, crowned with truncate calyx limbs. Seed 1, globose or cylindric, large.

PACHMARHI: Jambudeep (900 m); Dhupgarh (1200 m). BORI: Dhaein (413 m). In mixed forest and planted. Common.

Fl. & Fr.: April - July.

39. LECYTHIDACEAE Poit.

Careya Roxb.


PACHMARHI: Dhupgarh (1200 m). In mixed forest and roadside. Abundant.

Fl. & Fr.: February - September.

40. MELASTOMATACEAE Juss.

1a. Stem and branches scaly. Stamens unequal

... Melastoma

1b. Stem and branches hairy, hispid or glabrous. Stamens all equal:
FLORA OF PACHMARHI

2a. Flowers 4-5-merous. Anther connective produced, horned or tubercled below. Inflorescence lanceolate ... Osbeckia 2
2b. Flowers 3-merous. Anther connective not produced. Inflorescence scorpioid ... Sonerila 3

1. MELASTOMA L.


Shrubs. Leaves elliptic lanceolate, acute at both ends, 3-nerved, scaly. Calyx lobes deciduous. Petals large, showy, broadly obovate, purplish. Larger stamens purple, smaller ones yellow.

PACHMARHI: Vicinity (1000 m). Along streams and nullas under shade. Abundant.

Fl. & Fr.: All seasons.

2. OSBECKIA L.


PACHMARHI: Apsara Bihar (950 m). In shady places. Occasional.

Fl. & Fr.: August October.

3. SONERILA ROXB.

Slender annual herbs, hairy. Leaves ovate or ovate elliptic, nearly entire, 3 nerved from the base. Flowers a few in terminal racemes. Calyx tubular, hairy, teeth 3. Petals 3 white or pink, ovate elliptic, apiculate. Capsule oblong, 3 gonous, hairy.

PACHMARHI: Apsara Bihar (900 m), Saxena 1096 (SFDI). In shady places. Rare.

Fl. & Fr.: September – November.

41. LYTTHRACEAE Jaum St. Hil.

1a. Trees. Stamens many

... Lagerstroemia 2

1b. Herbs or undershrubs. Stamens 1 - 12 :

2a. Undershrubs. Stamens 12

... Woodfordia 4

2b. Herbs. Stamens 1 - 6 :

3a. Capsule septicidally dehiscent, wall densely and finely cross - striate

... Rutala 3

3b. Capsule indehiscent or bursting irregularly, wall not finely cross - striate

... Ammania 1

1. Ammania L.


var. baccifera

BORI: Reserve forest (500 m). In wet places along streams. Abundant.

*Fl. & Fr.*: October - December.


Tall, erect herbs. Leaves often cordate at base, those on the main stem more than double the size than those on the branches. Flowers larger than the type variety.

PACHMARHI: Vicinity (1000 m). In moist places and along river sides. Abundant.

*Fl. & Fr.*: April - December.

2. **Lagerstroemia** L.

1a. Calyx tube smooth outside. Petals less than 1 cm long, white ... *L. parviflora* 1

1b. Calyx tube ribbed outside. Petals 2.5 cm or more long, purple ... *L. spectosa* 2


Deciduous trees; bark white, smooth. Leaves elliptic-oblong. Flowers white, fragrant, in axillary and terminal many or few-flowered panicles. Capsule ellipsoid. Seeds winged, wings much longer than the seeds.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). In sal forest and mixed deciduous forest. Common.

*Fl. & Fr.*: April - December.


**PACHMARHI** : Mahadev hill (1200 m). In mixed forest. Abundant. *Fl. & Fr.* : April - June.

3. **Rotala L.**

1a. Flowers in terminal spikes:

2a. Capsule 4-valved. Leaves suborbicular ...  *R. rotundifolia* 3

2b. Capsule 2-valved. Leaves ovate or elliptic ...  *R. serpyllifolia* 4

1b. Flowers axillary:

3a. Petals 5. Calyx lobes 5 ...  *R. densiflora* 1

3b. Petals 0. Calyx lobes 4 ...  *R. mexicana* 2


**PACHMARHI** : Vicinity (1000 m). In wet places along the streams. Abundant. *Fl. & Fr.* : November - March.


PACHMARH : Dhupgarh (1200 m), Saxena 1012 (sprt). In moist places near streams. Rare.

*Fl. & Fr.* : September - January.


PACHMARH : Vicinity (1000 m). In moist places along streams. Abundant.

*Fl. & Fr.* : September - January.


*Fl. & Fr.* : November - February.

4. WOODFORDIA Salish.

*Woodfordia fruticosa* (L.) Kurz in Journ. As. Soc. Beng. 40(2) : 56.

Straggling shrubs with spreading branches. Leaves opposite or subopposite, sometimes in whorls of three, sessile, ovate lanceolate. Flowers red in axillary cymes, often from the axis of leaf scars. Capsule ellipsoid, irregularly dehiscent. Seeds numerous, obovoid, brown, smooth.

BOR1 : Reserve forest (550 m). In mixed forest. Abundant.

*Fl. & Fr.* : December - April.

42. **ONAGRACEAE** Juss.

1a. Stamens twice as many as calyx lobes. Seeds either uniseriate or pluriseriate throughout the length of each locule. ... *Fissendecarpa* 1

1b. Stamens as many as calyx lobes. Seeds uniseriate at the proximal portion and pluriseriate at the distal portion of each locule. ... *Ludwigia* 2

1. **FISSENDECARPA** (Haines) Bennet


Herbs with young parts puberulous. Leaves alternate, elliptic, acute, base narrowed. Flowers sessile, axillary, solitary or passing into terminal spike. Sepals lanceolate. Petals 4, yellow, broadly elliptic or elliptic-ovate. Stamens 8, epipetalous, one shorter. Capsule reddish or pinkish.

PACHMARHI: Vicinity (1050 m). Along water courses. Occasional.

*Fl. & Fr.* : November - June.
2. **Ludwigia** L.

1a. Bracteoles large, mostly persistent, placed near the middle of ovary. ... *L. octovalvis* 1

1b. Bracteoles very small, deciduous early, near base of ovary ... *L. perennis* 2

1. **Ludwigia octovalvis** (Jacq.) Raven in Kew Bull. 15 : 476. 1962


**PACHMARHI** : Vicinity (1000 m). Along streams and swamps. Abundant.

*Fl. & Fr.* : August - January.


**PACHMARHI** : Vicinity (1000 m). **BORI** : Reserve forest (50 Km). In moist places and along streams. Common.

*Fl. & Fr.* : November - April
PASSIFLORACEAE Juss.

PASSIFLORA L.


Woody climber with grooved, pubescent branches; tendrils simple. Leaves deeply 3 lobed. Flowers whitish blue, solitary, axillary, 5-7 cm across. Fruit ovoid oblong.

PACHMARHI: Vicinity (1000m), 28.7.64, Panagrahi 4592 (BSA). In gardens. Rare.

Fl. & Fr.: September March.

CUCURBITACEAE Juss.

1a. Corolla - lobes limbricate
   ... Trichosanthes 7

1b. Corolla - lobes or segments not limbricate:
   2a. Tendril branched
       ... Diplazyclos 3
   2b. Tendril simple:

   3a. Calyx tube closed near attachment of stamens by 2-3 incurved scales. Male peduncle with spathaceous bracts ...
       Momordica 4

   3b. Calyx - tube not closed. Bracts not spathaceous:

   4a. Anthers sigmoid:

      5a. Anthers weakly sigmoid. Seeds turgid
          ... Solena 6

      5b. Anthers strongly sigmoid. Seeds compressed
          ... Cucumis 2

   4b. Anthers arcuate or straight:

      6a. Male and female peduncles 1-flowered, clustered
          ... Mukia 5

      6b. Male flowers corymbose or subumbellate or racemose
          ... Corallocarpus 1
1. **Corallocarpus Welw. ex Hook. f.**


Perennial climbers with large, conical tap root. Stem much branched; branches zig zag, angular and terete. Leaves 3-5 lobed; lobes usually lobulate, obtuse, rounded at base, pubescent. Male flowers 4-15; female flowers solitary or fascicled. Calyx lobes erect, lanceolate, glandular hairy outside near the base. Corolla yellowish green; lobes ovate, acute, erect, spreading. Fruits ovate or ellipsoid, circumscissile near the base. Seeds pyriform, turgid.

**PACHMARHI** : Gabra nala (900 m), Saxena s.n. (SRQ). In scrub jungles on the slopes Rare.

*Fl. & Fr.* : August November.

2. **Cucumis L.**

1a. Lobes of leaves obtuse. Corolla 0.5-1 cm long ... *C. melo var. cultus* 1

1b. Lobes of leaves acute or acuminate. Corolla 1-2 cm long ... *C. sativus* 2


Annual, prostrate, hirsute, trailing herbs. Leaves hirsute, suborbicular or reniform, 3-7 lobed, base cordate; lobes obtuse, denticulate. Male flowers 5-6 in fascicle. Calyx narrow campanulate; lobes subulate. Corolla segments ovate oblong, acute. Female flower peduncled. Fruits spherical. Seeds white, oblong, apex obtuse, base subacute.

**BORI** : Dhain (430 m). In waste lands along pathways as escape. Occasional.

*Fl. & Fr.* : June October.


"Khira"

Scabrous, trailing or climbing annuals. Leaves 3–5 lobed, cordate, very rough. Flowers yellow; male ones in axillary clusters and females solitary or fascicled. Fruit ovoid or oblong. Seeds numerous, white.

PACHMARHI: Vicinity (1000 m). In waste sandy places and borders of forests. Occasional.

Fl. & Fr.: May September.

3. Diplacyclus (Endl.) Corr. & Jeffrey


Tuberous, slender herbs. Leaves lobed; lobes sometimes pinnatifid, remotely toothed. Flowers fascicled, small, greenish yellow. Calyx campanulate; lobes subulate. Corolla campanulate, deeply partite; segments ovate. Stamens 3, one monotheccous, two bithecous. Staminodes 3. Berry ovoid, brick red, with white lines.

PACHMARHI: Vicinity (1000 m). Over hedges at the edge of forests. Abundant.

Fl. & Fr.: August December.

4. Momordica L.

1a. Plants monoeccious. Bracts of male flowers about the middle or below the middle of the peduncle

M. charantia 1

1b. Plants dioecious. Bracts of the male flowers at the apex of the peduncle

M. dioica 2

Weak climbers. Leaves reniform or suborbicular, often pedately 5-7-lobed. Flowers monoeccious, yellow, solitary, long peduncled. Fruits oblong or fusiform, tuberculate, orange-red when ripe.

BORI: Reserve forest (550 m). On hedges in thorny forests. Abundant.

Fl. & Fr.: August November.

2. 


Perennial climbers with tuberous roots and glabrous stem. Leaves ovate, often 3-lobed. Flowers pale yellow, males bracteate and females bracteate or nearly so. Fruit ovoid, echinate, yellowish-red when ripe.

PACHMARHI: Vicinity (1000 m). In the mixed forest. Occasional.

Fl. & Fr.: July November.

5. 


PACHMARHI - Dhanpur (1200 m). On hedges near the forest margins. Occasional.

Fl. & Fr.: July November.

6. 

Solenia Lour.


PACHMARHI: Dhupgarh (1300m); Mahadev Hill (1200 m); Vicinity (1000m). On shrubs in the forests. Common.

Fl. & Fr.: June January.

7. Trichosanthes L.

1a. Male flowers solitary or in pairs ... T. dioica 2
1b. Male flowers in peduncled racemes ... T. bracteata 1


Dioecious, perennial climbers, glabrous. Tendrils 3 rid. Leaves ovate orbicular. 5-7 lobed, acuminate, dentilicate, with white tubercles on the upper surface. Male flowers in peduncled racemes. Calyx tube hairy, striate. Petals fringed. Female flowers axillary, solitary or rarely in racemes. Fruit globose, red when ripe with 10 longitudinal orange streaks. Seeds ovate oblong, smooth.

BORI: Reserve forest (550 m). On bushes in the forest. Occasional.

Fl. & Fr.: March November.

45. BEGONIACEAE C. A. Agardh

BEGONIA L.

1a. Plants tuberous. Tepals biseriate ... B. plicata 2
1b. Plants without tuber. Tepals uniseriate ... B. malabarica 1

Perennial herbs. Leaves lanceolate, acute, serrate, cordate and oblique at base, sparsely hairy. Tepals 2 in both sexes. Ovary 3 locular ; styles 3 ; stigma many branched. Capsule winged ; wings equal.

PACHMARHI : Vicinity (1067 m), Feb. '78, Part 27196 (BSA). Along road sides. Rare.

Fl. & Fr. : All seasons.

New record for the area.


Perennial herbs with tuberous rootstock ; tubers globose ovoid. Stems annual. Leaves 1-3 on each stem, besides a radical leaf, broadly ovate cordate, obtuse or acuminate, irregularly dentate. Flowers in few flowered, peduncled cymes. In male flowers tepals 4 (2+2), scarlet or pink. In female flowers tepals 5, pinkish. Fruits trigonous, winged, setose hairy. Seeds ovoid.


Fl. & Fr. : July December.

46. CACTACEAE Juss.

Opuntia Mill.


shrubs : 1-3 m high, straggling. Stem segments obovate or oblanceolate ; areoles finally with 4-8 straw coloured thick spines and numerous small, slender bristles. Flowers 5-6 cm across, attractive light yellow. Tepals 3-4 cm long. Hypanthium 3-5 cm long, narrowly turbinate ; areoles bristled, nonspinous.

BORI : Reserve forest (550 m). On rocky hill slopes. Occasional.
Fl. & Fr.: March July.

On sandy soil the plants produce thick yellow latex, but on clayey soil they produce yellowish-watery latex.

47. AIZOACEAE: Rudolfii

1a. Flowers in terminal cymes. Seeds aristateolate ... Molitgo 2
1b. Flowers in axillary fascicles. Seeds aristateolate ... Glinus 1

1. GLINUS L.

1a. Plants stellately hairy. Flowers subsessile on up to 5 mm long, pedicellate ... G. lotoides 1
1b. Plants glabrous. Flowers distinctly 4-18 cm long, pedicellate ... G. oppositifolia 2


Prostrate, stellate hairy, annual herbs. Leaves very small, obovate, rarely spatulate, obtuse or rounded. Tepals elliptic, acute, mucronate. Stamens 5-10, rarely more. Capsules oblong, little shorter than the tepals, loculicidally 5 valved. Seeds reniform, dark brown.

BORI: Reserve forest (550 m). On sandy dry riverbed. Abundant.

Fl. & Fr.: February May.


PACHMARHI: Vicinity (1000 m). In moist areas. Occasional.

Fl. & Fr.: March May.
2. *Mollugo* L.


Diffuse, glabrous, annual herbs with numerous stems and dichotomous, 4 angled branches. Leaves in whorls of 2 - 9, linear lanceolate to obovate or oblanceolate. Flowers white, numerous in lax corymbose terminal cymes. Capsules subglobose. Seeds many, estrophiolate.

**PACHMARHI**: Dhupgarh (1250 m). In moist situations. Common.

*Fl. & Fr.*: July - December.

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1a. Leaves simple. Flowers in simple or compound umbels:

2a. Flowers in simple umbels:

3a. Mericarps 7 - 9 - ribbed ... *Centella* 2

3b. Mericarps 3 - ribbed ... *Hydrocotyle* 3

2b. Flowers in compound umbels:

4a. Leaves entire ... *Bupleurum* 1

4b. Leaves dissected:

5a. Leaves palmately 5 - partite ... *Santolina* 6

5b. Leaves pinnately dissected ... *Pycnanthemum* 5

1b. Leaves compound. Flowers in compound umbels:

6a. Ovary and fruit hairy ... *Trachyspermum* 7

6b. Ovary and fruit glabrous or papillose ... *Pimpinella* 4

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1. *Bupleurum* L.

1a. Cauline leaves broadly oblong. Bracts elliptic, foliaceous ... *B. plangenufolium* 1

1b. Cauline leaves linear or linear - oblong. Bracts lanceolate ... *B. wightii* 2


BORI: Reserve forest (900 m), 6 10 60, Joseph 11260 (BSA). On hill slopes amongst the grasses. Rare.

Fl. & Fr.: July December.

Reported from Nilgiris at 6,000 ft. in Shola forests.


PACHMARHI: Dhupgarh (1200 m), 26 12 62, Panigrahi 6552 (BSA). BORI: Reserve forest (500 m). On dry hill slopes and amongst the grasses. Occasional.

Fl. & Fr.: July December.

Reported from Nilgiris at 7000 ft.

2. CENTELLA L.


Trailing herbs with long stolons. Leaves in rosettes, rounded reniform, crenate or crenate - dentate. Flowers in simple umbels, usually 3, middle one sessile, lateral ones pedicellate.

PACHMARHI: Mahadev hill (1200 m). Along road side amongst the grasses. Occasional.

Fl. & Fr.: All seasons.
3. *Hydrocotyle L.*


Perennial herbs with creeping stems, sometimes with ascending extremities. Leaves usually less than 3 cm across. Inflorescence solitary, sessile or short peduncled, along the creeping stems and ascending tips. Fruits up to 15 in each inflorescence, yellow to dark brown when ripe.

**PACHMARHI:** Jambudeep (1050 m). Along stream banks and moist places. Common.

*Fl. & Fr.*: March - November.

4. *Pimpinella L.*

1a. Fruits glabrous ... *P. keynaeana* 3

1b. Fruits papillose:

2a. Cauline leaves pinnate:

3a. Bract solitary ... *P. wallichiana* 4

3b. Bracts several ... *P. bracteata* 1

2b. Cauline leaves not pinnate ... *P. diversifolia* 2


Stout, biennial herbs. First year leaves radical, 3 foliolate; leaflets ovate lanceolate, cordate, pubescent. Second year cauline leaves 3 5-foliolate; leaflets ovate in the lower region; upper leaflets lanceolate; uppermost leaflets pinnatifid; lobes linear lanceolate ending in subspinate tips. Umbels 2.5 - 5.0 cm across; bracts 6, linear; bracteoles 3 - 5. Fruit minutely papillose.

**PACHMARHI:** Vicinity (1000 m). In shady places in the forests. Common.

*Fl. & Fr.*: October - January.

Erect, stout, herbs. Cauline leaves not pinnate. Radical leaves pinnate; leaflets 3-5, variable in shape, ovate lanceolate, lanceolate, irregularly inciso serrate. Flowers in compound umbels. Bracts nil or 1-3; bracteoles absent. Fruit ovoid, papillate.

**PACHMARH**I: Vicinity (1000 m). In shady places in the forests. Common.

*Fl. & Fr.: July October.*


**PACHMARH**I: Dhupgarh (1250 m). *BORI*: Reserve forest (550 m); Dhan (462 m). In damp places and in teak forests. Common.

*Fl. & Fr.: August December.*


Tall herbs. Radical leaves simple, if present; lower cauline leaves trifoliolate, leaflets simple; upper cauline leaves pinnate. Bract solitary; bracteoles 0-3. Flowers polygamous. Petals white. Fruit papillate.

**PACHMARH**I. Dhupgarh (1250 m). *BORI*: Reserve forest (900 m). In shady places in forests. Common.

*Fl. & Fr.: August - January.*

5. **Pycnocycla** Lindl.


Perennial herbs with woody rootstock and rush-like stems. Leaves pinnately dissected; segments illiform. Flowers white or purplish, collected
in heads, resembling a composite. Heads terminal on long, pubescent, peduncles.

PACHMARHI: Chauragarh hill (1100 m), Saxena & Randi: 83317 (SFRI). On hill slope. Rare.

Fl. & Fr.: June December.

6. SANICULA L.


 Erect herbs; radical leaves persistent, glabrous, mucronate serrate. Umbels compound; umbellules few flowered. Perfect flowers sessile; male flowers pedicelled. Fruits densely covered with hooked bristles, slightly compressed laterally.

PACHMARHI: Vicinity (1000 m), 77. 7. 64, Panigrah 4963 (RSA). On hill slope. Rare.

Fl. & Fr.: July October.

New record for the area.

7. TRACHYSPERMUM Link

1a. Leaves 2-3 pinnate. Ultimate segments of leaf linear, 1 mm broad

T. ammi 3

1b. Leaves 2 pinnate. Ultimate segments of leaf lanceolate, 2 - 2.5 mm broad

T. strictocarpum 2

Erect, much-branched, annual herbs. Leaves 2-3-pinnate; segments linear. Flowers in axillary or terminal compound umbels, white. Fruit 2-mm or less long, scaly hair especially on the ribs.


*Fl. & Fr.*: December-March.


1a. Fruits small with minute hairs. ... var. *stictocarpum*

1b. Fruits larger, densely hispid ... var. *hebecarpum*

var. *stictocarpum*


PACHMARHI: Dhupgarh (1250 m). On hill slopes. Occasional.

*Fl. & Fr.*: December-February.


Erect herbs with much-branched stems. Leaves 2-pinnate; segments lanceolate-linear. Bracts 3-6, linear. Bracteoles 4-8, linear-lanceolate. Fruits larger than the type variety, densely hispid.


*Fl. & Fr.*: December-February.

49. ARALIACEAE Juss.

Schefflera J. R. & G. Forster


**PACHMARHI** : Dhupgarh (1250 m). On hill slopes. Occasional.

*Fl. & Fr.* : April June.

50. RUBIACEAE Juss.

1a. Inflorescence a head:

2a. Leaves cordate at base. Sepals distinct

2b. Leaves acute-rounded at base. Sepals O.

1b. Inflorescence not a head:

3a. Herbs:

4a. Fruits many-seeded:

5a. Anthers connate into a tube. Stigma capitate

5b. Anthers free, stigma 2-lobed:

oa. Seeds angular:

7a. Corolla divided halfway or less down. Stigma overtopped by anthers

7b. Corolla divided more than halfway down. Stigma not overtopped by anthers:

8a. Carpels 4-angled

8b. Carpels tereete

6b. Seeds sea shell-shaped

4b. Fruit 2-seeded:

9a. Inflorescence corymbose. Fruit dehiscing into 2 indehiscent coats
9b. Inflorescence not corymbose. Fruit dehiscing into 2 dehiscent cocci

3b. Shrubs or trees:


10b. Inflorescence not spicate. Bracts otherwise. Corolla lobes coarcted in bud:

11a. Ovary 1-locular. Stipules amplexicaul

11b. Ovary 2-locular. Stipules otherwise:

12a. Inflorescence axillary or at apex of brachyblasts

12b. Inflorescence terminal on normal shoot:

13a. Flowers not in corymb or solitary:

14a. Corolla less than 3 mm long

14b. Corolla 10-25 mm long

13b. Flowers in corymb or solitary:

15a. Flowers solitary or in fascicles

15b. Flowers in corymb

1. Adina Salisb.


Tall trees. Leaves ovate-orbicular, pubescent; petiole up to 8 cm long. Inflorescence 1 3-fascicled heads, axillary; peduncles 3 5 cm long, 2-bracteate near the middle. Corolla brownish-yellow. Capsules about 4 mm long.

PACHMARHI: Dhupgargh (1250 m). In mixed deciduous forests. Abundant.

Fl. & Fr.: June February.
2. ARGOSTEMMA Wall.


Perennial, fleshy herbs with tuberous root stock. Stems erect; runners arising from the axils of lowest pair of caduceous leaves. Leaves of upper pairs ovate-elliptic to oblong or obovate, obtuse or rounded at apex. Inflorescence umbelliform above the highest leaf-pair, 1 3-flowered, glabrous. Corolla white with greenish centre, divided almost down to the base. Anthers connate into a tube. Stigma capitate. Fruit many-seeded.


Fl. & Fr.: August November.

3. BORRERIA G. F. W. Mey.

1a. Stem procumbent. Corolla-tube with a ring of hairs within at base

... B. articulatis 1

1b. Stem erect. Corolla-tube without a ring of hairs

... B. pusilla 2


Fertile in juvenile stage, later procumbent, hispid herbs. Leaves elliptic-lanceolate. Calyx 4-lobed. Corolla bluish-white. Mericarps pubescent with septum on one mericarp; finally separating.

PACHMARHI: Mahadev hill (1300 m). In waste lands and along pathways. Common.

Fl. & Fr.: July December.


Frequent, prickly herbs. Leaves opposite or sub-verticillate, oblong-oblong-lanceolate or lanceolate, acute or acuminate; stipules connate to the leaf-base. Flowers in axillary and terminal clusters. Corolla white, funnel-shaped. Ovary 2-celled, 1 ovule in each cell. Stigmas capitate.

PACHMARHI: Mahadev hill (1300 m). In lateritic soil along road side. Common

Fl. & Fr.: August October.

4. Coffea L.


Glabrous shrubs or small trees. Leaves opposite, oblong, acuminate, narrowed into short petioles. Flowers numerous in axillary fascicles or solitary. Corolla funnel-shaped; lobes oblong, as long as the tube. Filaments as long as the anthers. Berry fleshy, purple when ripe.

PACHMARHI: Mahadev hill (1250 m). On hill slopes. Cultivated.

Fl. & Fr.: March December.

5. Gardenia J. Ellis

1a. Corolla tube less than 2 cm. long. Plants sometimes armed, not resiniferous

1b. Corolla tube more than 3 cm. long. Plants unarmed, resiniferous


PACHMARHI: Dhapgarh (1200 m); Vicinity (1000 m). In mixed deciduous forest. Abundant.

Fl. & Fr.: March December.


PACHMARHI: Vicinity (1000 m). In mixed deciduous forest. Abundant.

Fl. & Fr.: March July.

6. HYMENODICTYON Wall.


Large deciduous trees: bark furrowed, rough. Leaves ovate-elliptic, obtuse or acuminate, narrowed into short petioles, membranous, finely pubescent on both surface. Stipule caducous. Inflorescence spicate. Bracts solitary, foliaceous. Flowers small, white or greenish, fragrant. Capsules ellipsoid on recurved pedicels, provided with many leanticles. Seeds small many.

PACHMARHI: Vicinity (1000 m). Saxena 8197 (SIKI). In mixed deciduous forests. Rare.

Fl. & Fr.: July February.

The soft starchy underground portion of the saplings and seedlings are very much liked by the pigs. So the species has become threatened. This may be a source of quinine.

7. IXORA L.


PACHMARHI : Vicinity (1000 m), 25.7.64, Panigrahi (BSA), In mixed forests. Scarcce.

Fl. & Fr. : November July.

3. KOHAUTIA Cham. & Schlecht.


BORI : Reserve forest (550 m). Along the pathways. Occasional.

Fl. & Fr. : July December.

9. KNOXIA L.


Erect herbs. Stems 4 - angled, pubescent. Leaves elliptic - lanceolate to oblong, acute to subacuminate, narrowed to the base, thinly pubescent. Flowers blue or pinkish white in corymbose paniciles. Calyx lobes unequal.
Corolla lobes ovate, obtuse. Fruit ellipsoid, dehiscent into 2 indehiscent cocci; cocci 3 ribbed.

PACHMARHI: Vicinity (1000 m). In forest undergrowth amongst the grasses.

Fl. & Fr.: September December.

10. MITRAGYNA Korth.


PACHMARHI: Vicinity (1000 m). BORI: Dhaín (413 m). In mixed deciduous forests. Abundant.

Fl. & Fr.: April August.

11. NEANOTIS Lewis


Erect annual herbs with 4-angled stems. Leaves ovate lanceolate, acute or acuminate, thinly pubescent. Flowers in few flowered cymes. Capsules didymous, truncate, often longer than the calyx lobes. Seeds shell shaped.

PACHMARHI: Jambudeep (1050 m); Vicinity (1000m). On moist shady rocks. Occasional.

Fl. & Fr.: August November.

1a. Upper inflorescences many-flowered and panicked ... *O. affinis* 1

1b. All inflorescences 1 - 4-flowered:

2a. Tip of capsule round, protruding, green herbs ... *O. herbacea* 4

2b. Tip of capsule flat, not protruding. Herbs often diffuse:

3a. Stamens and style included ... *O. corymbosa* 2

3b. Stamens and style exserted ... *O. diffusa* 3


*Fl. & Fr.* : July October.


*Fl. & Fr.* : July December.

Prostrate or decumbent annual herbs. Stems slender, 4 angled, glabrous. Leaves linear lanceolate to oblong, subacute, with a revolute margin, often narrowed to the base. Flowers solitary or 1-4 together. Calyx lobes subequal, ovate lanceolate, acute. Corolla white, lobes ovate, acute. Fruit glabrous, didymous.


*Fl. & Fr.*: July October.


PACHMARHI: Vicinity (1000 m); Jambudeep (1050 m). On way-sides in the forest. Common.

*Fl. & Fr.*: October December.


Spreading shrubs. Leaves opposite, elliptic oblong or ovate. Flowers fascicled in large panicles. Calyx lobes 4 5 or 6. Corolla blue, 5 lobed. Capsule ellipsoid, 1 celled, 5 valved at the top. Seeds 5.

PACHMARHI: Mahadev hill (1200 m); Dhupgarh (1250 m). On hill slopes. Common.

*Fl. & Fr.*: September December.

14. *Thecagonium* Babu

Erect annual herbs. Leaves in a few pairs, often 4 together at apex of the stem, ovate oblong or oblong rounded, obscure, glabrous or thinly hairy on the lower surface. Flowers in many-flowered loose, corymbose panicles. Calyx lobes ovate triangular, acute. Corolla white, divided more than halfway down; lobes lanceolate oblong, hairy within. Stamens inserted near the top of corolla tube. Fruit hemispherical, crowded with calyx lobes. Seeds ovoid globose, brown, pitted.

**PACHMARHI**: Vicinity (1600 m). On lateritic soil of hill slopes. Occasional.

*Fl. & Fr.*: August November.

15. **WENDELANDIA** Bartl. ex DC.


*RORT*: Reserve forest (550 m). In mixed forest. Abundant.

*Fl. & Fr.*: March - July.

16. **XEROMPHIS** Rafin.

1a. Spines axillary. Calyx - lobes persistent

1b. Spines terminal. Calyx - lobes caducous

... *X. spinosa* 1

... *X. xiginosa* 2

Rigid shrubs or small trees with long, opposite, axillary spines. Leaves obovate, obtuse, or sub acute, pubescent, rarely glabrous, deciduous. Flowers 1 few fascicled, 5 merous. Calyx lobed. Corolla pale yellow. Berry ellipsoid.

**Pachmarhi**: Vicinity (1000 m). In mixed deciduous forest. Occasional.

*Fl. & Fr.* July December.


**Bori**: Dhain (413 m). In mixed forest. Common.

*Fl. & Fr.*: May November.

51. **ASTRACEAE** Dum.

1a. Florets all tubular, outer sometimes larger than inner florets:

2a. Plants white - woolly

2b. Plants glabrous, hairy or tomentose, but not white - woolly:

3a. Leaves all opposite, sometimes the upper alternate:

4a. Head with 1 floret, in clusters surrounded by foliar bracts

4b. Head with many florets:

---

**Gnaphalium** 18

**Lagarosceae** 20
5a. Pappus of 5 scales. Plants aromatic. Heads in pedunculate corymbs
   ... Ageratum 5

5b. Pappus of 2 - many hairs. Plants aromatic or not. Heads in corymbs
   ... Adenostoma 7

3b. Leaves all alternate:

6a. Achenes enclosed in an indurate, spiny involucre. Anthers not adherent to each other...
   ... Xanthium 33

6b. Achenes not enclosed in an indurate, spiny involucre. Anthers adherent:

7a. Florets yellow:

8a. Anther bases tailed:

9a. Upper leaves without ampli- crenulate base
   ... Blumea 6

9b. Upper leaves with ampli- crenulate base
   ... Blumiopsis 7

8b. Anther bases obtuse, entire, not tailed:

10a. Stem distinctly winged. Plants often viscid ...
   ... Lagurus 21

10b. Stem not winged. Plants usually not viscid:

11a. Erect herbs:

12a. Leaf base cuneate, narrowed, never cordate ...
   ... Coptis 12

12b. Leaf base cordate, ampli- crenulate ...
   ... Lagurus 21

11b. Diffuse prostrate herbs ...
   ... Centipeda 9

7b. Flowers not yellow:

13a. Leaves deeply pinnatifid:

14a. Pappus O. Leaves ashy - tomentose beneath ...
   ... Artemisia 4

14b. Pappus of hairs. Leaves not ashy - tomentose beneath:
15a. Heads of equal florets (bisequal)  ...  \textit{Família 16}

15b. Heads with outer florets (female) larger than inner (bisequal)  ...  \textit{Cyathocline 13}

13b. Leaves not lobed more than half way to midrib; margin various:

16a. Stem narrowly winged. Plants aromatic  ...  \textit{Sphaeranthus 26}

16b. Stem not winged. Plants not aromatic:

17a. Leaves mostly round and a few reduced cauline ones above  ...  \textit{Elephantopus 15}

17b. Leaves all cauline:

18a. Involucral bracts 2 - seriate  ...  \textit{Caesalpina 8}

18b. Involucral bracts many - seriate:

19a. Involucral bracts with foliaceous upper part

19b. Involucral bracts without foliaceous upper part  ...  \textit{Vernonia 30}

1b. Florets all ligulate or only the outer ligulate:

20a. Florets all ligulate. Sap milky  ...  \textit{Sonchus 25}

20b. Outer florets ligulate, the inner tubular and bisexual. Sap not milky:

21a. Outer involucral bracts hooded - spinous  ...  \textit{Arctotheca 1}

21b. Outer involucral bracts unarmed:

22a. Leaves alternate:

23a. Leaves deeply pinnatisect  ...  \textit{Senecio 23}

23b. Leaves never lobed more than half way to midrib:

24a. Head solitary, Pappus double, the outer of scales and inner of hairs  ...  \textit{Passionaria 22}
24b. Heads corymbose or panicled.
Pappus single, of hairs ... 

22b. Leaves opposite, merely upper leaves alternate:

25a. Pappus bristles plumose ... 

25b. Pappus bristles retrorse - 
        sely barbellate, not plumo - 
        use : 

26a. Leaves deeply lobed : 

27a. Leaves trif - 
        late ... 

27b. Leaves pinnate - 
        mid ... 

26b. Leaves crenate, not deeply lobed : 

28a. Outer involucral bracts glan - 
        dular, clavate ... 

28b. Outer involucral bracts not glandular:

29a. Receptacle not paleaceous.
Paleas not enclosing flowers:

30a. Marginal flowers numerous, many - 
        seriate, white ... 

30b. Marginal flowers 5 to few, 1 seriate, 
        yellow ... 

29b. Receptacle paleaceous.
Paleas enclosing flowers:

31a. Ligule large, more than 1.5 
        cm long ... 

31b. Ligule small, less than 1 cm 
        long : 

32a. Heads sessile, usually axil - 
        lary ... 

32b. Heads pedunculated, axil - 
        lary and termi - 
        nal :
33a. Receptacle raised, conical; ligules filiform, included ... *Spilanthes* 27

33b. Receptacle flat; ligules exserted ... *Galinsoga* 17

I. *Acanthospermum* Schrank.


Erect, diffusely branched, hairy, annual herbs. Leaves obovate spatulate, acute, cuneate at base, hairy. Heads sessile, solitary at the dichotomy of branches, yellow. Achenes triangular, with 2 large spines and numerous lateral hooked spinules.

PACHMARHI: Mahadev hill (1250 m). In the borders of deciduous forest in moist situations. Abundant.

*Fl. & Fr.*: July December.


Fl. & Fr.: July November.

3. AGERATUM L.


Erect, much-branched annual herbs with terete stem, hairy when young. Leaves rough hairy, opposite or upper ones alternate, broadly ovate. Heads blue, purple or white, crowded on terminal peduncles; bracts acute at tip, sometimes glandular hairy. Achenes sharply 4-angled.

_PACHMARHI_: Dhupgarh (1200 m); _BORI_: Reserve forest (350 m); _Dhanip_(462 m). Edges of the forests. Abundant.

Fl. & Fr.: All seasons.

4. ARTEMISA L.

1a. Leaves densely white-lanate beneath. Stems subulate, pubescent. Involucral bracts lanate. Disk-flowers fertile... _A. nilagirica_ 1

1b. Leaves not densely white-lanate beneath. Stems ribbed, glabrous. Involucral bracts glabrous. Disk-flowers sterile... _A. parviflora_ 2


_PACHMARHI_: Vicinity (1000 m); Mahadev hill (1250 m). In forest undergrowth. Abundant.
2. Artemisia parviflora Buch. Ham. ex D. Don, Prodr. 181. 1825 ;
    1977.

    Erect, perennial herbs with ribbed stems. Leaves sessile, spatulate
    cuneate, serrate - lobed, pubescent, upper ones linear lanceolate, entire.
    Heads short peduncled, involucral bracts 2 - 3-seriate, glabrous, ovate -
    rounded. Florets yellow. Achenes minute.

**PACHMARHI**: Manadev hill (1250 m). In forest undergrowth.
    Occasional.

    *Fl. & Fr.* : October February.

5. **Bidens L.**

    Bidens intermedia (Lour.) Merr. & Sherff ex Sherff in Bot. Gaz.
    88: 293, 1929 ; Babu, Herb. Fl. Dehra Dun 242. 1977. Coreopsis inter-
    media Lour. Fl. Cochinch, 508. 1790, Bidens pilosa (aut. non L. 1753) ;

    Erect, annual herbs with terete, grooved, pubescent stems. Leaves
    3 - 5 foliolate; leaflets ovate lanceolate, acute to acuminate, narrowed
    below, dentate. Bracts hairy along margin. Ray florets present or absent,
    white. Outer cypselae smaller, inner longer.

**PACHMARHI**: Mahadev hill (1200 m). **BORI**: Reserve forest
(900 m). In forest undergrowth and on hill slopes. Occasional.

    *Fl. & Fr.* : All seasons.

6. **Bluma DC.**

1a. Receptacle densely short - hairy around the pits ... **B. fistulosa 2**

1b. Receptacle glabrous, if hairy, then the plants shrubby :

2b. Pappus pale red on drying ... **B. balsamifera 1**

2b. Pappus - hairs white or dirty white :
3a. Corolla hairy. Leaves spinulose-toothed. Heads subaxillary or combined into corymbs. ... \textit{B. oxyodon}\textit{na} 5

3b. Corolla of marginal flowers glabrous, and of disk flowers hairy. Leaves not spinulose-toothed. Heads combined into a lax, terminal panicle:

4a. Achenes ribbed:

5a. Stems and leaves pilose, glabrous with age. Achenes hairy. ... \textit{B. membranaceum} 4

5b. Stems with stalked glands. Leaves glan-
dular beneath. Achenes glabrous. ... \textit{B. virgus} 6

4b. Achenes angular-terete, not ribbed. ... \textit{B. lacera} 3


Tall, tomentose, aromatic shrubs. Leaves coriaceous, elliptic or oblong lanceolate, sometimes pinnatifid, narrowed to the base. Heads sessile or peduncled on the branches of a large spreading or pyramidal panicle. Involucral bracts tomentose. Receptacles glabrous. Achenes 10 ribbed, silky. Pappus red.

\textbf{PACHMARHI} : Vicinity (1000 m). In forest undergrowth and road sides. Occasional.

\textit{Fl.} & \textit{Fr.} : December April.


\textbf{BÖRÖ} : Reserve forest (550 m). On hill slopes and waysides. Common.

\textit{Fl.} & \textit{Fr.} : October February.


PACHMARHI: Mahadev hill (1200 m). BORI: Reserve forest (430-550 m). In forest undergrowth, waysides and river banks. Common.

Fl. & Fr.: September January.


BORI: Reserve forest (550 m). In forest undergrowth. Common.

Fl. & Fr.: December April.


PACHMARHI: Dhupgarh (1250 m). BORI: Reserve forest (550 m). By the sides of paths and open lands. Abundant.

Fl. & Fr.: November February.


Fl. & Fr.: November January.


PACHMARHI: Vicinity (1000 m). In mixed forests and on hill slopes. Common.

Fl. & Fr.: October January.

8. CAESULIA Roxb.


BOKH: Reserve forest (350 m). In the mixed forest and wayside on moist soil. Common.

Fl. & Fr.: September April.

9. CENTIPEDA Lour.


**PACHMARHII**: Vicinity (1000 m). Along waysides and in waste land. Occasional.

**Fl. & Fr.**: All seasons.

10. **CENTRATHERUM** Cass.

1a. Leaves not white beneath. Outer involucral bracts long, linear...

   ... **C. antihelminticum** 1

1b. Leaves white beneath. Outer involucral bracts short, leathery...

   ... **C. indicum** 2


   **BORI**: Reserve forest (900 m). In mixed forest. Occasional.

   **Fl. & Fr.**: August—December.


   Erect, stout, branched herbs. Leaves sessile, ovate or oblong, base acute or cordate, white tomentose beneath. Heads subsolitary. Inner
involucral bracts broad, acute, pubescent, outermost leafy, short. Pappus equaling the corolla tube, yellowish.


Fl. & Fr.: August December.

11. CHRYSANTHEMUM L.


Fl. & Fr.: December February.

12. COMYXIA Less.

1a. Heads 2–3 mm across. Plants not viscid. Corolla white or yellow;

2a. Corolla of marginal flowers white

C. canadensis 1

2b. Corolla of marginal flowers yellow

C. stricta 3

10. Heads 4–15 mm across. Plants viscid. Corolla pink or pale violet

C. linicantha 2


PACHMARHI: Dhupgarh (1250 m). BORI: Reserve forest (550 m).
In mixed forests and waste moist places. Common.

*Fl. & Fr.*: July February.


BORI: Reserve forest (550 m), Feb. 78. Pamp 27284 (BAI). In forest clearings. Rare.

*Fl. & Fr.*: October February

New record for the area.


PACHMARHI: Dhupgarh (1300 m). On hill slopes amongst the grasses. Occasional.

*Fl. & Fr.*: July October.


Erect, much-branched, densely glandular hairy annual herbs. Leaves sessile, alternate, oblanceolate, lyrata or variously irregularly lobed; lobes dentate, acute. Heads purple, in dense terminal corymbose cyrnes. Achenes minute, oblong, smooth, black.
PACHMARHI: Vicinity (1000 m). In forest undergrowth near nulas and streams. Common.

*Fl. & Fr.: November March.*

14. **Eclipta L.**


Erect or prostrate annual, often rooting at nodes. Stem and branches hairy. Leaves opposite, sessile, oblong-lanceolate or linear-lanceolate, sometimes ovate-lanceolate. Heads white, peduncled in the axils of leaves. Achenes cuneate compressed.

PACHMARHI: Mahadev hill (1250 m). On the margins of streams. Abundant.

*Fl. & Fr.: All seasons.*

15. **Elephantopus L.**


PACHMARHI: Jambudeep (1100 m). BOKI: Dhain (450 m). In forest undergrowth. Abundant.

*Fl. & Fr.: September November.*


Erect or decumbent, annual perennial herbs. Leaves sessile; lower ones often resinate, narrowed at the base with an entire - dentate lower part, passing into ovate triangular, orbicular or reniform, dentate upper part; upper ones sagittate, acute, dentate, with rounded basal auricles. Heads pink or purple. Achenes oblong, 5 - genous.

PACHMARHI: Mahadev hill (1200 m). BUKI: Reserve forest (550 m); Dhain (462 m). In cool shaded places near forest margins.

Fl. & Fr.: July - December

17. Galinsoga Ruiz & Pav.


Slender annual herbs. Leaves ovate, acute, sparsely hairy. Heads peduncled, combined into a terminal corymbiform panicle. Involucral bracts 2 - seriate, ovate, obtuse. Corolla of 5 marginal florets, white. 3 - dentate; of disk florets yellow, hairy. Achenes black, viscid, hairy.


Fl. & Fr.: August - January.

18. Cirsium L.

1a. Pappus - hairs free:

2a. Heads in leafless, corymbose clusters 

2b. Heads in leafy spikes or leafy clusters:

3a. Heads in simple or branched spikes

3b. Heads in rounded axillary or terminal clusters

1b. Pappus - hairs connate at base into a ring


PACHMARHI: Manadevi hill (1250 m), 21. 12.52. *Ranighari* b605 (BSA). In the forest undergrowth. Rare.

*Fl. & Fr.*: October - January.


PACHMARHI: Vicinity (1000m). In waste places in the forest and roadsides. Occasional.

*Fl. & Fr.*: December - April.


BORI: Reserve forest (500 m). Along the margins of streams. Abundant.

*Fl. & Fr.*: November - April.


BORI: Reserve forest (550 m). In moist places near streams. Occasional.

Fl. & Fr.: October January.


Tall, hirsute herbs. Stem hairy upward. Leaves opposite, lanceolate to elliptic oblong, acute, cordate at base, amplexicaule, sparsely hairy. Heads yellow. Ray achenes 3 angled; disk achenes 4 genous.

BORI: Reserve forest (900 m). As escape from cultivation in waste places. Abundant.

Fl. & Fl.: September December.

20. Lagascea Cav.


Much branched herbs. Stem grooved, pubescent above, glabrous below. Leaves alternate, rhomboid ovate, pubescent. Heads 1 flowered, crowded in clusters, white. Achenes cuneate, black.

BORI: Reserve forest (500 m). Along stream in the forest. Abundant.

Fl. & Fr.: July March.


Erect, perennial herbs with broadly winged, glandular pubescent stems. Leaves sessile, oblong lanceolate, decurrent on to wing of stem, dentate, glandular. Heads in racemose panicles; peduncle and outer involucral bracts glandular. Florets purplish. Achenes ribbed, hairy. Pappus hairs white.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (500 m). Along roadside streams. Abundant.

*Fl. & Fr.: October - December.*


1a. Involucral bracts acute. Ligules equaling the bracts. Outer scales united in a cup ...  

   Branched, glaucous, annual herbs. Leaves sessile, linear oblong or obovate, entire or serrulate. Ray florets ligulate. Achenes glabrate, not ribbed. Inner pappus hairs twice as long as the achenes; outer scales laciniate.

   PACHMARHI: Vicinity (1000 m). In waste land. Occasional.

   *Fl. & Fr.: August - February.*

1b. Involucral bracts acuminate. Ligules exceeding the bracts. Outer scales laciniate ...  


   PACHMARHI: Vicinity (1000 m); Mahadev hill (1250 m). BORI: Reserve forest (900 m). On hill slopes. Occasional.

   *Fl. & Fr.: October - December.*
23. Senecio L.

1a. Radical leaves in rosette

1b. Radical leaves not in rosette:

2a. Leaves with cottony tomentum beneath. Achenes with pappus

2b. Leaves without cottony tomentum beneath. Achenes without pappus


PACHMARHI: Dhupgargh (1250 m), Saxena 1036 (SFRI). BORI: Reserve Forest (550 m), 6-10-60, Joseph 11266 (BSA). In forest undergrowth. Rare.

Fl. & Fr.: August December.


PACHMARHI: Vicinity (1000 m). In the undergrowth of mixed forest and wayside. Occasional.

Fl. & Fr.: April June.


**PACHMARHI** : Vicinity (1000 m); Beedham (900 m). Along road side and in waste land in the forest. Occasional.

*Fl. & Fr.* : July December.

24. **Siegesbeckia L.**


Erect, widely branched, annual herbs. Leaves opposite, crenate, ovate triangular. Heads yellow, terminal in the centre of forks, combined into a loose panicle. Involucral bracts 2 - serrate; outer ones 5, spatulate; inner ones 5 - 7, broadly ovate. Achenes obovoid, curved, narrowed below, truncate, glandular. Pappus nil.

**PACHMARHI** : Vicinity (1000 m); Jambudeep (1050 m). Along wayside and in waste land. Occasional.

*Fl. & Fr.* : February October.

25. **Sonchus L.**

1a. Outer involucral bracts densely clothed with coarse gland - bristles. Plants perennial ... *S. brachyotus* 1

1b. Outer involucral bracts without gland - bristles. Plants annual ... *S. oleraceus* 2


Erect, perennial herbs with stout tap roots. Radical leaves in rosette; cauline ones remote, oblong with a semiamplexicaul base. Heads combined into branched corymbs. Involucral bracts 3 - 4-seriate, lanceolate. Corolla bright yellow, turning brownish on maturity. Achenes linear oblong, curved, 5 - ribbed on lateral faces. Pappus hairs white.

Fl. & Fr.: February October.

New Record for the area.


PACHMARH1: Vicinity (1000 m). In moist places near springs. Occasional.

Fl. & Fr.: September January.

26. Sphaeranthus L.


BORI: Reserve forest (550 m). In moist places along streams. Common.

Fl. & Fr.: January April.

27. Spathanthus Jacq.

Stout herbs. Leaves broadly ovate, acute, subentire. Heads in axillary and terminal panicles. Bracts oblong elliptic, fimbriate. Florets white. Achenes of the outer florets trigonous with thickened and densely ciliate margin, of inner florets dorsally compressed, ciliate along margin; black, verrucose.

BORI: Reserve forest (550 m). In moist shaded places. Abundant. Fl. & Fr.: November January.

28. Synedrella Gaertn.


BORI: Reserve forest (550 m), 23 12 62, Panigrahi 6372 (BSA). In moist shaded places. Rare. Fl. & Fr.: July December.

29. Tridax L.


30. **Vernonia** Schreb.

1a. Achenes densely hairy, Pappus biseriate
   \[...\] *V. cinerea* 1

1b. Achenes glabrescent, Pappus uniseriate
   \[...\] *V. diversens* 2


Erect, annual herbs. Leaves alternate, mostly spatulate or lanceolate, acute, crenate, hairy. Heads purple, in terminal corymbose cymes. Achenes 2-3-angled, densely hairy. Pappus biseriate, the outer ones shorter.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m); Dhain (462 m). In rock crevices on hill slopes. Common.

*Fl. & Fr.*: July - December.


**PHCHMARHI**: Dhapgarh (1250 m). **BORI**: Reserve forest (500 m). On hill slopes. Occasional.

*Fl. & Fr.*: December - February.

31. **Vicoa** Cass.

1a. Leaves elliptic, acuminate, serrate. Involutral bracts recurved
   \[...\] *V. cerna* 1

1b. Leaves lanceolate or obtong-lanceolate. Involutral bracts sparingly recurved
   \[...\] *V. indica* 2


Slender, sparsely pubescent, annual herbs. Lower leaves shortly petioled, upper ones sessile, elliptic, acuminate, serrate. Involutral bracts with filiform, recurved tips. Achenes sparsely hairy.
PACHMARHI: Vicinity (1000 m). On hill slopes and on newly exposed soil. Occasional.

Fl. & Fr.: December April.


Erect, viscid, perennial herbs. Stems reddish brown, terete, grooved, glabrous with age. Leaves ovate lanceolate, acute, cordate hastate and amplexicaul below, entire, scabrid along margin, pubescent beneath. Heads usually solitary on long peduncles. Bracts lanceolate, acute, hairy, the outer shorter. Flores bright yellow. Achenes thinly hairy, Pappus hairs white, few.

PACHMARHI: Vicinity (1000 m) BORI: Reserve forest (450 m). In forest undergrowth on hill slopes and valley. Common.

Fl. & Fr.: September April.

32. Wedelia Jacq.


Erect or decumbent ascending or straggling perennial herbs with woody base, hairy. Leaves ovate elliptic, acute or acuminate, mucronate, serrate hispid; upper ones smaller, lanceolate. Heads solitary. Involucral bracts 2-seriate; outer ones oblanceolate spathulate; inner ones lanceolate. Ray florets 5, yellow with 3-dentate corolla. Achenes with a truncate apex, hairy at the top. Pappus of short bristles.

PACHMARHI: Vicinity (1000 m). In forest undergrowth. Occasional.

Fl. & Fr.: August November.

33. Xanthium L.

Erect, annual herbs. Stem stout, terete. Leaves broadly ovate or suborbicular and slightly broader than long, acute, often 3-lobed, irregularly incised serrate. Heads globose, in axillary and terminal short racemes. Achenes oblong, ovoid, compressed, glabrous, black.

**PACHMARHI**: Vicinity (1000 m). In waste lands and hill slopes. Abundant.

*Fl. & Fr.:* September-March.

52. **STYLIDIACEAE** K. Br.

**Stylidium** Sw. ex Willd.


Erect, glabrous, annual herbs. Leaves alternate, sessile, lanate or oblong or obovate-spathulate, obtuse, entire, 3-nerved; lower ones in rosette; upper ones passing into bracts. Flowers sessile, 2-3 in cymes. Corolla purplish or pink; lower 3 lobes minute; upper 2 spathulate. Stamens 2. Capsule linear, pubescent.

**PACHMARHI**: Vicinity (1000 m), Saxena 414 (SFRI). In open moist places near sal forest. Rare.

*Fl. & Fr.:* September-March.

53. **CAMPANULACEAE** Juss.

1a. Flowers irregular. Stamens united by anthers.

1b. Flowers regular. Stamens free:

2a. Capsules dehiscing loculicidally with 2-3 apical valves.

2b. Capsules dehiscing by lateral pores or by 3 basal valves.

... **Lobelia** 2

... **Wahlenbergia** 3

... **Campanula** 1
1. **Campanula L.**


**PACHMARHI**: Mahadev hill (1250 m), Feb. 78, *Pant* 27130 (BSA). In forest floor. Rare.

*Fl. & Fr.*: January May.

New record for the area.

2. **Lobelia L.**


Under shrubs. Stem terete at the base, angular towards the apex, hollow, simple or apically branched. Leaves spirally arranged, crenate-serrate, lanceolate, ovate, acuminate, rounded and narrowed at base, glabrous with age. Corolla white; staminal filaments fused, hairy; anthers sparsely hairy on back, hairy at apex. Capsule dehiscent, many-seeded.

**PACHMARHI**: Dhupgarh (1250 m). On hill slopes. Occasional.

*Fl. & Fr.*: July March.

3. **Wahlenbergia Schrad. Ex Roth**


**BORI**: Reserve forest (550 m). In moist places along streams. Common.

**Fl. & Fr.**: March, April.

54. PLUMBAGINACEAE Juss.

**Plumbago L.**


Erect or straggling, perennial undershrubs. Leaves ovate-lanceolate or oblong. Flowers white, in terminal and axillary racemes combined into a leafy panicle; rachis glandular. Calyx glandular hairy; lobes linear-subulate. Corolla white, lobes oblong, apiculate. Style glabrous. Fruits oblong-acute, longitudinally furrowed, with a patent or recurved calyx.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (900 m). In moist places in forest undergrowth. Common.

**Fl. & Fr.**: August, March.

55. PRIMULACEAE Vent.

1a. Corolla blue or white rarely pink. Plants not gland-dotted. Capsule circumscissile

1b. Corolla mostly yellow, rarely white. Plants mostly gland-chaffed. Capsule dehiscing with valves or irregularly bursting

... *Anagalis* 1

... *Lysimachia* 2
1a. Leaf 3-nerved. Petals blue, rarely pink longer than calyx. Filament villous  

... *A. arvensis* 1

1b. Leaf 1-nerved. Plants white, shorter than calyx. Filament glabrous  

... *A. pumila* 2


Erect or decumbent-ascending, annual herbs. Stems 4-angular, narrowly winged. Leaves opposite, ovate or ovate-lanceolate. Flowers blue with red throat, axillary, solitary. Pedicels long, recurved in fruiting. Capsule globose.

PACHMARHI: Vicinity (1000 m), Feb. 78, Pant 27187 (BSA). In moist places along forest margins. Abundant.

*Fl. & Fr.*: December March.

New record for the area.


Erect annual herbs. Leaves alternate on the lower ones opposite, ovate-oblong or lanceolate. Flowers white or pale pink, axillary, solitary. Pedicels very short. Filaments glabrous. Capsules subglobose, as long as the calyx. Seeds trigonous.

PACHMARHI: Jata Shankar (1050 m). Saxena 1087 (FRS). In moist places. Rare.

*Fl. & Fr.*: September December.

2. *Lysimachia* L.

Erect, simple or sparsely branched, more or less glaucous herbs. Leaves usually petiolate, minutely gland-dotted, acute or obtuse. Flowers in elongate racemes. Bracts as long as the pedicels. Corolla-segments obovate, Staminal filaments short; anthers apiculate.

**PACHMARHI**: Dhupgarh (1200 m), Saxena et Pandey 83553 (SERI). Along water courses. Rare.

*Fl. & Fr.*: July – November.

Very very rare/endoangered. Dutia reported from Dehra Dun and no recent collection seen. Saxena reported from Dhupgarh, along stream only.

56. **MYRISINACEAE** R. Br.


**PACHMARHI**: Dhupgarh (1200 m). **BORT**: Dhaín (413 m). On the edges of forest. Abundant.

*Fl. & Fr.*: All seasons.

57. **SAPOTACEAE** Juss.

**Manilkara** Adans.

Trees or shrubs. Leaves scattered, broadly obovate, obtuse, subcoriaceous. Flowers axillary, fascicled on curved peduncles, pale yellow. Calyx lobes 6, lanceolate, reflexed, pubescent outside, outer 3 broader than the inner 3. Corolla lobes 18, the inner 6 longer than the rest and shortly clawed. Stamens 6; staminode 6, alternate with the stamens. Ovary 12 celled, pubescent. Fruits small, ovoid, smooth, red. Seed solitary.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). On hill slopes. Abundant.

*Fl. & Fr.*: November April.

58. EBENACEAE Gurke

Diospyros L.


**PACHMARHI**: Vicinity (1000 m); Dhupgarh (1250 m). In sal forest and mixed deciduous forest. Common.

*Fl. & Fr.*: April December.

59. OLEACEAE Hoffm. & Link

1a. Shrubs, scandent or erect. Leaves simple to

1b. Trees. Leaves 5-7-foliolate

**Jasminum** 1

**Schrebera** 2
1. *Jasminum L.*

1a. Leaves 1-foliate:

2a. Calyx teeth twice the length of the tube.... *J. sambac* 4

2b. Calyx teeth less than twice as long as the tube:

3a. Leaves ovate, obtuse or subacute. Calyx teeth minute, ovate... *J. roxburghianum* 3

3b. Leaves broadly ovate or orbicular, acuminate. Calyx teeth linear subulate... *J. arborescens* 1

1b. Leaves 5-7-foliate


Large climbing shrubs, densely hairy. Leaves broadly ovate or orbicular, long acuminate, 6-12 cm in diameter or broader. Flowers white, 2-2.5 cm across.

**PACHMARHI**: Dhupgarh (1200 m). In forest undergrowth. Occasional.

*Fl. & Fr.*: March October.


Very similar to the type variety but all leaflets are of equal size. Flowers larger. Corolla lobes often streaked with red on the back.

**PACHMARHI**: Dhupgarh (1200 m). In forest undergrowth.

*Fl. & Fr.*: June October.


Twining or scandent shrubs. Leaves 1-foliate, ovate or elliptic, 0.5-3 x 0.5-2.2 cm. Flowers white, sweet-scented, in terminal, short, trichotomous cymes. Fruits ellipsoid, smooth, black.

**PACHMARHI**: Vicinity (1000 m). In forest undergrowth. Abundant.

*Fl. & Fr.*: March October.

Suberect shrubs; young branches pubescent. Leaves opposite, broadly ovate or elliptic, 3 × 2 cm. Flowers white, in few to many flowered terminal cymes, very fragrant and often double in cultivation.

PACHMARHI: Vicinity (1000 m). In forest undergrowth. Occasional.

*Fl. & Fr.*: April October.

2. **SCHREBERA ROAD.**


Medium sized trees. Leaves opposite, imparipinnate, leaflets 5–9, ovate, acute, often unequally sided; petiolules articulate. Flowers in terminal, trichotomous, many flowered cymes, white or brown, fragrant at night. Calyx campanulate, pubescent. Corolla lobes ovate, obtuse, as long as the tube, dotted on the inside with glandular brown spots. Capsule 2.5 cm long, rough with white raised dots. Seeds 3–4 in each cell.

PACHMARHI: Galra Nala (900m). In sal forests. Occasional.

*Fl. & Fr.*: April December.

60. APOCYNACEAE Juss.

1a. Plants with spines. Fruits fleshy berries...  
1b. Plants without spines. Fruits follicles:

2a. Plants herbaceous...  
2b. Plants woody:

3a. Trees or erect shrubs...  
3b. Climbing or twining shrubs:

*Corissa* 1  
*Catharanthus* 2  
*Wrightia* 5
1. **Carissa L.**


Erect or scandent spiny shrubs. Spines straight or slightly curved. Leaves broadly ovate; base cuneate to slightly rounded; apex bluntedly acute, mucronate. Flowers white, fragrant. Berry spherical or ellipsoid, fleshy, black on ripening. Seeds 4, flat.

**BORI**: Reserve forest (550 m). On forest edges and rocky slopes. Common.

*Fl. & Fr.*: May October.

2. **Catharanthus G. Don**


Erect, glabrous, annual herbs. Leaves lanceolate, glabrous; base attenuate; apex acuminate. Flowers in 1-2 flowered cymes. Corolla white; mouth of the tube pilose within; lobes obovate. Follicles slender, striate, glabrous. Seeds black, muricate ribbed.

**BORI**: Reserve forest (500 m). Along river banks. Abundant.

*Fl. & Fr.*: July December.

3. **Icacinus R. Br.**


Woody, twining shrubs. Leaves lanceolate to ovate, glabrous to sparsely pubescent below; base acute; apex acute to acuminate. Corolla white to rose; lobes pubescent along margins and at base. Follicles 5-15 cm long, sometimes divergent.

**PACHMARHI**: Vicinity (1000 m). In mixed forest forming canopy on trees. Abundant.

*Fl. & Fr.*: August February.

4. **VALLARIS N. BURM.**


Large, woody, twining shrubs. Leaves elliptic or obovate, acute or shortly acuminate at apex, acute at base, more or less pubescent, glandular-dotted abaxially. Flowers white, fragrant, in many flowered axillary cymes. Calyx divided to near the base, pubescent; tube short, longer than the calyx lobes. Ovary and style hairy. Fruits oblong, fibrous, fleshy.

**BORI**: Reserve forest (550 m). In mixed forest. Common.

*Fl. & Fr.*: December April.

5. **WRIGHTIA R. BR.**

1a. Leaves glabrous. Coronal - scales free ....

1b. Leaves tomentose. Coronal - scales connate...

W. *tomentosa* 2


Small trees. Leaves elliptic oblong, acuminate, base rounded.
Flowers white in lax, terminal cymes. Corolla tube twice the length of calyx. Corona of numerous linear scales. Fruits of 2 distinct pendulous, slender follicles cohering at the top only.

PACHMARHI: Vicinity (1000 m); Mahadev hill (1250 m). In mixed deciduous forest amongst rocks. Abundant.

Fl. & Fr.: April January.


Small trees, softly tomentose. Leaves elliptic, acuminate. Flowers in subsessile, corymbose cymes, tomentose; bracts ovate, deciduous. Corolla-tube twice the length of calyx, lobes oblong, yellowish, corona fleshy, orange coloured, cleft into unequal lobes. Fruits subcylindrical, laterally compressed, lenticellate, with two shallow black furrows at the junction of the carpels.

PACHMARHI: Dhupgarh (1250 m). In mixed deciduous forest. Abundant.

Fl. & Fr.: April January.

61. ASCLEPIADACEAE R. Br.

1a. Plants erect.

1b. Plants twining, procumbent, or straggling:

2a. Leaves absent

2b. Leaves well developed:

3a. Corolla more than 20 mm long, tubular

3b. Corolla less than 20 mm long, rotate:

4a. Corolla entirely glabrous:

5a. Corona of 5 lobes

5b. Corona unlobed or absent:

6a. Corona of 5 prominent fleshy anuatus at the base of the gynostegium. Anthers connate

Colostreum 1
Sarcoptemna 9
Ceropogia 2
Typhora 10
Eulostemma 6
6b. Corona absent. Filaments free:

7a. Corolla lobes valvate...

7b. Corolla lobes imbricate...

Hemidesmus 5

Cryptolepis 3

4b. Corolla pubescent, at least within or on the margin:

8a. Corolla with fleshy lobes within at the sinuses:

9a. Corolla lobes valvate, margins revolute at anthesis...

9b. Corolla lobes imbricate, margins not revolute at anthesis...

Leptadenia 8

Gynnema 4

8b. Corolla without fleshy lobes...

Hovea 7

1. Calotropis R. Br.


Shrubs with white, toxic latex. Leaves elliptic ovate to obovate, densely arachmoid pubescent when young; base clasping cordate; apex obtuse or slightly acuminate. Corolla rotate, lobes purple to white. Follicles 7–10 cm long, falcately lanceolate. Seeds comose.

PACHMARHI: Mahadev hill (1200 m). On waste lands near the roads. Occasional.

Fl. & Fr.: December - May.

Roots are used for treatment of night blindness.

2. Ceropegia L.

1a. Corolla nearly straight; tube longer than the ciliate lobes. Leaves hirsute...

C. hirsuta 1
1b. Corolla distinctly curved; tube not longer than
the glabrous lobes. Leaves nearly glabrous ... 
C. raizadiana 2

Hook. f. Fl. Brit. Ind. 4: 74. 1883; Stevens in Sald. & Nicol. Fl. Hassan 
444. 1976. "Bosia Kand".

Stem twining, rhizome tuberous. Leaves mostly ovate elliptic. 
Cymes few flowered. Corolla light green and variously blotched and 
striped with purple; mouth dilated; lobes broad, folded back, ciliated on 
the margins and midrib. Outer corona lobes deltoid, apex cleft, long 
pilose, extending above the gynostegium; inner lobes linear, hooked at 
the tips, 3 times longer than the outer. Gynostegium short, stipitate.

**PACHMARHI**: Dhupgarh (1250 m). **BORI**: Reserve forest (550m.).
In forest undergrowth. Abundant.

*Fl. & Fr.*: July October.

Ind. 4: 74. 1883.

Stout climbers with fusiform tubers and glabrous branches. Leaves 
ovoate or elliptic oblong; base rotundate, cuneate; apex acuminate, 
glabrous, rarely hispid. Inflorescence of 4–8 flowered cymes; peduncles 
short, solitary. Calyx 5-lobed; lobes linear, glabrous. Corolla tube curved with 
a swollen base, lobes lanceolate, connate only at the top. Corona scales 5, 
deeply 2-fid. Follicles 10–12 cm long.

**PACHMARHI**: Dhupgarh (1250 m) In forest undergrowth. 
Occasional.

*Fl. & Fr.*: July October.

3. **Cryptolepis R. Br.**

*Cryptolepis buchananii* Roem. & Schult. Syst. Veg. 4: 409. 1819; 
Hook. f. Fl. Brit. Ind. 4: 5. 1883; Stevens in Sald. & Nicol. Fl. Hassan 
446. 1976. "Karanja".

Large, glabrous, twining shrubs. Leaves elliptic or oblong or oblong 
lanceolate. Flowers white or yellowish green in short paniculate cymes. 
Follicles fusiform, spreading, seeds black, long, cornose.
PACHMARHI: Mahadev hill (1250 m). BORI: Reserve forest (550 m). In the mixed forest climbing on trees and shrubs. Common.

Fl. & Fr.: April October.


1a. Leaves broadly ovate. Corolla
   5 - 6 mm across
   ...  

1b. Leaves elliptic or obovate Corolla 2 3 mm
   across 
   ...  


Twining shrubs. Leaves broadly ovate, softly pubescent on both sides, as are the branches and petioles. Cymes 2 nate, subsessile, few to many - flowered. Corolla 5 6 mm across, lobes thick ciliolate. Follicles slender, glabrous.

PACHMARHI: Vicinity (1000m). In mixed forest on trees and shrubs. Abundant.

Fl. & Fr.: April July.


PACHMARHI: Dhupgarh (1250 m). In mixed forest climbing on trees and shrubs. Abundant.

Fl. & Fr.: April July and October - February.

The leaves, if chewed, temporarily paralyses the taste buds of the tongue; used in diabetes in the villages.
5. **Hemidesmus R. Br.**


Prostrate or twining shrubs. Leaves variable, ovate, elliptic, elliptic oblong or rarely obovate. Flowers dull brown outside, red within. Follicles linear lanceolate. Seeds with silvery white coma.

**PACHMARHI**: Dhupgarh (1250 m). In mixed forest climbing on trees and shrubs. Abundant.

*Fl. & Fr.*: August December.

6. **Holostemma R. Br.**


Large twining shrubs. Stem much - branched; young parts minutely pubescent. Leaves ovate, acuminate, cordate and shortly cuneate at the base. Flowers pinkish purple in lateral, short, fasciculate cymes. Follicles linear - oblong, somewhat tapering to a blunt point.

**PACHMARHI**: Mahadev hill (1250 m). In mixed forest. Abundant.

*Fl. & Fr.*: July October.

7. **Hoya R. Br.**

Usually epiphytic, perennial climbers. Leaves elliptic, glabrous; base acute to attenuate; apex acuminate; margins revolute and not undulating; lateral veins at nearly right angles to the midrib. Flowers cream-coloured, scented, in lateral, many flowered umbels. Corolla lobes pubescent within. Follicles solitary or in pairs, linear, tapering at the apex. Seeds oblong, coma 5 cm long.

PACHMARII: Vicinity (100 m). Creeping on steep hill slopes. Occasional.

Fl. & Fr.: May January.

8. Leptadenia R. Br.


Erect, much branched, nearly leafless shrubs. Stems cylindrical, green, herbaceous, straggling or drooping. Leaves usually wanting, present on young shoots only, sessile, fleshy, linear, acute at the apex. Flowers very small, greenish-yellow, in lateral umbellate cymes. Calyx cupular, pubescent outside; lobes divided half-way down. Corolla rotate or nearly so; lobes lanceolate, pubescent on both sides. Follicles solitary lanceolate, beaked. Seeds ovate lanceolate; coma 4 cm long.

PACHMARII: Vicinity (1000 m), 25. 7. 64, Passiguli 4501 (BSA). In mixed forest. Rare.

Fl. & Fr.: October February.


Fl. & Fr. : July January.

10. TYLOPHORA R. BR.


Erect, perennial, undershrubs ; sap watery. Leaves coriaceous, ovate or lanceolate, acute or shortly acuminate, rounded or cordate at base. Cymes lateral, umbellate to paniculate. Calyx lobes deltoid, revolute at anthesis, sparsely pilose. Corolla lobes purplish brown, pilose within. Corona lobes rounded, laterally concave with a short cusp appressed to the gynostegium. Gynostegium stipitate. Follicles usually solitary, ovoid, flat above, bulging on the lower side. Seeds broadly ovate or orbicular.

PACHMARHI : Vicinity (1000 m), Saxena 83341 (SFRI) In forest undergrowth on bushes. Rare.

Fl. & Fr. : May December.

62. LOGANIACEAE Mart.

1a. Trees or shrubs:

2a. Flowers 4 - merous. Abaxial side of leaf always tomentose ... Buddleja 1

2b. Flowers 5 - merous. Abaxial side of leaf never tomentose ... Strychnos 3

1b. Herbs ... Mitreola 2
1. Buddleia L.

1a. Ovary and style glabrous. Fruit a dehiscent capsule ...  
1b. Ovary and style pubescent. Fruit fleshy, indehiscent ...  

B. asiatica 1  
B. madagascariensis 2


Evergreen, suffruticose undershrubs. Leaves lanceolate or long, acuminate, base acute, white tomentose on the lower surface. Flowers in thyrsoid, densely tomentose panicles. Calyx divided above the middle, densely white tomentose; lobes triangular, acute. Corolla white, throat densely hairy; lobes oblong, obtuse, hairy outside. Stamens inserted above the middle of the corolla tube. Fruits ellipsoid, oblong, glabrous.

PACHMARHI : Mahadev hill (1200 m). Along river bank and streams. Abundant.

Fl. & Fr. : November March.


Shrubs with silvery-white tomentum. Leaves ovate or lanceolate, glabrous above, densely tomentose beneath; base rounded to acute; margin entire; apex acute. Inflorescence terminal, thyrsoid cymes. Flowers subsessile, sweet-scented. Calyx campanulate, outside densely tomentose, broadly triangular. Corolla orange, outside densely tomentose; lobes rounded. Stamens inserted slightly below the mouth. Fruit globular, pubescent, at first white, when ripe purple-blue. Seeds ellipsoid.

PACHMARHI : Vicinity (1000 m), 27. 12. 62, Pangiari 6597 (BSA). In mixed forest. Rare.

Fl. & Fr. : October February.

2. Mitreola L.

Flect, slender, annual herbs. Stem 4 angular, narrowly winged. Leaves 1-2 pairs, ovate lanceolate to oblanceolate, base rounded or subcordate; apex acute or acuminate. Flowers sessile in long-peduncled, 2 to 4 times forked cymes. Calyx divided less than halfway down; lobes linear, obtuse. Corolla white; lobes oblanceolate, obtuse. Fruits 2 horned, erect, deeply emarginate, with upcurved lobes.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Dhain (462 m). In forest undergrowth. Occasional.

**Fl. & Fr.**: August November.

3. **STRYCHNOS** L.


**BORI**: Dhain (462 m). In mixed forest. Occasional.

**Fl. & Fr.**: September June.

The seed paste has got good electrolytic activity and clears the turbid water. Highly poisonous in large quantities; contains strichnine and brucine.

63. **GENTIANACEAE** Juss.

1a. Flowers irregular:

2a. Small herbs. Flowers sessile. Stamens 1...

2b. Large herbs. Flowers stalked. Stamens 4...

1b. Flowers regular:

3a. Petals glandular...

3b. Petals eglandular...

... *Hoppea* 3

... *Canasora* 1

... *Swertia* 4

... *Exacum* 2
1a. Stem 4 - angled, but not winged
1b. Stem 4 - winged:

2a. Pedicels winged
2b. Pedicels not winged

I. Canscora Lamk.


Herbs with winged stem. Leaves elliptic, acute at both ends. Pedicel and calyx not winged. Corolla pink.

PACHMARHI: Vicinity (1000 m). In moist places along water courses. Occasional.

Fl. & Fr.: October November.


PACHMARHI: Jambudeep (900 m). In open forest under moist condition. Occasional.

Fl. & Fr.: September November.


Erect, annual biennial herbs. Stem 4 - angled, not winged. Leaves elliptic - ovate to oblong, narrowed at both ends. Flowers in a leafy, paniculate cyme, sometimes solitary. Corolla pink with a brown throat; segments unequal. Capsule as long as the calyx.

PACHMARHI: Mahadev hill (1250 m). BORI: Reserve forest.
(300 m); Dhain (430 m). In conglomerate beds and laterite soil along water courses. Common.

Fl. & Fr.: October February.

2. EXACUM L.

1a. Leaves distinctly petiolate
1b. Leaves all sessile:
   2a. Corolla 2 cm long
   2b. Corolla less than 1 cm long


Erect herbs. Leaves sessile, elliptic oblong, acute. Inflorescence usually dense, many flowered cymes; occasionally flower solitary. Calyx 4 lobed, winged on back. Corolla showy, 2 cm long, 4 lobed; lobes broadly ovate, acute, white with dark purple tips.

BORI; Dhain (430 m). In moist places in the forest. Occasional.

Fl. & Fr.: September January.


Small herbs. Leaves petiolated, elliptic, acute at both ends or ovate, acuminate, 3-nerved. Cymes few-flowered. Calyx 4 lobed. Corolla 4 lobed, pale blue.

BORI; Reserve forest (900 m). On hill slopes under moist conditions. Occasional.

Fl. & Fr.: September November.


PACHMARHI: Dhupgarh (1200 m). On moist soil in the forest. Occasional.
Fl. & Fr.: September - October.

3. Hoppea Willd.


PACHMARHI: Jambudeep (1050 m). On moist slopes. Occasional.
Fl. & Fr.: September - November.

4. Swertia L.


PACHMARHI: Dhupgarh (1250 m). On hill slopes. Occasional.
Fl. & Fr.: October - December.

64. Menyanthaceae Dum.

Nymphoides Seguier.


**Bori**: Reserve forest (440 m). In stagnant pools near the river bed. Abundant.

*Fl. & Fr.*: All seasons.

65. BORAGINACEAE Juss.

1a. Herbs:

2a. Flowers more than 1 cm wide, long - pedicelled, solitary or in nonscorpioid racemes ...

   *Trichodesma* 6

2b. Flowers less than 1 cm wide, sessile or short-pedicelled, in scorpioid spikes or racemes:

3a. Flowers racemose, remote; nutlets glochidiate ...

   *Cynoglossum* 2

3b. Flowers spicate, crowded; nutlets smooth ...

   *Heliotropium* 4

1. Woody shrubs or trees:

4a. Leaves less than 3 cm long, crowded on short lateral branches or fasciculate ...

   *Rosita* 5

4b. Leaves with at least some over 5 cm long, alternate to subopposite:

5a. Style dichotomously twice - branched; endocarp unlobed ...

   *Cordia* 1

5b. Style once - branched; endocarp 2 - 4 lobed ...

   *Ehretia* 3

1. **Cordia** L.


Medium sized trees; young parts pubescent. Leaves alternate, ovate, elliptic or orbicular. Flowers white, polygamous in axillary and terminal cymose panicles. Drupes pale orange coloured, globose.
BORI: Reserve forest (350 m). In mixed forest. Common.
Fl. & Fr.: March June.

2. CYNOGLOSSUM L.

1a. Flowers deep blue. Nutlets strongly margined, glochidiate, sparingly on the faces
... C. glochidiatum 1

1b. Flowers white with bluish centre. Nutlets glochidiate on all sides, not or most obscurely margined:

2a. Flowers 2.5-2.5 mm across. Leaves rough with long, white, bulbous based hairs
... C. lanceolatum 2

2b. Flowers 3 mm across. Leaves mostly clothed with short, soft brown hairs
... C. zeylanicum 3


Erect, pubescent herbs. Radical leaves petiolate; cauline ones sessile, ovate lanceolate, entire, pubescent, hairs occasionally bulbous based. Flowers in long one-sided racemes. Calyx deeply 5-lobed. Corolla deep blue; tube as long as the calyx; lobes 5, spreading. Nutlets 4, strongly margined, glochidiate, sparingly on the faces.

PACHMARHI: Vicinity: (1000 m). In forest undergrowth. Occasional.
Fl. & Fr.: July November.


Erect, pubescent herbs. Lower leaves petiolate, upper ones sessile, alternate, narrowly lanceolate, with bulbous based hairs. Flowers in long, simple or forked one-sided racemes. Calyx deeply 5-lobed, persistent. Corolla white, with blue centre; tube as long as the calyx, 5-lobed, spreading. Nutlets 4, not or obscurely margined, glochidiate in all sides.

PACHMARHI: Dhupgarh (1250 m). In forest undergrowth and waste lands. Occasional.
Fl. & Fr.: July-October.

Erect, pubescent herbs. Radical leaves stalked; cauline ones sessile, ovate, acute at both ends. Calyx lobes ovate, bristly hairy. Corolla lobes rounded, spreading, white with a blue tinge. Nutlets 4, glochidiate on all sides, not or most obscurely margined.

**PACHMARHI** : Mahadev hill (1200 m). **BORI** : Reserve forest (550 m); Dhain (430 m). In forest undergrowth and in forest holes. Common.

*Fl. & Fr.* : July - October.


Small trees. Leaves lanceolate, ob lanceolate, acuminate, cuneate to rounded at base, usually symmetrical. Calyx lobes small, ovate, campanulate. Corolla white; lobes ovate, acute to rounded, with recurved margins, reflexed. Fruits fleshy, indehiscent, 4 seeded.

**BORI** : Reserve forest (550 m). In mixed forest. Abundant.

*Fl. & Fr.* : April - October.

4. *Heliotropium* L.

1a. Bracts inconspicuous. Flower spikes up to 7 cm long ... **H. brevifolium** 1

1b. Bracts conspicuous. Flower spikes up to 2.5 cm long ... **H. marifolium** 2

Much branched undershrubs. Leaves narrowly oblong, lanceolate, white, strigose hispid, margins reflexed. Flowering spikes up to 7 cm long. Nutlets ovoid, with minute grey hairs.

PACHMARHI: Vicinity (1000 m). Along the sandy river bed. Abundant.

*Fl. & Fr.: December - July.*


BORI: Dhain (430 m). Along the river bed. Abundant.

*Fl. & Fr.: December - July.*

5. *Rotula Lour.*


Trailing shrubs. Leaves entire, oblong oblanceolate, apiculate. Inflorescence a few-flowered cyme. Flowers pink to purple. Drupes globose, tipped by persistent style, strongly 4 loded breaking into four 1-seeded pyrenes.

BORI: Reserve forest (500 m). Along the sandy and rocky river bed. Abundant.

*Fl. & Fr.: September - March.*


1a. Calyx lobes hastate below. Flowers white

1b. Calyx lobes not hastate below. Flowers blue


**PACHMARHI**: Mahadev hill (1250 m); Dhupgarh (1200 m). On hill slopes amidst grasses. Common.

*Fl. & Fr.*; December July.


**BORI**: Reserve forest (500 m). On road side and waste lands. Abundant.

*Fl. & Fr.*; December August.

66. **CONVOLVULACEAE** Juss.
1. Argyreia Lour.

1a. Leaves broadly ovate, cordate, acute, densely silky-white-tomentose beneath. Bracts ovate-lanceolate, caudate acuminate. Sepals ovate or orbicular, obtuse. ... A. nervosa 2

1b. Leaves ovate or deltoid, acute or acuminate, rounded truncate or cordate, sparsely strigose beneath. Bracts linear-oblong. Sepals lanceolate, acute or acuminate. ... A. involucrata 1


Large twining shrubs. Leaves ovate or deltoid, acute or acuminate, sparingly hairy or glabrescent. Peduncles shorter than the leaves, Bracts linear-oblong, persistent. Flowers subcapitate. Corolla pinkish-grey.

BORI: Reserve forest (1000 m). In mixed forest. Common.

Fl. & fr.: August November.


PACHMARHI: Vicinity (1000 m). In the valley. Occasional.

Fl. & Fr.: July October.

2. Cuscuta L.

FLORA OF PACHMARHI


PACHMARHI: Vicinity (1000 m). BORK: Reserve forest (1000 m). Parasite on trees and shrubs. Abundant.

Fl. & Fr.: September January.

3. EVOLVULUS L.


PACHMARHI: Dhupagrah (1250 m); Mahadev hill (1200 m). In the forest floor among the rocks. Common.

Fl. & Fr.: January December.

4. INOMORA L.

1a. Inflorescence subsessile. Flowers less than 1 cm long...

1b. Inflorescence distinctly peduncled. Flowers more than 1 cm long:

2a. Sepals awned at or below the apex...

2b. Sepals obtuse, acute at apiculate, not awned:

3a. Leaves lobed:

4a. Leaves palmately 3-lobed...

4b. Leaves palmately dissected to the base;
3a. Calyx glabrous
3b. Calyx hairy outside

3b. Leaves entire:

6a. Sepals glabrous
6b. Sepals hirsute


Slender, glabrous, perennial twiners with tuberous rootstock. Leaves palmately 5 to 7 parted; segments elliptic obovate or lanceolate, narrowed at both ends; basal ones often 2-lobed or parted. Petioles long, with a pair of glands and stipule-like leaves at the axillary shoot on the base. Flowers in 1 to 3 flowered cymes. Calyx segments unequal, ovate. Corolla white or purple, with red purple inside towards the base. Capsule globose, glabrous.

PACHMARHI: Dhupgarh (1250 m), Feb. 78, Pari 27161 (BSA). On roadside hedges and bushes. Occasional.

Fl. & Fr.: All seasons.

New record for the area.


PACHMARHI: Vicinity (1000 m). In the forest on bushes. Occasional.

Fl. & Fr.: April December.


BORI: Reserve forest (550 m); Dhain (462 m). On bushes in the mixed forest. Occasional.

Fl. & Fr.: July-December.


PACHMARHI: Vicinity (1000 m). On bushes in the forest. Occasional.

Fl. & Fr.: March-November.


PACHMARHI: Vicinity (900 m). On bushes and hedges. Abundant.

Fl. & Fr.: September-March.


Slender, twining, sometimes prostrate, annual herbs with rigid hairs. Leaves orbicular, palmately divided nearly to the base with 5-7 segments
segments oblong to elliptico-oblong, slightly acuminate towards both ends, densely hairy. Inflorescence axillary with an involucrate, cymose, few-flowered head at the apex. Sepals slightly unequal, lanceolate, long hairy. Corolla funnel-shaped, white. Capsule ovoid, 1-celled, 4-valved. Seeds 4, sparsely grey tomentose.

**PACHMARHI**: Jambudeep (1000 m). On bushes in the forest. Common.

*Fl. & Fr.*: September December.


Twining, annual herbs with short hairs mixed with longer bristles. Leaves broadly ovate or orbicular, sometimes 3-lobed, cordate at base, shortly acuminate at apex, hairy on both surfaces. Inflorescence axillary, one to few-flowered at the apex. Pedicels recurved. Sepals equal in length, hairy at the base, glabrous at the apex. Corolla funnel-shaped, glabrous; limbs inside purple-blue with reddish midpetaline bands, outside paler; tube much paler to white. Capsule globose, glabrous, 3-celled. Seeds 8 or less.

**PACHMARHI**: Vicinity (1000 m). Roadside escape. Occasional.

*Fl. & Fr.*: September March.

67. SOLANACEAE Juss.

1a. Anthers dehiscent by apical pores. Aculeate or armed... *Solanum* 4

1b. Anthers longitudinally dehiscent. Unarmed:

2a. Fruit a berry, indehiscent... *Nicandra* 2

2b. Fruit a capsule, dehiscent:

3a. Flowers solitary... *Datura* 1

3b. Flowers in cymose panicles or corymbs... *Nicotiana* 3

1. *Datura* L.


PACHMARHI: Dhupgarh (1250 m). In waste places and forest margins. Common.

Fl. & Fr.: All seasons.

2. NICANDRA Adans.


Small, erect, glabrous herbs. Leaves ovate or ovate-lanceolate, lobed or coarsely toothed. Flowers blue, solitary, axillary or terminal on short peduncles. Berries somewhat dry with numerous flat seeds, enclosed by calyx.

BORI: Reserve forest (550 m). In forest undergrowth and wayside. Occasional.

Fl. & Fr.: September December.

3. NICOTIANA L.


Erect herbs. Leaves large, ovate-lanceolate, acute. Flowers white in terminal panicles. Capsules ovoid, 2-4-valved, more or less enclosed by the calyx exposing only a conical top portion, glabrous.

PACHMARHI: Vicinity (1000 m). Near sal forest as escape from cultivation.

Fl. & Fr.: January March.
4. Solanum L.

1a. Plants climbing
1b. Plants not climbing:

2a. Plants unarmed:
   3a. Corolla white
   3b. Corolla purple

2b. Plants armed:
   4a. Flowers unisexual
   4b. Flowers bisexual:
      5a. Corolla violet or blue
      5b. Corolla white

- S. seaforthianum 5
- S. nigrum 4
- S. dulcamara 1
- S. incanum 2
- S. indicum 3
- S. torvum 6


PACHMARHI: Mahadev hill (1250 m). On forest margins. Occasional.

Fl. & Fr.: August January.


PACHMARHI: Mahadev hill (1250 m), Feb. 78, pant 27123 (BSA). In the forest margin. Rare.

Fl. & Fr.: January June.

New record for the area.


PACHMARHI: Mahadev hill (1200 m). On hill slopes. Abundant.

Fl. & Fr.: April December.


Perit. annual herbs, unarmed, glabrous or sparsely hairy. Leaves ovate-lanceolate. Flowers white in extra-axillary 3 8-flowered short racemes. Berries black (in diploid) or red (in tetraploid), globose, smooth, shining. Seeds many, discoid, yellow, minutely pitted.

PACHMARHI: Dhupgarh (1200 m). In forest undergrowth. Common.

Fl. & Fr.: August January.


PACHMARHI: Vicinity (1000 m), Feb. '78, Punt 27131 (BSA). Roadside and on forest margins. Rare.

Fl. & Fr.: January October.

New record for the area.


BORI: Reserve forest (900 m). On hill slopes. Common.

Fl. & Fr.: All seasons.
68. SCROPHULARIACEAE Juss.

1a. Fruit dehiscent by apical pores, Corolla spurred
1b. Fruit dehiscent not by apical pores, Corolla not spurred:
   2a. Leaves alternate
   2b. Lower leaves opposite; upper ones opposite or alternate:
      3a. Corolla subrotate, nearly actinomorphic, 4-partite near the base
      3b. Corolla not rotate, zygomorphic, 2-lipped:
      4a. Corolla with upper lobes outside in the bud:
         5a. Fertile stamens 2
         5b. Fertile stamens 4:
            6a. Fruit 4-valved
            6b. Fruit 2-valved:
               7a. Anther-cells divergent
               7b. Anther-cells parallel:
                  8a. All the stamens with perfect cells
                  8b. Two or all the stamens with one imperfect cell
         4b. Corolla with lower lobes outside in the bud:
            9a. Calyx campanulate, subfoliaceous
            9b. Calyx tubular, not foliaceous:
               10. Anthers 2-celled, but one fertile
               10b. Anthers 1-celled
                  11a. Corolla-tube straight, faintly ribbed
                  11b. Corolla-tube forwardly curved, prominently ribbed

1. Adenosma R. Br.


_Buchnera L._


_PACHMARHI:_ Vicinity (1000 m). _BORI:_ Reserve forest (550 m). In forest undergrowth near moist situations. Common.

__Fl. & Fr.:__ October December.

3. _Centranthera R. Br._


Erect, hispid, annual herbs. Leaves sessile, narrowly lanceolate-oblong, obtuse, shallowly serrate; higher ones smaller, passing into bracts. Flowers in spike-like racemes. Calyx spathaceous. Corolla white or purple. Tube light-yellow, slightly curved; lobes subequal, orbicular, crenulate. Capsule ovoid.

_BORI:_ Reserve forest (450 m). Feb. '78. _Pust 27242_ (BSA). Along the nalsas. Rare.
Fl. & Fr.: October February.

New record for the area.

4 Kickxia Num

1a. Plants villous. Leaves ovate or hastate ... K. incana 1

1b. Plants glabrous or slightly pubescent. Leaves variable in size; lower ones 3-7-lobed ... K. ramosissima 2


Prostrate, villous, perennial herbs. Leaves ovate or hastate. Flowers larger, yellow; spur much shorter than the corolla-tube. Capsule subglobose. Seeds closely pitted.

PACHMARHI: Vicinity (1000 m), 22-8-49. Narayaneswami 3513 (CAL). In the forest undergrowth. Rare.

Fl. & Fr.: September December.


Perennial herb often much-branched from the base; branches slender, glabrous. Leaves alternate, glabrous, the lower ones 3-7-lobed, triangular-hastate, the upper ones usually lanceolate-sagittate, apiculate. Flowers yellow, on filiform axillary pedicels, obtrorse. Capsule subglobose.

PACHMARHI: Vicinity (1000 m), 26-12-62, Panigrahi 6527 (CAL). In forest undergrowth. Rare.

Fl. & Fr.: September December.

5. Limnophila R. Br.

1a. Flowers small, solitary or in short-peduncled, head-like spikes. Leaves opposite, serrate:
2a. Leaves feebly nerved, nerves few  
   ... *L. aromatica* 1

2b. Leaves strongly nerved, nerves many:

3a. Leaves pinnately nerved. Calyx lobes lanceolate  
   ... *L. rugosa* 4

3b. Leaves parallel-nerved. Calyx lobes ovate  
   ... *L. connata* 2

1b. Flowers pedicellated, axillary, solitary. Lower leaves in whorls, divided into several, widely patent, short, narrow segments  
   ... *L. indica* 3


**PACHMARHI**: Vicinity (1000 m). Saxena 7845 (SFRI). Along the streams. Rare.

*Fl. & Fr* : August November.


Erect, stout, glabrous herbs. Leaves all opposite, with semi-amplexicaul base, elliptic or ovate, oblong, obtuse, entire, crenulate. Flowers sessile in axils of leafy bracts, combined into spikes, rose purple. Corolla as long as the calyx. Capsule broadly ellipsoid.

**PACHMARHI**: Vicinity (1000 m). Saxena 445 (SFRI). Along the streams. Rare.

*Fl. & Fr* : September November.

Aquatic, aromatic herbs. Lower leaves divided into linear - filiform segments; upper ones 3 - 5 - lobed or often undivided. Flowers in the axils of submerged leaves. Calyx divided less than half - way down; lobes linear. Corolla pale purple. Capsules ovoid - ellipsoid, as long as the calyx.

PACHMARHI: Jambudeep (900 m), BORI: Dhaia (430 m). In stagnant pools along the rivers. Common.

Fl. & Fr.: July - December.


Creeping erect, annual, aromatic herbs. Leaves opposite, ovate - elliptic to oblong, shallowly serrate; nerves strong, pinnately arranged on the abaxial surface. Flowers sessile in head - like spikes. Bracts leaf - like. Calyx divided half way down; segments unequal, lanceolate. Corolla - tube yellow; limbs lilac; upper lip emarginate; lower lip 2 - lobed.

PACHMARJI: Vicinity (900 m). Along the streams. Occasional.

Fl. & Fr.: August - December.


Erect or decumbent - ascending glandular - hairy, annual herbs. Leaves ovate - elliptic, patently glandular - hairy. Flowers axillary. Calyx divided less than halfway down. Corolla yellow.

PACHMARHI: Vicinity (1000 m). In damp, shaded localities on hill slopes. Occasional.

Fl. & Fr.: July - February.
7. Lindernia All.

1a. Leaves palmately 3-5-nerved:
   2a. Stamens 4
      ...  L. procumbens 6
   2b. Stamens 2; staminodes 2
      ...  L. hyssopoides 4

1b. Leaves pinninerved:
   3a. Capsule shorter or as long as the calyx:
      4a. Calyx divided halfway down or less:
         5a. Corolla 1 cm long. Calyx - ribs keeled or narrowly winged. Calyx patently long - hairy ...
            ...  L. hookeri 3
         5b. Corolla 0.5-0.6 cm long. Calyx - ribs not keeled or winged. Calyx glabrous ...
            ...  L. crustacea 2
      4b. Calyx divided very near to the base ...
            ...  L. viscosa 7
   3b. Capsule much longer than the calyx:
      6a. Fertile stamens 4
      Fertile stamens 2
      ...  L. nummulariifolia 5
      ...  L. ciliata 4


Erect, annual herbs. Leaves sessile, oblong or obovate, obtuse, pinninerved, serrate. Flowers in terminal racemes. Corolla pinkish white. Stamens 2; staminodes 2. Capsule more than twice the length of the calyx, cylindric.

PACHMARHI: Vicinity (100 m). In moist shady places. Occasional.

Fl. & Fr.: August November.


Erect or decumbent, ascending annual herbs. Leaves petiolate, ovate, pinninerved. Flowers axillary, solitary. Calyx shortly lobed during anthesis, afterwards divided near to the base. Corolla purple; lower lip with a yellow spot at the base. Stamens 4; anterior filaments appendiculate. Capsules obovate, slightly exceeding the calyx.
PACHMARHI: Dhupgarh (1250 m); Mahadev hill (1200 m). On moist slopes of hills. Common.

Fl. & Fr.: July October.


PACHMARHI: Vicinity (900 m), Saxena & Pandey 81342 (SFR). In marshy places near streams. Rare.

Fl. & Fr.: September November.


BORI: Kobra nala (430 m), Feb. '78. Pant 27257 (BSA). In swampy places near the streams. Rare.

Fl. & Fr.: August - March.

New record for the area.


PACHMARHI: Vicinity (1000 m). In moist shaded places and moist rocks. Occasional.

Fl. & Fr. : September - November.


PACHMARHI: Jambudeep (900 m), Feb. '78. Pant 27204 (BSA). In moist shady places. Rare.

Fl. & Fr. : September-February.

New record for the area.


PACHMARHI: Jambudeep (900 m). On hill slopes and shaded localities. Occasional.

Fl. & Fr. : September - November.
8. **Mazus Lour.**


**PACHMARHI** : Vicinity (1000 m). In moist shady places. Occasional.

*Fr. & Fr.* : July - February.

9. **Melasma Thunb.**


Erect, stiff, annual parasitic herbs. Leaves reduced to green, brown or purple scales, the largest oblong, obtuse. Flowers in lax racemes. Calyx in fruit hemispheric; lobes broadly triangular. Corolla yellow with red nerves. Capsules globose, as long as the calyx. Seeds linear.

**PACHMARIII** : Vicinity (1000 m). In shady places. Occasional.

*Fr. & Fr.* : September - November.

10. **Scoparia L.**


**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve Forest (550 m). In forest undergrowth and sides of pathways. Common.

*Fl. & Fr.*: August February.

11. **STRIGA LOUP**.


Erect, tuberous, parasitic herbs. Leaves scale like, ovate lanceolate, acute; higher ones passing into bracts. Flowers in terminal spikes. Calyx 4-ribbed; lobes lanceolate. Corolla purple. Capsule ovoid-globose.

**PACHMARHI**: Vicinity (1000 m). Amidst grasses, parasitic on *Lepidagathis* sp. on hill slopes. Occasional.

*Fl. & Fr.*: August October.

12. **VERBASCUM L.**


Erect, pubescent, annual herbs. Leaves radical, long petioloed lyrate or pinnatisect, rarely entire, elliptic oblong or ob lanceolate, acute, crenate; cauline leaves passing into bracts, all coarsely dentate. Flowers in terminal racemes. Capsules globose, 4-valved.
BORT: Reserve forest (550 m). On hill slopes. Occasional.

Fl. & Fr.: January June

69. LENTIBULARIACEAE Rich.

UTRICULARIA L.

1a. Free-floating aquatic herbs. Leaves divided into filiform segments

_..._ U. exscapa 1

1b. Terrestrial or epiphytic herbs. Leaves entire or apparently so:

2a. Epiphytic herbs. Leaves orbicular, reniform. Seeds glochidiate

_..._ U. striatula 5

2b. Terrestrial herbs. Leaves linear, spathulate or peltate. Seeds not glochidiate:

3a. Flowers yellow:

4a. Leaves peltate. Capsule ellipsoid

_..._ U. scandens 4

4b. Leaves not peltate. Capsule globose

U. pubescens 3

3b. Flowers light blue or purple:

5a. Calyx lobes longer than wide in fruit, not denticulate. Plants erect or twining

_..._ U. graminifolia 2

5b. Calyx lobes nearly as wide as long, minutely denticulate. Plants always erect

_..._ U. uliginosa 6


PACHMARHI: Kanjighat (1000 m), Saxena 8214 (SFRI). In stagnant water pool near a stream. Rare.

Fl. & Fr.: September - March.

Occurrence of the species at this altitude is interesting.


Terrestrial herbs. Leaves 3 nerved. Traps with basal mouth; upper lip with simple appendages. Scapes erect or twining; scales, bracts and bracteoles basifixed. Pedicels usually longer than calyx. Calyx lobes sub-equal, longer than wide in fruit, acute or acuminate. Corolla blue; upper lip obovate; lower lip ovate orbicular, truncate; spur narrowly conic, curved. Capsules depressed globose. Seeds ovoid.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1200 m). Along streams. Occasional.

Fl. & Fr.: September - March


PACHMARHI: Jambudeep (900 m). In boggy open ground by stream near sal forest, among grasses and sedges. Occasional.

Fl. & Fr.: September - November.


PACHMARHI: Vicinity (1000 m). Boggy area near stream in sal forest. Occasional.

Fl. & Fr.: September - March.


Epiphytic herbs. Leaves orbicular reniform. Traps on stolon, mouth lateral. Scape filiform, erect. Calyx lobes very unequal. Corolla pale blue, often with white and orange spots; lower lip suborbicular, 5 lobed along the margin; spur curved under the lower lip of corolla. Capsule nearly globose. Seeds ovoid, glochidiate.

PACHMARHI: Mahadev hill (1250 m). On moist mossy barks and hill slopes. Occasional.

Fl. & Fr.: June - October.


PACHMARHI: Vicinity (1000 m). Amongst grasses in slightly moist situation in sal forest. Common.

Fl. & Fr.: July - September.

70. GESNERIACEAE Dum.
FLORA OF PACHMARHI

1. CHIRITA Buch. Ham.


PACHMARHI: Dhupgarh (1230 m); Vicinity (1000 m). On hill slopes. Abundant.

Fl. & Fr.: July-September.

Himalayan herb.

2. DIDYMOCARPUS Wall.


BORI: Reserve forest (1000 m). On hill slopes in rock crevices. Occasional.

Fl. & Fr.: August-October.

Himalayan herb.

71. DICYONIACEAE Juss.

1a. Fertile stamens 3
1b. Fertile stamens 4:

... Oroxyllum 2
2a. Leaves bipinnate. Capsule strongly tuberculate. ... *Rademachera* 3  
2b. Leaves unipinnate. Capsules out tuberculate:  
   3a. Leaflets distinctly serrate. Anthers pubescent ... *Tecoma* 4  
   3b. Leaflets entire or minutely crenulate or toothed. Anthers glabrous ... *Dolichandrone* 1

1. **Dolichandrone (Pent.) Seemann**


Deciduous trees; bark grey; young parts densely white-tomentose. Leaves 1-pinnate; rachis pubescent; leaflets orbicular or obovate, emarginate or rounded with short acumen. Flowers white in terminal few-flowered racemes. Capsules flat, falcately curved, acute at apex.

*BORI*: Reserve forest (550 m). In mixed forest. Common.  
*Fl. & Fr.*: April February.

2. **Oroxyllum Vent.**


Small trees; branching at top; bark light-brown, often with corky lenticels. Leaves very large, 2 3-pinnate; pinnae opposite, leaflets 2-4 pairs, ovate or elliptic, acuminate. Flowers in erect racemes. Calyx oblong-campanulate, glabrous. Corolla purple, fleshy. Stamens 5, one shorter. Capsule 30–90 cm long. Seeds numerous, winged.

*PACHMARHI*: Vicinity (1000 m). In mixed forest. Occasional.  
*Fl. & Fr.*: July February.

3. **Rademachera Zoll. & Mor.**


Large deciduous trees. Leaves bipinnate; pinnae 3 pairs. Inflores-
ence densely tormentose. Calyx campanulate, 1 cm long. Corolla white, 3
em long, glabrous. Capsules up to 20 cm long, woody. Seeds winged.

**BORI**: Reserve forest (550 m). In mixed forest. Common.

**Fl. & Fr.**: April - February.

4. **Tecoma Juss.**


Small trees, glabrous. Leaves once pinnate; leaflets 3-7, opposite,
Juncellate, acuminate, acute and slightly unequal sided at base, serrate.
Flowers bright-yellow, large, in terminal, few-flowered corymbose racemes
often shorter than the leaves. Capsules 10 - 12 cm long, flat, brown, acute.
Seeds thin, winged.

**PACHMARHI**: Vicinity (1000 m), Mahadev Hill (1200 m). In mixed
forest. Occasional.

**Fl. & Fr.**: September - February.

72. **PEDALIACEAE** R. Br.

**Sesamum L.**

Erect, glandular pubescent, annual herbs. Upper leaves lanceolate, entire; lower ones often lobed, glabrous above, puberulous beneath. Flowers white, pink or pale purple, axillary, solitary, appears as false raceme at the end of branches. Capsules bluntly quadrangular, shortly beaked, pubescent. Seeds oblong, slightly compressed, glabrous, black or white.

**BORI**: Dhain (430 m). Along pathways as an escape from cultivation.

**Fl. & Fr.**: August October.

### 73. ACANTHACEAE Juss.

1a. Fertile stamens 4:

2a. Anthers 1-celled

2b. Anthers 2-celled:

3a. Corolla without well developed upper lip

3b. Corolla with a well developed upper lip:

4a. Corolla segments conorted in bud:

5a. Seeds without retinacula. Calyx entire or shallowly lobed. Capsule long-beaked...

5b. Seeds with retinacula. Calyx usually deeply lobed. Capsule not beaked:

6a. Ovary cells 3 to 17-ovuled. Cells of the capsule 3 or more-seeded:

7a. Corolla distinctly 2-lipped...

7b. Corolla not distinctly 2-lipped, subequally 5-lobed:

8a. Capsule fusiform, not clavate, seminiferous throughout...

8b. Capsule clavate with a sterile, solid, stalk-like base...

6b. Ovary cells 1 to 2-ovuled. Cells of the capsule 1 to 2-seeded. Valves of the capsule with 1-2 retinacula:

9a. Anther cells basally spurred...

9b. Anther cells not spurred:
10a. Leaves sessile, amplexicaule. Flowers in dense spikes ... Perillepta 16

10b. Leaves petioled, not amplexicaule. Flowers in elongate spikes:

11a. Leaves usually 3-nerved. Bracteoles present ... Nilgirianthus 15

11b. Leaves with 8-16 pairs of nerves. Bracteoles absent ... Corvia 5

4b. Corolla - segments imbricate in bud:

12a. Two anterior stamens united, the other one minute, often reduced to staminodes. Corolla 4-10 cm long ... Barleria 3

12b. All stamens perfect, included. Corolla less than 2 cm long ... Lepidagathis 13

1b. Fertile stamens 2:

13a. Seeds without retinacula ... Naisonta 14

13b. Seeds with retinacula:

14a. Anther cells not unequally placed:

15a. Flowers subtended by abortive branches ... Haplanthodes 9

15b. Flowers not subtended by abortive branches:

16a. Ovary - cells 2-ovuled. Cells of capsules 2-seeded ... Eranthemum 8

16b. Ovary - cells 6-10-ovuled. Cells of the capsules 6-10-seeded ... Andrographis 2

14b. Anther cells unequally placed:

17a. Anther cells without a basal spur:

18a. Bracts mucronate. Lateral walls of the capsule - valves membranous, basally separating from the placenta when the capsule bursts, and form a wind ... Dictyoptera 6

18b. Bracts not mucronate. Lateral walls of the capsule - valves permanently attached to the placenta throughout their length ... Peristrophi 17

17b. Both or one of the anther-cells with a basal spur:

19a. Inflorescence axillary ... Adhatoda 1

19b. Inflorescence terminal:

20a. Calyx - segments 4, if 5, then the posterior one much smaller than others, sometimes minute ... Roselliana 19
20b. Calyx - segments 5, nearly equal:

21a. Both cells of anthers with basal spur. Bracts linear: ... Justicia 12

21b. Only one cell of the anthers with a basal spur. Bracts broadly lanceolate to ovate: ... Rungia 20

1. Adhatoda Mill.


Shrubs or small trees. Leaves ovate lanceolate, acute acuminate, narrowed below. Bracts broadly elliptic, acute, pubescent; bracteoles narrower. Flowers in axillary dense spikes shorter than the leaves. Calyx-lubes shorter than bracteoles, acute, Corolla white, hairy without. Capsules club-shaped, subacute, shortly pointed, pubescent.

BORI: Reserve forest (550 m), 23°12' 62, Panigrahi 6350 (BSA). In mixed forest and clearings. Occasional.

Fl. & Fr.: August December.

New record for the area.

2. Andrographis Wall. ex Nees


Erect annual herbs; branches 4 angled. Leaves lanceolate, slightly undulate, narrowing towards base. Flowers solitary, whitish, spotted with


Fl. & Fr.: October December.

3. Barleria L.

1a. Plants armed. Flowers yellow ... B. priotitis 2
1b. Plants unarmed. Flowers blue, purple or white ... B. cristata 1


Erect, perennial herbs. Stems 4-gonous, appressed hairy. Leaves elliptic-oblong, acute or acuminate. Flowers purple in axillary and terminal short spikes. Capsules ellipsoid, acute at both ends, 4 seeded.

PACHMARHI: Vicinity (1000 m); Mahadev hill (1200 m).

BORI: Reserve forest (550 m). On forest edges and clearings. Common.

Fl. & Fr.: September December.


Spinescent shrubs, branching from the base, glabrous. Leaves elliptic to oblong - elliptic, acute and bristle-tipped. Flowers sessile, yellow, solitary, axillary passing into short terminal spikes. Capsules ovoid with a long, tapering, solid beak; 5 seeded.

PACHMARHI: Vicinity (1000 m). In open forest and waste places. Occasional.

Fl. & Fr.: November January.
4. **Blepharis Juss.**


Prostrate, perennial herbs. Leaves in whorls of 4, unequal, long petiolated, ovate-elliptic to lanceolate, lower surface whitish. Flowers sessile, 1-4 together, apparently axillary, often combined into a leafy spike. Calyx segments 4, unequal, ciliate. Corolla white with a yellow spot on the throat. Stamens 4; anthers 1-celled. Capsule ellipsoid.

**PACHMARHI**: Dhupgarh (1250 m). **BORI**: Reserve forest (550 m). On hill slopes and cliffs. Common.

*Fl. & Fr.*: *September* November.

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5. **Carvia Bremek.**


**PACHMARHI**: Dhupgarh (1250 m). On hill slopes. Occasional.

*Fl. & Fr.*: *September* April.

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6. **Dicipteris Juss.**


Perennial herbs with somewhat woody base. Leaves ovate, acuminate, subentire. Flowers in 2 to 4-flowered, axillary, flabeliform groups, often combined into a terminal spike. Bracts in unequal pairs, forming a flat involucre enclosing a cyme of 3 flowers. Calyx segments unequal, linear. Corolla purplish or rarely white. Capsule clavate, pubescent.

\textbf{PACHMARHI :} Vicinity (1000 m); Dhupgarh (1250 m). In forest undergrowth. Common.

\textit{Fl. & Fr.:} All seasons.

7. \textit{Dipteracanthus} Nees \textit{emend.} Brenek.


\textbf{PACHMARHI :} Vicinity (900 m), 25-7-64, \textit{panigraht} 4483 (BSA). On wayside. Occasional.

\textit{Fl. & Fr.:} July November.

New record for the area.


**BORI**: Dhain (462 m). On forest edges. Occasional.

**Fl. & Fr.**: September December.

9. **Haplanthodes Kuntze**


Erect, herbs. Leaves ovate, acuminate or acute, abruptly cuneate at the base. Flowers sessile, subtended by abortive branches. Calyx segments lanceolate, pointed, glandular-pubescent. Corolla lilac with darker lines. Capsules narrowly oblong, acute, glabrous.

**BORI**: Reserve forest (550 m), Feb. 78, Pant 27262 (BSA). On hill slopes. Occasional.

**Fl. & Fr.**: December February.

New record for the area.

10. **Hemigraphis Nees**


**BOR1:** Dhain (430 m). Along edges of mixed forest. Common.

**Fl. & Fr.:** October - January.

### 11. HYGROPHILA R. Bt.

1a. Plants armed. Calyx 4-segmented. Flowers in axillary whorls.

   ... *H. auriculata* 1

1b. Plants unarmed. Calyx 5-segmented. Flowers in terminal spikes:

   2a. Leaves glabrous or puberulous. Fertile stamens 2 ...

      ... *H. polysperma* 2

   2b. Leaves hairy. Fertile stamens 4 ...

      ... *H. sagittatum* 3


Erect herbs; spines developed during developmental stage. Leaves sessile, oblong-lanceolate in verticils of 6 at a node, the two outer leaves large, the inner 4 much smaller. Flowers purple, whorled in axils of leaves, often 8 in 4 pairs of 2 each. Capsule linear-oblong, pointed, 4 - 8-seeded.

**BOR1:** Reserve forest (1000 m). Along nala. Common.

**Fl. & Fr.:** September - February.


Prostrate or decumbent-ascending, slender, annual-perennial herbs. Leaves subsessile, elliptic-lanceolate to ovate, higher ones passing into

**BORI**: Reserve forest (500 m). Feb. 78, *Pant* 27248 (RSA).

Near streams in moist places. Rare.

**Fl. & Fr.**: September - April.

New record for the area.


**BORI**: Reserve forest (550 m). In moist places in the forest. Common.

**Fl. & Fr.**: September - February.

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12. *Justicia* L.


Erect or procumbent shrubs. Leaves ovate or ovate-elliptic. Flowers white in axillary and terminal spikes. Spikes short or long, with white, foliaceous, membranous, ovate-lanceolate, acuminate, veined, bracts and bracteoles. Calyx 5-lobed. Corolla white with pink patches; nerves on corolla hairy. Staminal filaments short hairy. Capsules subgustate, acute, with a flat solid base, glabrous.

**Pachmarhi**: Vicinity (1000 m). **BORI**: Reserve forest (550 m); Dhain (462 m). In waste lands in the forests. Common.

**Fl. & Fr.**: August - December.

1a. Seeds 2 … *L. cristata* 1

1b. Seeds 4:

2a. Erect undershrub, leaves entire … *L. cuspidata* 2

2b. Prostrate herbs, leaves crenate or crenate-serrate … *L. fasciculata* 3


**B**ORI: Dhain (462 m). In forest undergrowth. Occasional.

*Fl. & Fr.*: All seasons.


**B**ORI: Reserve forest (550 m). 26 12 52. Panigrahi 6531 (RSA). In forest undergrowth. Occasional.

*Fl. & Fr.*: December - May.

New record for the area.


Forest, villous, perennial herbs with tuberous roots. Lower cauline leaves long petiolate, obovate, elliptic; higher ones subsessile, elliptic, ovate to obovate, entire. Flowers in axillary and terminal spikes. Bracts ovate, obovate, ciliate. Bracteoles a pair of tufted hairs. Calyx - segments unequal; the largest one 2½ - 3½d. Corolla purple. Capsule ovoid, acute.

*Bori*: Reserve forest (550 m). Along forest edges. Common.

*Fl. & Fr.*: February - June.

15. *Nilgirianthus* Bremek.

1a. Plants less than 25 cm high. Leaves with 4 - 5 pairs of nerves, not prominent.

1b. Plants 50 - 90 cm high. Leaves with 6 - 8 pairs of raised nerves


Small shrubs, reaching up to 25 cm. Leaves small, ovate, subacut, obtuse or subcordate at base, softly villous, 4 x 2.5 cm, main nerves 4 - 5 pairs, not prominent. Spikes subglobose, solitary or a few together. Bracts obovate, deflexed. Corolla campanulate.
PACHMARHI: Vicinity (900 m). BORI: Reserve forest (550 m). Along forest pathways and hill slopes. Occasional.

Fl. & Fr.: July December.


BORI: Reserve forest (900 m). On hill slopes. Common.

Fl. & Fr.: July December.

16. **Perilepta** Bremek.


PACHMARHI: Vicinity (1000 m). In forest undergrowth. Common.

Fl. & Fr.: September December.
17. Peristrophe Nees

1779. "Atrilat".


BORI: Reserve forest (500 m). In forest undergrowth. Occasional.

Pl. & Fr.: September December.

18. Petalidium Nees

Petalidium barlerioides (Roth) Nees in Wall. Pl. As. Rar. 3: 82.
1832; Clarke in Hook. f. Fl. Brit. Ind. 4: 416. 1884; Babu, Herb. Fl.


BORI: Reserve forest (550 m). In forest undergrowth. Common.

Pl. & Fr.: April June.


1a. Spikes cylindrical. Bracts and bracteoles as long as or longer than calyx lobes:
2a. Leaves with raphides irregularly arranged in the middle, transversely near the margins ...  

2b. Leaves with raphides concentrically transverse:

3a. Bracts and bracteoles linear ...  

3b. Bracts and bracteoles elliptic ovate:

4a. Leaves up to 2.5 cm long, main nerves about 6 pairs. Plants pale when dry ...  

4b. Leaves up to 5 cm long, main nerves about 4 pairs. Plants nearly black when dry. ...  

1b. Spikes linear. Bracts and bracteoles shorter than the calyx lobes:

5a. Bracts, bracteoles and calyx lobes obtuse at apex ...  

5b. Bracts, bracteoles and calyx lobes acute at apex ...

Rostellularia diffusa (Willd.) Nees in DC. Prodr. 11 : 372. 1847.  

Slender herbs with more or less 4 angled and grooved stems. Leaves usually thin, ovate, obtuse or acute. Spikes slender with small pinkish or white flowers. Bracts, bracteoles and sepals membranous with green midrib. Capsules glabrous or hairy, oblong with a short solid base.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1200 m). BORT: Reserve forest (550 m). In forest undergrowth among the grasses.

Fl. & Fr.: July January.


Erect or prostrate annual herbs with 4 genous, hairy stems. Leaves ovate lanceolate to elliptic, subentire crenulate. Flowers in densely villos spiky. Bracts elliptic, oblanceolate. Bracteoles longer than the calyx. Corolla pale purple or lilac, with a purple spotted throat. Capsules ciliolate at the top. Seeds 1 cm across.
PACHMARH : Dhopgarh (1200 m). BORI : Dhain (450 m). In forest undergrowth among the grasses. Common.

*Fl. & Fr.* : September March.


Undershrubs, somewhat woody below, turning nearly black on drying, covered with scattered stiff strigose hairs. Leaves ovate or elliptic, up to 5 × 2.5 cm, main nerves about 4 pairs. Flowers in spikes, pale blue, spotted white. Bracts and bracteoles elliptic, ovate. Capsule papery, glabrous.

PACHMARHI : Vicinity (1000 m), Feb. '78, Paut 27089 (BSA).

In forest undergrowth. Rare.

*Fl. & Fr.* : September March.

New record for the area.


Erect herbs. Leaves elliptic rounded, with cystoliths transversely oriented towards margin. Flowers in spikes. Bracts and bracteoles similar to calyx lobes, with white bulbous based hairs along margins. Calyx 4 - lobed; lobes scarious along margin. Corolla pink. Capsules small, pubescent.

PACHMARH : Vicinity (1000 m), Feb. '78, Paut 27101 (BSA).

In forest undergrowth amongst the grasses. Occasional.

*Fl. & Fr.* : February August.

Procumbent annual herbs. Stems rooting at lower nodes. Leaves narrow to broadly elliptic, acute at both ends. Flowers pink in dense cylindric spikes. Capsules oblong, pointed, pubescent at the tip.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Dhain (462 m). In moist places as forest undergrowth. Common.

*Fl. & Fr.*: August December.


**BORI**: Reserve forest (500 m), 26 12 62, *Panigrahi 6530* (BSA). In forest undergrowth amongst the grasses. Occasional.

*Fl. & Fr.*: July December.

New record for the area.

20. **Rungia** Nees

1a. Sterile and fertile bracts similar

1b. Sterile and fertile bracts dissimilar

   ... *R. repens* 2


Usually much branched, prostrate or decumbent herbs. Leaves subsessile, ovate elliptic. Spikes short, mostly axillary. Fertile bracts
ovate, very much hyaline margined, hairy on back and margins; barren ones reduced in size, not hyaline margined. Calyx lobes linear lanceolate, acuminate. Corolla purple, hairy. Capsule glabrous.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (500 m). In forest undergrowth and waste places. Common.

Fl. & Fr.: November - May.


Erect or decumbent herbs, often rooting at nodes near the base. Leaves shortly petiolated, elliptic lanceolate, acute. Flowers blue or pale purple in erect terminal spikes. Bracts orbicular, apiculate; margin hyaline. Calyx lobes 5, linear. Capsules ovoid, oblong, acute, compressed, pubescent.

BORI: Reserve forest (500 m). In forest undergrowth. Common.

Fl. & Fr.: September - January.

21. Strobilanthes Blume


PACHMARHI: Vicinity (1000 m). In forest along pathways. Occasional.

Fl. & Fr.: October - December.

Flowers after every six years.
22. Thunbergia Retz.


PACHMARHI: Vicinity (1000 m). Aug. '49, Narayanaswami s.n. (CAL). Along the roads and in waste places. Rate.

Fl. & Fr.: September - December.

74. VERBENACEAE J. St. Hil.

1a. Corolla - lobes 4 - 5, concorded. Stamens 2. Ovary 2 - celled ... Nystanthes 7
1b. Corolla - lobes 4 - 5, imbricate. Stamens 4 or 5 - 6. Ovary 2 - 4 - celled:

2a. Inflorescence spike, raceme or narrow panicles:

3a. Flowers sessile ... Lantana 6
3b. Flowers pedicelled:

4a. Stamens 4. Ovary 4 - carpelled:

5a. Inflorescence racemose, centrifugal ... Duranta 3
5b. Inflorescence cymose, centrifugal ... Gmelina 4
4b. Stamens 5. Ovary 2 - carpelled ... Citharexyllum 1

2b. Inflorescence compound with partial inflorescence cymose:

6a. Trees. Flowers regular or nearly so. Stamens 5 - 6 ... Tecoma 9
6b. Shrubs. Flowers actinomorphic or syngomorphic; 4 or 5 merous:

7a. Flowers actinomorphic, 4 - merous ... Premna 8
7b. Flowers syngomorphic, 5 - merous:

8a. Leaves digitate ... Vitex 10
8b. Leaves simple:
9. Corolla - tube slender. Drupe exserted  ... Clerodendrum 2
9b. Corolla - tube widened upwards. Drupe included within large showy calyx  ... Holmskioldia 5

I. CITHAREXYLUM MILL.


Small trees, glabrous. Leaves ovate elliptic or obovate, shining above, remotely shallowly serrate towards the apex, petioled. Flowers in long, drooping racemes, white, fragrant. Calyx shortly 5 lobed. Corolla 5 std. Drupe succulent.

PACHMARHI: Vicinity (1000 m), 28 7 64, Panigrahi 4599 (BSA). In sal forest. Rare.

Fl. & Fr. ... July October.

New record for the area.

2. CLERODENDRUM L.

1a. Leaves cordate, tomentose abaxially. Calyx divided to the base, red  ... Clerodendrum viscosum 2
1b. Leaves neither cordate nor tomentose. Calyx truncate, green  ... Clerodendrum serratum 1


Erect, perennial undershrubs. Leaves sessile, usually in whorls of 3, oblong elliptic or obovate, glabrous. Flowers in axillary cymes, forming a terminal panicle. Calyx minutely truncate, glandular within, Corolla violet. Drupe purple.

BORI: Reserve forest (500 m). In mixed forest. Common.


BORI : Reserve forest (550 m). In forest undergrowth. Common.

Fl. & Fr. : March - June.

3. Duranta L.


PACHMARIII : Vicinity (1000 m), Mahadev hill (1200 m).

On forest margins and roadsides. Common.

Fl. & Fr. : All seasons.

4. Gmelina L.


PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m).

In mixed deciduous forest. Common.

Fl. & Fr.: January April.

5. HOLMSKIOLDIA Retz.


Straggling evergreen shrubs with drooping, angular branches. Leaves ovate, crenate-serrate or subentire, acuminate. Flowers dark-red in panicked cymes at the end of branches. Drupes included in the enlarged calyx.

PACHMARHI: Vicinity (1000 m), Feb. '78, Pant 27132 (BSA).

In the forest. Rare.

Fl. & Fr.: November March.

New record for the area.

6. LANTANA L.


Straggling shrubs with recurved prickles on branches and stems, pubescent. Leaves ovate to oblong-ovate, crenate-dentate. Flowers
orange red, turning scarlet, in corymbose heads, flat topped, on stout axillary peduncles. Drupes globose, shining black when ripe, with 2 bony nutlets.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). Near forest margins and roadsides. Common.

*Fl. & Fr.: All seasons.*

7. **Nyctanthes L.**


Large shrubs or small trees, covered with stiff, whitish hairs; branches 4 angular, hairy. Leaves opposite decussate, ovate, acute or often shortly acuminate. Flowers fragrant, white with orange red corolla tube, sessile, fascicled in axillary and terminal panicked cymes. Capsules nearly orbicular, compressed, 2 - celled; cells 1 - seeded.

PACHMARHI: Vicinity (1000 m). In sal forest. Occasional.

*Fl. & Fr.: September December.*

8. **Premna L.**

1a. Large shrub or small tree. Leaves petiolate, somewhat ovate

P. barbata 1

1b. Small, almost stemless undershrub. Leaves almost sessile, obovate

P. herbacea 2


Erect, deciduous shrubs. Leaves ovate, acuminate with 4 - 6 pairs of lateral nerves. Flowers in terminal, trichotomous, villous, short panicles.
Bracts small, linear, deciduous. Calyx subequally 4-lobed. Corolla greenish, sub-bilabiate, 4-lobed. Drupe globose or somewhat obovoid.

PACHMARHI : Vicinity (1000 m). In forest undergrowth. Common.

Fl. & Fr. : April - July.


PACHMARHI : Vicinity (1000 m). In sal forest under shaded and moist places. Common.

Fl. & Fr. : April - June.


Large deciduous trees ; branches 4-angular, densely clothed with tomentum. Leaves elliptic or obovate, acute or acuminate, adaxial surface glabrous, abaxial tomentose. Flowers white, shortly pedicellate in large, terminal, tomentose, cymose panicles. Fruits subglobose, somewhat 4-lobed.

BORI : Reserve forest (550 m) ; Dhain (460 m). In the forest specially on the hill slopes. Common.

Fl. & Fr. : July - December.

Dominant and commercially the most important species of Bori area.
10. *Vitex* L.


Shrubs or small trees; branches 4-angular, densely covered with ash-grey tomentum. Leaves 3 to 5-foliolate; leaflets lanceolate. Flowers pale bluish purple, in large axillary or terminal panicles. Drupes globose, black. Seeds 4, obovate-oblong.

**PACHMARHI**: Vicinity (1000 m) Along roadsides and near the streams. Common.

*Fl. & Fr.*: January - July.

75. *LAMIACEAE* Lindl.

1a. Stamens decussate:

2a. Lower lip of corolla 1-lobed. Stamens usually exerted. Basal scar of anthers not oblique:

3a. Lower lip of corolla flat

3b. Lower lip of corolla concave:

4a. Corolla distinctly 2-lipped, lower lip longer than the upper:

5a. Upper lip of calyx rounded, deflexed or the calyx subequally 3-toothed

5b. Upper lip of calyx beaked or truncate or calyx 1-lipped; the upper lip absent.

4b. Corolla 3-lobed, the lowest lobe shorter than or equaling the other lobes

2b. Lower lip of corolla 3-fid. Stamens included. Basal scar of anthers oblique:

5b. Stamens straight or descending:

6a. Anthers 1 or 2-celled, not separated, perfect stamens 2 or 4:

7a. Stamens subequal, not didynamous:

8a. Calyx 5-toothed; teeth neither feathery nor longer than the tube

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*Orthosiphon* 11

*Plectranthus* 12

*Anisochilus*

*Hyptis* 4

*Lavandula* 6

*Pogostemon* 13
8b. Calyx 5-partite, segments feathery, longer than the tube ... Calceolaria 3
7b. Stamens didynamous ... Micromeria 9
6b. Anthers 2-celled, cells at length diverging. Prefect stamens 4:

9a. Calyx 15-nerved ... Nepeta 10
9b. Calyx 5 - 10-nerved:

10a. Upper lip of corolla flat, not hooded ... Anisomeles 2
10b. Upper lip of corolla hooded:

11a. Anther-cells hairy ... Lamium 5
11b. Anther-cells glabrous:

12a. Upper lip of corolla shorter than the lower ... Leucas 8
12b. Upper lips of corolla longer than the lower ... Leonotis 7

1. Anisochilus Wall.

1a. Calyx glabrous or pubescent with minute hairs ... A. carnosus 1
1b. Calyx villous with long white hairs ... A. atricocephalus 2


BORI: Dhain (430 m). In forest undergrowth and wayside. Common.

Fl. & Fr.: October - January.


PACHMARHI: Vicinity (1000 m). In the forest under shades. Common.

Fl. & Fr.: October - January.

2. Anisomeles R. Br.


Erect, annual-perennial herbs; branches quadrangular, densely grey-tomentose. Leaves ovate, acute, crenate-serrate. Flowers pink or pale-purple, sessile or shortly pedicellate, in dense axillary whorls which are distant below but approximate above to form a dense spicate inflorescence. Nutlets broadly ovoid with rounded ends, smooth, black.

PACHMARHI: Vicinity (1000 m); Mahadev hill (1200 m). In waste lands and forest undergrowth. Common.

Fl. & Fr.: August - January.

3. Colebrookea J. E. Smith


BORI: Reserve forest (550 m). Under teak forest. Common.

Fl. & Fr.: December - April.


Erect, woody, glandular-tomentose, sweet-scented herbs. Leaves ovate or the lower ones ovate-cordate. Flowers blue, sessile, 2-4 in peduncled cymes in upper leaf axils. Nutlets oblong, rugose, glabrous, brown.

_PACHMARHI_: Vicinity (1000 m); Dhupgarh (1350 m). In forest undergrowth. Common.

Fl. & Fr.: September - December.

5. Lamium L.


Slender, decumbent herbs. Leaves long petiolated below, subsessile or sessile above, orbicular, inciso-crenate, lower almost lobulate, base rounded or cordate, glabrous. Flowers in distant axillary whorls. Calyx villous, converging in fruit. Corolla purple. Nutlets brown with very prominent scaly marks all over.

_PACHMARHI_: Vicinity (1000 m), Feb. '78, Pani 27180 (SBA).

Along roadsides. Rare.

Fl. & Fr.: December - March.

A temperate plant. New record for the area.

6. Lavandula L.

7. LEONOTIS R. Br.


BORI: Reserve forest (550 m), 23 12 62, Panighati 6384 (BSA).

In forest undergrowth. Occasional.
Fl. & Fr.: September–December.

New record for the area.

8. LEUCAS R. Br.

1a. Calyx mouth oblique:

2a. Bracts imbricating and forming an involucre, covering the floral heads...

2b. Bracts neither imbricating nor forming an involucre...

1b. Calyx mouth not oblique:

3a. Leaf margin entire:
6a. Calyx - teeth 2.5 mm long; the upper teeth much longer ... L. stricta 6

4b. Calyx - teeth 1 mm long; almost subequal ... L. zeylanica 7

3b. Leaf margin crenate or serrate:

5a. Hairs on stem and branches erect or spreading ... L. lanata 2

3d. Hairs on stem and branches reflexed:

6a. Leaves obtuse, rounded at the base. Petiole very short ... L. montana 5

6b. Leaves acute, cuneate at the base. Petiole up to 2.5 cm long ... L. mollissima 4


PACHMARHI: Vicinity (1000 m). In forest clearings. Common.

Fl. & Fr.: August - November.


PACHMARHI: Vicinity (1000 m); Mahadev hills (1200 m); Dhupgarh (1250 m). In forest undergrowth and waste lands. Common.

Fl. & Fr.: November - March.


Stout herbs. Leaves ovate or ovate lanceolate, broadly crenate-serrate, obtuse or broadly acuminate. Flowers white in dense or occasionally few - flowered axillary clusters. Nutlets oblong.

BORI: Reserve forest (550 m), 22 12 62, Panigrahi 6308 (BSA).
In forest undergrowth. Occasional.

Fl. & Fr. : October - March.

New record for the area.


Tomentose stragglers. Leaves long petiolated, ovate, truncate at base, coarsely serrate; verticillasters axillary, with 2-5 subsessile flowers on each side. Calyx teeth 10, nearly equal; mouth even; throat glabrous. Upper lip equaling lower lip.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (300 m).

In forest clearings and on the edges of forest. Common.

Fl. & Fr. : July December.


BORI: Reserve forest (550 m). In forest undergrowth. Common.

Fl. & Fr. : December - May.


PACHMARHI: Vicinity (1000 m). Along roadside and edges of forest. Common.

Fl. & Fr. : July November.


Erect annual herbs. Leaves opposite, decussate, ovate lanceolate or lanceolate, acute, entire. Flowers sessile or subsessile in terminal verticill-
lasters. Calyx - teeth almost subequal, spinescent at the tip. Corolla white, middle lobe large, lateral ones small; upper lip obovate, white – woolly. Nutlets obovoid-oblone, dark brown or black.

PACHMARHI : Dhupgarh (1250 m), Saxena 1048 (SFRI). In forest undergrowth. Rare.

Fl. & Fr. : October December.

9. MICROMERIA Benth.


PACHMARHI ; Vicinity (1000 m) ; Dhupgarh (1250 m) ; Mahadev hill (1200 m). In forest undergrowth. Common.

Fl. & Fr. : October March.

10. NEPETA L.


Erect, ascending or decumbent, annual perennial herbs, densely hairy; stems 4 - genous. Leaves ovate - rounded with a rounded base, serrate - dentate. Verticillasters combined into racemes or panicles. Bracts linear, Calyx sup 2 - lipped, villous, 15 - nerved. Corolla bluish or pinkish, throat purple - dotted. Nutlets brown, granulate.
PACHMARHI: Vicinity (1000 m). In moist shaded places of the forest. Common.

Fl. & Fr.: April - December.

11. Orthosiphon Benth.


Erect, perennial herbs, often with tuberous rootstocks. Leaves sessile, ovate or ovate-lanceolate, base cuneate, crenate-serrate. Vorticillasters combined to form an interrupted raceme like inflorescence. Bracts linear. Calyx hairy; lower lip 4-toothed. Corolla white or pink. Nutlets suborbicular, compressed, punctulate.

PACHMARHI: Vicinity (1000 m). In sal forests. Common.

Fl. & Fr.: July - December.


1a. Calyx 2-lipped; upper lip of fruiting calyx broad entire, reflexed; lower lip with 4 acute, awned or subulate teeth ... P. mollis 1

1b. Calyx subequally 5-toothed, or 2-lipped, with a 3-toothed upper lip and 2-toothed lower lip ... P. rugosus 2


 Succulent, pubescent herbs. Leaves ovate, cordate at base, membranous. Racemes sometimes with side branches at the base. Upper lip of calyx broad, entire; lower lip 4-toothed, longer and unequal. Corolla lilac or purplish blue. Stamens included.
PACHMARHI : Vicinity (1000 m); Mahadev hill (1200 m).

BORI : Reserve forest (550 m). In moist places among forest undergrowth. Common.

Fl. & Fr. : September  December.


Slender, hoary, erect shrubs. Leaves ovate or elliptic, obtuse, crenate, densely white-tomentose beneath. Cymes axillary, lax-flowered, panicked in leafy racemes. Calyx subequally 5-toothed or very shortly 2-lipped. Corolla white with purple spots; lower lip longer. Nutlets oblong.

PACHMARHI : Dhupgarh (1250 m). 28-12-62, Panigrahi 6653 (BSA). In forest undergrowth. Rare.

Fl. & Fr. : September  December.

Very rare. Mainly Himalayan species.

13. POGOSTEMON Desf.

1a. Whorls separated on the spike, semilunate in shape ... P. pinnatus 2
1b. Whorls close on the spike, not semilunate

2a. Leaves membranous. Calyx just longer than the bracteas. ... P. purpurascens 4
2b. Leaves chartaceous. Calyx shorter than the bracts...

3a. Inflorescence densely white tomentose ... P. benghalensis 1
3b. Inflorescence sparsely brown-tomentose ... P. pubescens 3


Erect, strongly aromatic, undershrubs. Leaves ovate-lanceolate, doubly serrate, truncate at base, white-tomentose beneath. Panicles conspicuously white-tomentose. Whorls close, stalked, subtended by foliar bracts.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). In forest undergrowth. Common.

Fl. & Fr.: December - April.


Erect, hairy undershrubs. Leaves usually in unequal pairs, ovate acuminate, irregularly incised, acute at both ends, appressed pubescent. Whorls on panicle generally separated, becoming seminuncate with age, subtended by longer foliar bracts. Calyx longer than bracts. Corolla purple.

PACHMARHI: Mahadev hill (1350 m). Feb. 78, Pant 27108 (BSA).

BORI: Reserve forest (550 m), 25-12-62, Panigrahi 6494 et 6514 (BSA). In forest undergrowth. Common.

Fl. & Fr.: November - March.

New record for the area.


PACHMARHI: Vicinity (900 m). BORI: Reserve forest (550 m) In waste land and near streams. Occasional.

Fl. & Fr.: January June.


Erect undershrubs, with furrowed stems, pubescent. Leaves membranous, ovate or ovate-lanceolate, irregularly serrate-crenate with appressed hairs. Whorls on panicles close, sessile. Calyx slightly longer than the bracts. Corolla white with purple upper lip.
PACHMARHI: Vicinity (900 m). BORI: Reserve forest (550 m). In waste places and valleys. Occasional.

Fl. & Fr.: January May.

66. AMARANTHACEAE. Juss.

1a. Leaves opposite:
   2a. Spikes long, narrow, lowest flowers finally remote. Flowers dehiscing after anthesis.
   
   3a. Modified flowers with hooked spines ...
   
   3b. Modified flowers without hooked spines ...
   
   2b. Flowers in dense globose cylindrical heads:
   
   4a. Staminal filaments fused below middle ...
   
   4b. Staminal filaments completely fused forming a tube ...

1b. Leaves alternate, sometimes in alternate fascicles:

5a. Flowers unisexual ...

5b. Flowers bisexual:

6a. Urticles many-seeded ...

6b. Urticles single-seeded:

   7a. Flowers in round or shortly ovate heads. Plants not white pubescent ...

   7b. Flowers in spikes. Plants white pubescent ...

1. ACHYRANTHES L.

1a. Basal wing of the spinescent bracteole adnate throughout the length of spine. Stamina nodal truncate, limbricate ...

   A. aspera 1

1b. Basal wing of the spinescent bracteole adnate to the base of the spine, otherwise free. Stamina nodal truncate, toothed, not limbricate ...

   A. bidentata

Erect, stiff, annual-perennial herbs, branching from the base. Leaves very variable, usually orbicular-obovate, hairy or glabrous. Spikes usually more than a foot long when mature. Flowers often pink.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). In forest undergrowth and clearings. Common.

**Fl. & Fr.**: April December.


Erect-ascending annual-perennial herbs. Leaves elliptic oblong or ovate-lanceolate, acuminate. Spikes axillary and terminal. Tepals subequal, lanceolate, acute. Pseudostamnodes truncate or shortly dentate at apex. Utricles 2-2.5 mm long.

**PACHMARHI**: Vicinity (1000 m). Roadsides and in forest undergrowth. Occasional.

**Fl. & Fr.**: September December.

2. *Aerva* Forsk.

1a. Spikes all axillary. Leaves alternate ... *A. lanata* 1

1b. Spikes axillary or in terminal panicles. Leaves opposite or alternate ... *A. sanguinolenta* 2


Erect, many-branched, undershrubs, tomentose. Leaves alternate, entire, obovate. Spikes axillary, usually 2-4 together. Flowers white, 5-merous.

**BORI**: Dhain (480 m). In forest undergrowth and clearings. Common.

**Fl. & Fr.**: October April.


Erect or rambling undershrubs. Leaves opposite or alternate, elliptic-ovate to lanceolate, crenate, acute. Spikes densely tomentose, solitary or fascicled. Tepals 5, lanceolate. Stigma 1, slightly 2-lobed. Utricles 0.8-1 mm across.

**RORI:** Reserve forest (550 m); Dhain (462 m). Among the bushes in forest undergrowth. Common.

**Fl. & Fr.:** April December.

3. **Allmania R. Br. ex Wt.**


Diffuse, branched, annual herbs. Leaves linear or linear-oblong, shortly petioled or sessile. Flowers in sessile, leaf-opposed, yellowish-green heads; stamens 5; anthers pink. Capsule membranous, circumscissile. Seeds solitary, arilate, black, minutely puberulous.

**RORI:** Dhain (413 m). Among grasses in forest undergrowth and waste places. Common.

**Fl. & Fr.:** July September.

4. **Alternanthera Forsk.**


Prostrate, branched, annual perennial herbs. Leaves elliptic, rounded at tip, cuneate at base. Flower heads globose, becoming cylindrical
later, axillary. Tepals more or less equal, glabrous, 1-nerved. Stamens 3-5, alternating with filamentous staminodes.

PACHMARHI: Mahadev hill (1200 m). In moist places on the edge of forest. Common.

Fl. & Fr.: All seasons.

5. Amaranthus L.


Slender, unarmed, annual herbs with slightly pinkish stems. Leaves entire, obviate, emarginate at tip. Tepals 3. Bracts shorter than tepals. Utricles corngated, acute at apex, as long as the tepals. Seeds black.


Fl. & Fr.: All seasons.

6. Celosia L.


Erect annuals; branches grooved. Leaves variable, linear or linear-lanceolate, acute. Flowers white or pink in dense, terminal, lanceolate spikes. Capsules ellipsoid, tapering at apex into the style, circumoscellate about the middle.

PACHMARHI: Jambudeep (1000 m); Mahadev hill (1200 m). On hill slopes. Common.

Fl. & Fr.: September - March.
7. GOMPHRENA L.


Diffused, annual-perennial herbs. Stem much-branched; branches prostrate or ascending, clothed with white hairs. Leaves oblanceolate or oblong-elliptic, sessile, narrowed at both ends. Flowers white in elongating capituliform terminal spike. Utricles indeliscent, compressed, membranous, beaked.

Fl. & Fr.: July - January.


Large scendent shrubs with terete, tomentose, striate branches. Leaves broadly ovate elliptic, acute or acuminate. Flowers in dense or distant spinous clusters forming terminal spikes; rachis tomentose. Utricles membranous.

PACHMARHI: Vicinity (1000 m). In forest undergrowth. Common.
Fl. & Fr.: July - December.

77. CHENOPODIACEAE Vent.

Chenopodium L.

Erect, annual herbs; stems often striate. Leaves oblong, rhombic, deltoid or lanceolate, entire, toothed or lobulate. Flowers in clusters forming complex or lax, paniculate, often meaty spikes. Fruits depressed-globose, finely papillate. Seeds smooth.

**PACHMARHI**: Vicinity (1000 m). In waste lands on the edge of forest. Common.

*Fl. & Fr.*: November April.

### 78. POLYGONACEAEE Juss.

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1. **Muehlenbeckia** Meissn.


Shrubs. All branchlets converted into phylloclades but bearing fleshy, small, rhomboid leaves during rainy season. Flowers green and white in clusters at the nodes. Fruits with fleshy perianth.

**PACHMARHI**: Mahadev hill (1200 m), 27 7 64, *Panigrahi 4544* (BSA). In the forest. Rare.

*Fl.* & *Fr.*: Collected once in July from Mahadeo hill.

New Record for the area.
2. POLYGONUM L.

1a. Flowers in spurious heads:

2a. Heads subtended at the base with an involucral leaf. ... P. nepalense 1

2b. Heads without involucral leaves. ... P. pedunculare 2

1b. Flowers in lax pseudo-spikes or panicles. ... P. stagninum 3


Erect - ascending annual herbs. Ochreae tubular, obliquely truncate, glabrous. Leaves on winged petioles with 2 rounded, amplexicaul basal auricles, ovate - triangular to rhomboid, cuneate at base, acute at apex, glabrous. Heads solitary with a sessile, semi-amplexicaul based, ovate-lanceolate, involucral leaf at base. Perianth red purple, divided halfway down; segments 4. Stamens 4.5. Nuts 3 genous, red brown, pitted, with a prominent rib on the lateral face.

PACHMARHI: Vicinity (1000 m). In roadside streams and moist situations. Common.

Fl. & Fr.: September November.


Fl. & Fr.: All seasons.


Fl. & Fr.: August November.

3. RUMEX L.


Erect, glabrous, annual herbs. Lower leaves long-petioled, oblong, obtuse, crispy; upper ones short petioled, lanceolate-oblong, subacute; uppermost ones smaller, linear-lanceolate. Flowers in whorls combined into leafy panicles. Pedicels deflexed, jointed. Outer tepals 2.5 mm long; inner fruiting tepals reticulate-veined, dentate, rarely entire. Styles terminal. Nuts 3-gonous.

PACHMARHI: Vicinity (1000 m), Feb. 78, Pant 27188 (BSA). Along roadside streams and moist places. Occasional.

Fl. & Fr.: February May.

New record for the area.

79. LAURACEAE Juss.

LITSEA Lamk.


Medium-sized trees. Leaves glabrous above and pubescent beneath, obovate to elliptic-oblong, apex acute or acuminate, base acute to rounded. Flowers greenish-yellow, globose. Perianth-tube long, pubescent outside. Stamens about 20; filaments softly pubescent; glands fleshy on villous stipules. Fruits subglobose, black or dark-brown.

**Pachmarhi**: Vicinity (1000 m); Mahadev hill (1200 m); Dhupgarh (1250 m). **Bori**: Dhan (430 m). In the forests. Common.

*Fl. & Fr.*: June - November.

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### 80. LORANTHACEAE Juss.

1a. Flowers unisexual. Leaves none, when present without midrib …

   ![Viscum 3](#)

1b. Flowers bisexual. Leaves well developed with midrib:

   2a. Flowers regular. Corolla tube not split on one side …

   ![Dendrophthoe 1](#)

   2b. Flowers irregular. Corolla tube split half-way on one side …

   ![Scirrhula 2](#)

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1. **Dendrophthoe Mart.**


Semi-parasite. Leaves obovate to lanceolate, acute, cordate-amplexicaul to cuneate at base. Racemes axillary. Calyx cup-shaped. Corolla-tube curved, slightly inflated upwards, orange or pink, split at the back; lobes 5,
linear, reflexed. Free portion of the filaments equal to the length of the linear anther. Style angular; stigma subglobose. Fruits ovoid-oblong, pinkish, with persistent calyx-limbs.

**PACHMARHI** : Vicinity (1000 m). On trees in the forest. Occasional.

*Fl. & Fr.* : January April.

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2. **SCURRULA L.**

1a. Leaves orbicular or broadly ovate with a cordate base, tomentose on both surfaces ... *S. cordifolia* 1

1b. Leaves ovate-elliptic to oblong or cordate-obovate, glabrous or tomentose beneath ... *S. parasitica* 2


Bushy semiparastites. Young parts and inflorescence with rusty tomentum. Leaves subopposite, ovate or orbicular with cordate base, obtuse or subacute. Flowers in corymbbose racemes. Bracts ovate, obtuse. Perianth greenish white, mealy tomentose without, dark purple-brown and glabrous within; segments ob lanceolate-oblong, acute, reflexed. Fruits clavate, rusty mealy tomentose.

**PACHMARHI** : Vicinity (1000 m). On trees in and around forest. Common.

*Fl. & Fr.* : October March.


**PACHMARHI** : Vicinity (1000 m). On trees in the forest. Occasional.

*Fl. & Fr.* : October March.
3. **Viscum L.**


**Pachmarhi**: Vicinity (1000 m); Mahadev hill (1200 m).

**Bori**: Reserve forest (550 m). On trees in the forest. Common.

*Fl. & Fr.*: April – December.

81. **Santalaceae** Juss.

**Osyris R. Br.**


**Pachmarhi**: Dhupgarh (1250 m). In the forest on hill slopes. Common.

*Fl. & Fr.*: July – January.

82. **Euphorbiaceae** Juss.

1a. Flowers naked, arranged in cyathia ...

**Euphorbia** 7

1b. Flowers with perianth, not arranged in cyathia:
FLORA OF PACHMARHI

2a. Leaves less than 3 cm long, obtuse or rounded:

3a. Disk none. Male calyx turbinate with truncated lobes. Fruits dry, Stamens 3, united. ... *Bryonia* 4

3b. Disk present. Calyx spreading; lobes obtuse or acute:

4a. Stamens 4 ... *Securinega* 12

4b. Stamens 3:

5a. Leaves narrow. Fruits fleshy ... *Eribilia* 6

5b. Leaves ovate or obovate. Fruits dry ... *Phyllanthus* 11

2b. Leaves more than 3 cm long, obtuse to acute, sometimes rounded:

6a. Herbs ... *Acalypha* 1

6b. Trees or shrubs:

7a. Palmately veined ... *Maliktus* 10

7b. Pinnately veined:

8a. Petioles with 2 glands ... *Baliospermum* 3

8b. Petioles without glands:

9a. Leaves rounded to obtuse at tip ... *Bridelia* 5

9b. Leaves acute to acuminate:

10a. Flowers clustered on short, branched cymes or fasciculate ... *Glachidian* 8

10b. Flowers spicate-racemose:

11a. Lower leaf surface with scattered lepidote scales ... *Homonoia* 9

11b. Lower leaf surface glabrous or with stellate pubescence ... *Antidesma* 2

1. Acalypha L.

Erect, pubescent, annual herbs. Leaves ovate or rhomboid-ovate, acute or obtuse, shortly acuminate, acute. Flowers in axillary spikes, the males minute at the summit of the spikes, the females 3–5, surrounded by bracts. Ovary hispid. Capsules small, hispid, concealed by bracts, often only 1-seeded.

PACHMARHI: Vicinity (1000 m). In forest undergrowth and shaded waste lands. Common.

Fl. & Fr.: June November.

2. ANTIDESMA L.


Fl. & Fr.: November December.

3. BALIOSPERMUM Bl.


Erect, branched, undershrubs. Leaves sinuate-toothed, the lower large, ovate, often palmately 3–5-lobed, upper small, lanceolate. Flowers in numerous axillary racemes or contracted pedicels, all male or a few female below. Capsules obovoid, usually hairy, of 3 two-valved crustaceous cocci.

BORI: Reserve forest (550 & 1000 m). In the forest. Common.

Fl. & Fr.: October April.


**PACHMARHI**: Mahadev hill (1200 m), 26-7-64, *Punigrahi* 4541 (BSA). On hill slopes. Common.

*Fl. & Fr.*: April - September.

New record for the area.


Moderate-sized trees with spines when young. Leaves ovate or elliptic-oblong, obtuse, rounded or acute at apex, rounded or subacute at base, coriaceous; lateral nerves up to 30 pairs. Flowers small, greenish, in axillary clusters or in long spikes; males and females intermixed. Fruits globose, scented on the persistent calyx and petals, purplish-black, succulent; cocci dehiscent.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Roservo forest (550 m). In the forest. Common.

*Fl. & Fr.*: August - January.


Medium-sized trees; bark greenish-grey or red; branchlets hairy. Leaves distichous, linear, imbricate when young. Flowers densely fascicled on new shoots, males on slender pedicels, females subsessile, few. Berries globose with 6 obscure vertical furrows, pale-yellow.

**PACHMARHI**: Vicinity (1000 m); Mahadev hill (1200 m). In deciduous forest. Common.

*Fl. & Fr.*: March December.

7. *Euphorbia* L.

1a. Trees or shrubs with succulent spiny branches. Leaves alternate, fleshy or O:

2a. Branchlets terete or angled, not winged:

3a. Stipular spines on short tubercles which are spirally disposed. Leaves rounded at apex, apiculate

3b. Stipular spines on prominent tubercles which are sub-confluent in 5 lines. Leaves acute at apex

2b. Branches and branchlets 3-winged

1b. Shrubs or herbs without spines. Leaves not fleshy, alternate or opposite:

4a. Shrubs or undershrubs with leaf-like coloured bracts below the involucres

4b. Herbs, sometimes woody at base, without leaf-like coloured bracts:

5a. Leaf-bases even; glands of involucres without a petaloid limb, often 2-horned

5b. Leaf-bases oblique, glands of involucres often with a petaloid limb:

E. nivella 5

E. nortifolia 6

E. antiquorum 1

E. heterophylla 3

E. dracunculoides 2
6a. Erect or procumbent, dichotomously branched herbs with medium-sized leaves; limb of the gland large conspicuous:

7a. Floral leaves neither distichous nor imbricate ... **E. hypericifolia** 4

7b. Floral leaves distichous, imbricate, enclosing the involucres which are solitary or 2-3 only. ... **E. pycnostegia** 8

6b. Prostrate herbs with very small leaves; limb of gland minute or 0:

8a. Capsules pubescent all over ... **E. thymifolia** 9

8b. Capsules pubescent at the angles of cocci, glabrous elsewhere ... **E. prostrata** 7


Much-branched small trees with jointed branches; branchlets usually 3, rarely 4-5-winged, repand-sinuate with short stipulary spines. Leaves small, fleshy, obovate-oblong or spatulate. Stamens red.

**BORI**: Reserve forest (550 m). On the rock crevices. Common.

*Fl. & Fr.*: November - January.


Erect, dichotomously much-branched herbs. Stems terete, rather glaucous. Leaves opposite; cauline leaves sessile, linear or linear-lanceolate, subacute; floral leaves broader at the base and shorter. Involucres broadly campanulate, subsessile, solitary. Capsules pale-yellow.

**PACHMARHI**: Mahadev hill (1200 m). In forest undergrowth. Occasional.

*Fl. & Fr.*: June - January.


Bushy annuals. Leaves three-lobed; lateral lobes ovate, acute; terminal lobe again 3-lobed, acute; floral leaves similar or entire and lanceolate, much smaller than the cauline leaves, green with a red or rosy spot at


Fl. & Fr. : October July.


Erect or spreading, glabrous or partly pubescent annual herbs. Leaves opposite, elliptic oblong, obtuse, serrulate, often tinged with red. Involucres in axillary and terminal, usually pedunculate, many flowered cymes. Capsules pubescent.

PACHMARHI : Dhupgarh (1250 m). In forest undergrowth. Common.

Fl. & Fr. : July February.


Large glabrous shrubs or small trees; branches terete, somewhat verticillate with pairs of sharp stipular spines arising from two conical, truncate, distant, spirally arranged tubercles. Leaves towards the ends of the branches, fleshy, obovate or obovate-oblong, rounded at apex, apiculate, narrowly cuneate at base, sessile or nearly so.

PACHMARHI : Vicinity (1000 m). On waste land along forest margins. Common.

Fl. & Fr. : January July.


Large, branched shrubs or small trees; the young branches angled with short stipular spines arising from thick tubercles arranged in 5 irregular rows. Leaves alternate, near the ends of the branches, obovate-oblong, acute, base narrowed into a very short petiole. Flower not seen.

PACHMARHI : Vicinity (1000 m); Dhupgarh (1250 m). On waste lands and hill slopes. Common.

Fl. & Fr. : January July.

Prostrate, pubescent, annual herbs. Leaves elliptic obovate, rounded at apex, rounded or cordate at base. Involucres hairy outside; lobes 5, lanceolate, ciliate. Glands red, suborbicular, with a narrow appendage. Capsule subglobose, hairy on angles. Seeds oblong, acutely quadrangular, red, transversely rugose with horizontal lines.

PACHMARH1: Vicinity (1000 m). In waste places. Common.

Fl. & Fr.: June January.


Erect, glabrous, annual herbs. Leaves opposite, oblong, obtuse; floral leaves distichous, imbricate, enclosing the involucres which are solitary or 2-3 only. Coci obtusely keeled, hirsute or glabrous. Seeds obtusely 4 angled, transversely furrowed or glabrous; limbs white.

PACHMARH1: Vicinity (1000 m); Mahadev hill (1200 m).

BORI: Reserve forest (900 m). In forest undergrowth. Common.

Fl. & Fr.: July January.


Prostrate, hispidly pubescent, annual herbs. Leaves elliptic-oblong. Involucres axillary, solitary or 2-5 together; glands minute or 0; limb 0.
Capsule obtusely keeled, pubescent all over.

PACHMARH1: Vicinity (1000 m). Along roadside and edges of forest. Common.

Fl. & Fr.: All seasons.

8. GLOCHIDION J. & G. Forst.

1a. Calyx of female flower 6-lobed. Style subglobose, deeply 3-lobed .......................... G. johnstonii 1

1b. Calyx of female flower with 6 free sepals. Style minute, 4-7-toothed. .......................... G. velatimulte 2


**PACHMARHI** : Dhupgarh (1250 m). 26°7' 64, Panigrahi 4521 (BSA). In the forest. Rare.

**Fl. & Fr.** : April - August.


**PACHMARHI** : Dhupgarh (1250 m); Mahadev hill (1200 m). In the forests. Common.

**Fl. & Fr.** : December - July.

9. **Homonoia Lour.**


**BORI** : Reserve forest (550 m). In moist situations near water courses. Common.

**Fl. & Fr.** : January - May.
10. **Mallotus** Loe.


**PACHMARHI**: Vicinity (1000 m); Dhupgarh (1250 m). **BORI**: Reserve forest (450 m). In the forest, near moist situations. Common.

*Fl. & Fr.*: August January.

11. **Phyllanthus** L.

1a. Stipules peltate

1b. Stipules not peltate:

2a. Leaf - apex acute. Disc of female flowers subentire ... *P. maderaspatensis* 3

2b. Leaf - apex obtuse or rounded. Disc of female flowers lobed ... *P. debilis* 2


**PACHMARHI**: Vicinity (1000 m). In forest undergrowth and waste places. Common.

*Fl. & Fr.*: April December.


PACHMARHI: Dhupgarh (1250 m). BORI: Reserve forest (550 m); Dhain (462 m). In forest undergrowth and waste lands. Common.

Fl. & Fr.: September - November.


Erect annual herbs. Stipules scarious, peltate. Leaves oblong-lanceolate, sessile, rounded at apex. Flowers whitish green, axillary; the males in subsessile clusters; the female solitary, pedicellate. Capsules 3 -gonyous, depressed globose, glabrous.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). In forest undergrowth. Occasional.

Fl. & Fr.: July - December.


1a. Plants armed with thorns

1b. Plants unarmed


Shrubs with somewhat straggling branches; branchlets angular, slender, ending in sharp thorns. Leaves obovate or orbicular, round or emarginate. Flower greenish white, in axillary clusters; the males numerous; the female usually 1. Fruits globose, smooth, white, 3 - celled.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1250 m). BORI: Reserve forest (550 m). Among boulders. Common.
Fl. & Fr.: April July.


Unarmed, glabrous shrubs. Leaves elliptic to obovate, rounded, obtuse or broadly and shortly acuminate. Flowers greenish-white in axillary clusters; the males numerous; the females usually 1-5, all subtended by minute bracts. Fruits globose, fleshy, white.

PACHMARHI: Dhupgarh (1250 m). BORI: Reserve forest (550 m). In the forests. Common.

Fl. & Fr.: April July.

83. ULMACEAE Mirb.

Tremat Lour.


PACHMARHI: Vicinity (1000 m); Dhupgarh (1250 m). BORI: Reserve forest (550 m). In the mixed forest. Common.

Fl. & Fr.: December - October.

84. URTICACEAE Juss.

1a. Plants with stinging hairs:

2a. Stipules large, foliaceous; cystoliths punctiform ... Girardinia 3

2b. Stipules small, scarious; cystoliths linear ... Laportea 4
1b. Plants without stinging hairs:

3a. Flowers in pedicelled, fleshy oenanthis ... _Lettuchina 3_

3b. Flowers in interrupted spikes or in cymes:

4a. Leaves sessile ... _Elatostema 2_

4b. Leaves distinctly petioled ... _Boehmeria 1_

1. **Boehmeria Jacq.**

1a. Female spikes longer than the subtending leaves ... _B. platyphylla 1_

1b. Female spikes shorter or as long as the subtending leaves ... _B. scabra 2_


**Bori**: Reserve forest (550 m). In mixed forest. Common.

**Fl. & Fr.**: September - December.


Erect, perennial, undershrubs. Leaves nearly equal, ovate-elliptic to rounded, with rounded-subcordate base, crenate-serrate. Stipules lanceolate. Flower-clusters in spikes which are often paniculate. Female flowers: perianth hairy at the top. Achenes obvoid-ellipsoid, hairy at the top.

**Pachmarhi**: Mahadev hill (1200 m). **Bori**: Reserve forest (1600 m). In mixed forest. Common.

**Fl. & Fr.**: September - December.
2. Elatostema J. & G. Forst.


Erect-ascending, stoloniferous herbs. Leaves sessile, orbicular to cuneate or elliptic-oblong to ovate-lanceolate, subentire-crenate-serrate to pinnatifid, obtuse to cAudate, with an acute or rounded base, glabrous, somewhat fleshy. Male flowers : receptacles long-peduncled. Involutec bracts free, rounded ; the outer ones horned. Female flowers : receptacles sessile. Achenes slender, ribbed.

PACHMARHI : Vicinity (1000 m). In the forest undergrowth. Occasional.

Fl. & Fr. : July December.


1a. Leaves not lobed in lower portion ; upper often palmate-ely 3 - 5 - lobed. Cymes elongate ... G. palmata 1

1b. Leaves pinnately lobed. Cymes in reniform clusters ... G. zeylanica 2


Erect, perennial herbs with stinging hairs. Leaves broadly ovate, acuminate ; the upper ones pinnately lobed. Stipules ovate. Male flowers ; in panicked spikes ; perianth 4-partite ; stamens 4. Female flowers ; in spikes combined into a panicle ; perianth 3-lobed ; achenes obliquely ovoid.


Fl. & Fr. : July December.

Erect, stinging hairy, perennial herbs. Leaves pinnately lobed; margins bluntly serrate. Stipules broadly cordate. Female inflorescence densely compacted into oblong or reniform masses in fruit.

**BORI**: Reserve forest (550 m); Dhain (462 m). In the mixed forest. Common.

**Fl. & Fr.**: July - December.

4. **Laportea Gaud.**


Diffuse, perennial herbs with stinging hairs. Stem flexuus or erect, furrowed. Leaves sparsely clothed with weak stinging hairs, ovate, acuminate, subcordate at base, crenate-dentate. Flowers in axillary spikes or panicles, dioecious. Sepals in male 4 or 5, free, valvate, in female 4, connate. Achenes oblique, tipped by style.

**PACHMARII**: Mahadev hill (1200 m); Dhupgarh (1250 m).

**BORI**: Reserve forest (550 m). On hill slopes and river bed. Common.

**Fl. & Fr.**: August - December.

5. **Lecanthus Wedd.**


Slender annual herbs without stinging hairs. Leaves opposite with unequal petioles; more or less pubescent below on nerves, sparsely hairy.
above. Flowers dioecious in axillary coenanthiums. Tepals 4-5, free, shortly hooded; in male; in female 3-4.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1250 m). On moist hill slopes and rocks. Common.

Fl. & Fr.: July October.

85. MORACEAE Link

1a. Flowers inside a closed receptacle (hypanthalium); sterile and fertile flowers together ...

1b. Flowers in spikes or catkins; sterile and fertile flowers in separate catkins or spikes.

Ficus 1
Morus 2

1. Ficus L.

1a. Leaves opposite ...
1b. Leaves alternate:

2a. Figs distinctly peduncled:

3a. Leaves scabrous above:

4a. Figs in pairs ...
4b. Figs solitary:

5a. Leaves 3-5-lobed ...
5b. Leaves not lobed ...

3b. Leaves not scabrous ...

2b. Figs sessile or sub sessile:

6a. Leaves caudate:

7a. Leaf base truncate or slightly attenuate; cusp 6 cm long ...
7b. Leaf base cordate; cusp 3 cm long ...

6b. Leaves not caudate:

8a. Leaves obtuse or blunt at apex:
9a. Lateral nerves 6-9 pairs, not very distinct from smaller nerves. Figs glabrous.

9b. Lateral nerves less than 6 pairs, distinct from smaller nerves. Figs silky pubescent.

10a. Midrib with an elongated gland at the base.

10b. Midrib eglandular

8a. Leaves acute to acuminate at apex


Small trees. Leaves broadly ovate, cuneate, cordate at base, glabrous, chartaceous; base 5-7 nervied; lateral nerves 8-12 pairs: rachis 3 cm long. Figs clustered on tubercles on stem, usually in the axils of fallen leaves, subsessile, glabrous, globose, purple; basal bracts distinct, caducous.

PACHMARHI: Vicinity (1000 m). In deciduous forest. Common.

Fl. & Fr.: February - April.


Large trees sending down many aerial roots from branches and thus extending the growth of the tree indefinitely; young parts softly pubescent. Leaves coriaceous, ovate or orbicular ovate to elliptic, obtuse, entire. Receptacles sessile in pairs, axillary, globose, puberulous, red when ripe with 3 broad, rounded, nearly glabrous bracts at the base.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). In the mixed forests. Common.

Fl. & Fr.: April - June.


Small, much branched, deciduous trees; branches pubescent. Leaves thick, broad, ovate to nearly orbicular in outline; usually 3-5 lobed. Receptacles axillary and subterminal, stalked, solitary, pear-shaped, reddish-purple or dark-purple when ripe, slightly depressed at apex; basal bracts 3, broadly ovate, acute, spreading.
PACHMARHI : Vicinity (1000 m). Road side. Occasional.

Fl. & Fr. : March - June.


Shrubs or small trees; young parts scabrid. Leaves alternate, minutely serrate, obovate-ovate or elliptic-oblong-lanceolate, abruptly acuminate, cuneate, scabrid above, hispid beneath, triplinerved; lateral nerves 3 ± pairs. Figs axillary, solitary, distinctly peduncled, globular, pubescent, yellowish red.

BORI : Reserve forest (550 m). In mixed forest. Common.

Fl. & Fr. : February - April.


Shrubs or small trees without aerial roots; all parts hispid pubescent. Leaves mostly opposite, oblong-lanceolate to ovate or obovate or elliptic, entire, blunt or acuminate, serrate, toothed or crenate in upper part. Receptacles paired, peduncled, globose, slightly depressed at apex, yellow when ripe, scabrous-hispid; basal bracts 3.

PACHMARHI : Vicinity (1000 m). BORI : Reserve forest (550 m). In mixed forest. Common.

Fl. & Fr. April - October.


Moderate sized trees, all parts glabrous. Leaves coriaceous, elliptic, ovate or obovate, rounded or shortly bluntedly acuminate at apex, polished and shining. Receptacles sessile, in pannus, axillary or from scars of fallen leaves, depressed-globose, smooth, yellow or reddish when ripe; basal bracts 3, broadly ovate, blunt, persistent.

PACHMARHI : Vicinity (1000 m). BORI : Reserve forest (550 m). In mixed forest. Common.

Fl. & Fr. : March - June.

Tall, evergreen trees; young parts puberulous. Leaves ovate or elliptic lanceolate, acute, glabrous. Receptacles shortly pedunculate on short, leafless, warty branches, pyriform or subglobose, orange red when ripe; basal bracts 3, ovate triangular.

**Bor** : Reserve forest (550 m). Along river side. Common.

*Fl. & Fr.* : December - July.


Large glabrous trees. Leaves coriaceous, ovate rounded, narrowed upwards and the apex produced into a linear lanceolate tail about half as long as the main portion of the blade, entire. Receptacles in pairs, axillary, sessile, smooth, depressed-globose, dark purple when ripe; basal bracts broad, spreading.

**Pachmarhi** : Vicinity (1000 m). **Bor** : Reserve forest (550 m). In mixed forests. Occasional.

*Fl. & Fr.* : April - August.


Small trees with aerial roots. Leaves subsessile, elliptic-oblong, acute or acuminate at apex, subacute at base, inequilateral, often gibbous on one side, glabrous, scabrid, coriaceous, trilobed, lateral nerves 5-6 pairs. Figs in axillary pairs, pedunculate, orange-coloured, scabrid, sparsely pubescent; basal bracts small.

**Pachmarhi** : Dhupgarh (1250 m). **Bor** : Reserve forest (550 m). In the mixed forests. Occasional.

*Fl. & Fr.* : April - December.

Large shady trees with thin aerial roots from the branches; young parts clothed with rusty grey tomentum. Leaves coriaceous, ovate elliptic or obovate elliptic, bluntly apiculate, entire, rusty grey tomentose beneath, base rounded or cordate, 3-7 nerved, midrib with an elongated gland at the base. Receptacles sessile in pairs, axillary, pisiform, grey tomentose; basal bracts 3, large, spreading.

PACHMARHI: Mahadev hill (1200 m); Dhupgarh (1250 m). In mixed forests. Common.

Fl. & Fr.: December July.


Medium deciduous trees. Leaves ovate lanceolate, abruptly obtusely acuminate, rounded or truncate at base, slightly glossy, with 3-5 pairs of basal nerves and 6-8 pairs of lateral nerves. Figs in axillary pairs, shortly peduncled, globular, glabrous, creamy white; basal bracts distinct.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 & 1000 m). In mixed forests. Common.

Fl. & Fr.: December April.

2. MORUS L.


Small, deciduous, monoecious or dioecious trees. Leaves ovate, rarely large, irregularly serrate or 3-lobed, acuminate. Flowers in short, pandulous catkins, greenish. Sorosis purplish black when ripe.

BORI: Reserve forest (550 m), Feb. '78, Pant 27239 (BSA). In mixed forest. Rare.

Fl. & Fr.: January March.

New record for the area.
86. SALICACEAE Mirbel.

Salix L.


Moderate sized deciduous trees; branchlets and young shoots white silky hairy. Leaves lanceolate or elliptic lanceolate, glandular-serrate, glabrescent, sometimes glaucous beneath, membranous. Carkins hairy; peduncles 3-12 cm long. Stamens 4-12, free, villous at base. Ovary glabrous.

Fl. & Fr.: September - December.

87. PINACEAE Lindl.

Pinus L.


Large trees; bark rough, cut into polygonal plates by deep dark-coloured furrows. Leaves needle-shaped in clusters of 3. Cones on short, stiff stalks, ovoid-conical. Seeds with a thin membranous wing, obtuse, oblancoellate and unequal sided.

PACHMARHI: Vicinity (1000 m). In the forest. Planted.
Fl. & Fr.: February - May.

88. CUPRESSACEAE S. F. Gray.

Cupressus L.

Tall, pyramidal trees; branches erect, often adpressed to the trunk; branchlets 4 sided. Leaves ovate oblong. Cones few, grey when ripe, varying in shape; scales rough, with a projecting point, convex or keeled. Seeds ovoid or oblong, angular, with a narrow wing.

PACHMARHI: Mahadev hill (1200 m). In mixed forest. Occasional.

Fl. & Fr.: February May.

89. ORCHIDACEAE Juss.

1a. Plants epiphytic:

2a. Plants with distinct pseudobulbs:
   
   3a. Lateral sepals deciduous along the column-foot ...
       Dendrobium 2
   
   3b. Lateral sepals not deciduous, Column-foot absent ...
       Liparis 7

2b. Plants without pseudobulbs:
   
   4a. Spur laterally compressed ...
       Rhynchostylis 12
   
   4b. Spur not compressed laterally:
       5a. Column-foot long ...
           Aerides 1
       5b. Column-foot absent ...
           Vanda 13

1b. Plants terrestrial:

6a. Lip spurred; spur projecting beyond the lateral sepals:

7a. Anthers 2:
   
   8a. Stigmatic lobes flat, almost confluent ...
       Platanthera 11
   
   8b. Stigmatic lobes not flat, distinct:
       9a. Stigmatic lobes convex, Flowers erect ...
           Peristylus 10
       9b. Stigmatic lobes cylindrical or club-shaped, Flowers patent or erectopatent ...
           Habenaria 6

7b. Anther 1:
   
   10a. Inflorescence erect, Lip with a short spur, distinctly 3-lobed ...
       Eulophia 3
   
   10b. Inflorescence decurved, Lip with a conical sac, faintly 3-lobed ...
       Geodorum 4
6b. Lip not spurred, often saccate with a sac not projecting beyond the sepals:

11. Pollinia 4  

11b. Pollinia 2:

12a. Leaves appear before the flowers. Venation divergent  

12b. Leaves and flowers appear together. Venation convergent  

Malaxis 8

Nerollea 9

Goodyera 5

I. AERIDES Lour.


Epiphytic plants. Leaves crowded, obtuse. Racemes 4 to 5-flowered. Flowers white or pale violet; often darker. Sepals and petals rounded; odd sepal and petal ovate-oblong; lateral ones ovate-oblanceolate. Lip 3-lobed; median lobe triangular-cordate, with a narrowed, rounded top, violet-red; spur straight, obtuse, upcurved.

PACHMARHI: Vicinity (1000 m), 26-12-62, Panigrahi 6557 (BSA). On forest trees. Rare.

Fl. & Fr.: October December.

2. DENDROBIUM Swartz.

1a. Flowers fascicled  

1b. Flowers racemose  

D. crepidatum 1

D. herbaceum 2


Epiphytic pendulous plants, leafless when in flower. Flowers 1-few, fascicled, white. Lip rounded, yellowish, pubescent. Foot and mentum present.

PACHMARHI: Vicinity (1000 m). On trees in the forest. Common.

Fl. & Fr.: March April.

Epiphytic plants with grooved stems; leafless when in flower. Flowers shortly reccumed, white. Lip with obscure side-lobes and a terminal triangular midlobe.

PACHMARHI : Mahadev hill (1200 m); Dhupgarh (1250 m). On trees in the forest. Occasional.

Fl. & Fr. : June July.

3. Euphobia R. Br.

1a. Lip saccate at base. Bracts shorter than the ovary ... E. explanata 1
1b. Lip with a short, bent spur. Bracts as long as or longer than the ovary ... E. herbacea 2


Pseudobulbs ovoid, anadulate. Leaves elliptic-lanceolate, acuminate. Racemes lax. Sepals and petals subequal, patent, white or yellowish streaked with reddish purple. Sepals spatulate-lanceolate, acute. Petals oblong, rounded at the apex. Lip 3-lobed, subpanduriform when flattened out; lateral lobes rounded, erect, white with reddish-purple; median lobe yellow with purplish veins, oblong with a rounded, emarginate apex and reflexed margins.

PACHMARHI : Dhupgarh (1250 m), Saxena 1004 (SFRI). In shady places on hill slopes. Rare.

Fl. & Fr. : June July.


PACHMARHI : Vicinity (1000 m), Saxena & Pandey 83527 (SFRI). In sal forest undergrowth. Rare.

Fl. & Fr. : June July.


Pseudobulbs globular. Leaves usually sessile, erect, lanceolate; sheaths forming a false stem. Flowers arranged in corymbose racemes, whitish-fleshy coloured, almost bell-shaped. Sepals linear-oblong. Petals obovate oblong. Lip broadly cymbiform, obscurely 3-lobed; lateral lobes subentire, median one crenulate.

PACHMARHI ; Dhupgarh (1250 m). On hill slopes. Occasional.

Fl. & Fr. : April May.

5. Goodyera R. Br.


PACHMARHI ; Vicinity (1000 m) ; Mahadev hill (1200 m). On hill slopes and forest undergrowth. Common.

Fl. & Fr. ; June July.


1a. Spur longer than the ovary ... *H. grandifloriformis* 1

1b. Spur shorter than the ovary ... *H. graveolens* 2

*Habenaria grandifloriformis* Blatter & Mc Cann in J. Bombay Nat. Hist. Soc. 36 : 17. 1932 *emend* Sant. & Kap. *ibid* 56 : 195. 1959 ; Sald. in

Leaf near the base, solitary, radical, orbicular or ovato-cordate. Scape usually naked, 1-4-flowered. Bracts sheathing. Flowers white. Sepals ovate, lateral oblique, acute. Upper segments of the petals suborbicular. Lip 3-partite; segments subequal; lateral filiform, median linear, lanceolate. Spur longer than the ovary.

PACHMARHI: Vicinity (1000 m). In forest undergrowth. Occasional.

Fl. & Fr.: June July.


Stem slender, leafy. Leaves variable, roundish to lanceolate. Scape lax, many-flowered. Flowers fragrant, pale green. Lateral sepals ovate, dorsal suborbicular. Petals 2-partite, segments unequal. Lip 3-lobed; lateral lobes a little longer than the petals; midlobe linear, straight, longer than the lateral ones. Spur shorter than the ovary.

PACHMARHI: Dhumgarh (1250 m). On hill slopes in forest undergrowth. Occasional.

Fl. & Fr.: July October.


Plants with pseudobulbs. Leaves 3-4, petiolate, acute or acuminate. Flowers in racemes, dark purple. Sepals long, linear, obtuse. Lip orbicular-ovate, recurved, fleshy with 2 large, long, tubercles at the narrowed base.

PACHMARHI: Vicinity (1000 m). In forest undergrowth. Occasional.

Fl. & Fr.: July October.
1a. Leaves flat. Inflorescence lax. Side lobes of lip produced upwards into auricles:

2a. Leaves green, often shaded purplish. Lip not constricted to the middle  

M. acumnata

2b. Upper surface or leaves dark brownish-green; lower surface purplish. Lip constricted to the middle  

M. mackinnonii 2

1b. Leaves erect. Inflorescence dense. Side lobes of lip not produced upwards into auricles:  

M. versicolor 3


PACHMARHI : Vicinity (1000 m), Feb. '78, Pant 27177 (BSA). Mahadev hill (1200 m), 27° 7' 64. Panigrahi 4572 (BSA). on hill slopes and forest undergrowth. Common.

Fl. & Fr. : July - October.

New record for the area.


Leaves 1 - 3, clustered and spreading on the ground, subfleshy, subplicate; upper surface dark brownish green; lower surface purplish. Flowers yellow. Sepals narrowly oblong, obtuse. Petals obtuse, twisted, reflexed, hardly visible. Lip constricted to the middle; side lobes produced upwards into auricles; the apex bilobed.

PACHMARHI : Dhupgarh (1250 m), Saxena & Pandey 83548 (SFRI). On hill slopes. Rare.

Fl. & Fr. : August - October.


**PACHMARHI** : Vicinity (1000 m) ; Dhupgarh (1250 m). On hill slopes and forest undergrowth. Common.

*Fl. & Fr.* : July August.

9. **Nervilia Comm. ex Gaud.**

1a. Leaf long - petiolate, ovate. Flowers 2 - 5 ... *N. aragoana* 1

1b. Leaf short - petiolate, orbicular. Flower solitary ... *N. prainiana* 2


Leaf long petiolate, orbicular, hastate at base, acute at tip, with undulating margins. Inflorescence 5 flowered. Flowers greenish yellow. Lip shortly 3 lobed; lateral lobes short, midlobe subacute, irregularly cuneate; nerves fleshy, purple.

**PACHMARHI** : Vicinity (1000 m), Saxena & Pandey 83538 (SPR1). In forest undergrowth. Rare.

*Fl. & Fr.* : May June.


Leaf hairy, reniform cordate, flat on ground. Flower solitary. Sepals and petals yellow. Lip 3 lobed, purple; lateral lobes as long as midlobe, rounded; midlobe fimbriate; nerves fleshy, hairy.
PACHMARHI: Dhupgarh (1250 m), 26 7 64, Panigrahi 4510 (BSA). On hill slopes. Occasional.

Fl. & Fr.: June - July.

New record for the area.

10. PERISTYLUS III.

1a. Spur as long as or longer than sepals

1b. Spur much shorter than sepals:

2a. Inflorescence a dense, cylindrical spike

2b. Inflorescence a lax, subscinduous spike


Tubers oblong, hairy. Leaves 3 - 6, ovate - elliptic. Spikes cylindrical, dense, many - flowered. Flowers white or pale yellow. Sepals subequal, oblong, obtuse; lateral ones with involute edges. Petals obliquely ovate lanceolate. Lip as long as the petals, 3 - lobed; lateral lobes linear, acuminate, somewhat diverging at their tips; median lobe oblong. Column very short, broad.

PACHMARHI: Vicinity (1000 m); Mahadev hill (1200 m). On hill slopes and forest undergrowth. Occasional.

Fl. & Fr.: July - August


Robust. Leaves 3 - 5, spirally arranged at about the middle of stem. Flowers small, creamy - white. Sepals unequal; middle one ovate - oblong; lateral ones obliquely oblong. Petals obovate - rounded. Lip 3 - 4 d.; median oblong, shorter, obtuse; lateral ones linear; spur globose.

PACHMARHI: Dhupgarh (1250 m), 26 7 64, Panigrahi 4513 (BSA). On hill slopes under forest. Occasional.

Fl. & Fr.: July - October.

New record for the area.


**PACHMARHI**: Dhungarh (1250 m). On hill slopes under forest. Occasional.

*Fl. & Fr.*: July September.


Robust; tubers 2, ellipsoid or ovoid. Leaves ovate, oblong or oblong-lanceolate, acute. Flowers white, faintly tinged with green. Sepals unequal, while faintly suffused with green; odd one obovate-elliptic, obtuse; lateral ones obliquely and subquadrately oblong, acute. Petals white, narrowly linear-oblong, acute. Lip white, fimbriate; spur pale-green, obtuse.

**PACHMARHI**: Vicinity (1000 m). In forest undergrowth and hill slopes. Occasional.

*Fl. & Fr.*: September October.


Epiphytic plants; stem sheathed. Leaves coriaceous, channelled, retuse at apex. Sepals, petals white, dotted with pink. Lip pink; spur laterally compressed, pubescent inside.

**PACHMARHI**: Vicinity (1000 m), Saxena 1000 (SpK1). On trees in the forest. Rare.

*Fl. & Fr.*: April September.

13. **VANDA R. Br.**


Epiphytes. Leaves leathery, unequally bilobed at the apex, linear. Flowers yellow; midlobe of lip lilac or whitish with lilac lines. Sepals broadly obovate, spreading. Petals spatulate-oblong. Lip adnate to the foot of the column; spur funnel shaped.

**PACHMARHI**: Vicinity (1000 m) On trees in the forest. Common.

*Fl. & Fr.*: May June.

99. **ZINGIBERACEAE** Lindl.

1a. Inflorescence on separate leafless shoots, associated with leafy stem:

2a. Anther connective prolonged into a beak, enclosing style ... *Zingiber* 5

2b. Anther connective truncate, crested:

3a. Anther not spurred; lateral staminodes reduced to small teeth. ... *Aenommum* 2

3b. Anther base spurred; lateral staminodes petaloid

1b. Inflorescence on a leafy shoot or leaves developing after flowering:

4a. Inflorescence racemose, Pedicels 1 - 2 cm long ... *Alpinia* 1

4b. Inflorescence spicate, Pedicels 5 mm long ... *Hedychium* 4
1. **Alpinia Roxb.**


PACHMARHI: Vicinity (1000 m), 28-12-62, Panigrahi 6687 (BSA). In forest undergrowth. Occasional.

*Fl. & Fr.*: April - June.

New record for the area.

2. **Amomum Roxb.**


BORI: Reserve forest (550 m), 23-12-62, Panigrahi 6504 (BSA). In forest undergrowth. Occasional.

*Fl. & Fr.*: June - December.

New record for the area.

3. **Curcuma L.**

1a. Rootstock small. Leaves ovate-cordate. Flower bracts purple

1b. Rootstock large. Leaves oblong. Flower bracts pale green

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*G. pseudomontana* 2

Herbs. Rootstocks small, bearing numerous small tubers. Leaves thin, ovate-cordate; petiole as long as the blade. Spikes with short peduncles; lower bracts ovate, many; upper sterile, longer, obovate. Flowers shorter than the bracts; flowers and bracts purple. Lip bicol, margin curled.

**PACHMARHI**: Vicinity (1000 m); Dhupgarh (1250 m). In forest undergrowth. Occasional.

*Fl. & Fr.*: July - November.


Perennial herbs with large rootstocks. Rhizome large with many ellipsoid or subglobose tubers. Leaves oblong, narrowed to the base; petioles as long as the blade. Spikes with peduncles shorter than the petioles. Flowers as long as the bracts. Flower bracts pale green. Corolla yellow.

**PACHMARHI**: Vicinity (1000 m). On hill slopes. Occasional.

*Fl. & Fr.*: July - December.


**BORI**: Dhain (430 m). In waste places in the forest. Common.

*Fl. & Fr.*: June - October.
5. ZINGIBER Boehm.


PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (900 m). In shaded places in forests. Common.

Fl. & Fr.: August October.

91. COSTACEAE (K. Schum.) Nak.

Costus L.


PACHMARHI: Vicinity (1000 m). BORI: Dhain (430 m). In moist shady places in the forest. Common.

Fl. & Fr.: July October.
Musa L.


Stoloniferous, stout, tall herbs. Leaves oblong, green. Inflorescence pendulous; bracts deciduous. Fruits oblong, trigonous, yellow when ripe; the pulp sweet and edible.

**PACHMARHI**: Vicinity (1000 m). In deep shaded valleys. Occasional.

*Fl. & Fr.*: All seasons.

93. HYPOXIDACEAE R. Br.

HYPOXIS L.


Slender herbs with coarse crowned with remains of old leaves; the root fibres fleshy. Leaves radical, spreading, reflexed, simple, linear, acute, glabrous or hairy. Flowers in scapes. Perianth lobes sessile on the top of ovary, elliptic, lanceolate, acuminate, yellow. Capsule green.

**PACHMARHI**: Dhupgarh (1250 m). On hill slopes. Occasional.

*Fl. & Fr.*: June August.

94. DIOSCOREACEAE R. Br.

DIOSCOREA L.

1a. Stem twining to the right. Seeds winged all around:

2a. Male spikes fascicled from nodes of leafy or leafless stem:
3a. Leaves 3-5-nerved, variable in shape, Pistillode minute
   D. oppositifolia 4

3b. Leaves 7-nerved, cordate, hastate or truncate at the base, Pistillode large, globose
   D. ruber 6

2b. Male spikes 1-4-nate on leafless stem
   D. betophylla 1

1b. Stem twining to the left. Seeds winged at base only :

4a. Leaves simple, 7-13-nerved :

5a. Stem bulbiferous. Male flowers crowded or scattered
   D. bulbifera 7

5b. Stem not bulbiferous. Male flowers always solitary
   D. wightii 7

4b. Leaves 3-5-foliate (rarely simple towards ends of branches), less than 7-nerved :

6a. Male spike up to 1 cm. Stamens 6. Female flowers in solitary distant spikes. Capsules less than 3 cm long
   D. hispida 3

6b. Male spikes 3-4 cm. Stamens 3 alternating with 3 staminodes. Female flowers in 2-3-nate racemes on the spike axis. Capsules more than 5 cm long.
   D. pentaphylla 5


Slender, glabrous, herbaceous twiners. Stem twining to right. Leaves simple, shallowly cordate, 7-9 ribbed. Petiole nearly as long as the blade. Male spikes 1-3-nate, on special leafless stems. Female spikes from nodes of leafy branches. Capsules pendulous, broader than long. Seed winged all around.

PACHMARHI: Vicinity (1000 m). In the forest. Occasional.
Fl. & Fr. : July February.


PACHMARHI : Vicinity (1000 m). BORI : Dhain (413 m). On bushes in the forest. Common.

Fl. & Fr. : July December.


Fl. & Fr. : July February.


PACHMARHI : Vicinity (1000 m) ; Mahadev hill (1200 m); Dhupgarh (1230 m). On bushes and trees in forests. Common.

Fl. & Fr. : July January.


Slender, herbaceous twiner with recurved prickles twining to the left. Leaves 3-5-foliolate, rarely unifoliolate at apex during flowering; leaflets digitate, ovate elliptic, oblique at base. Bulbs sometimes present in the axils of leaves. Male spikes in axillary or terminal panicules, 2-3-nate, white tomentose. Stamens 3, alternating with 3 staminodes. Female racemes 2-3 nate. Pistil hairy outside. Capsules longer than broad. Seeds winged only at base.

PACHMARHI : Vicinity (1000 m) ; Mahadev hill (1200 m). BORI : Reserve forest (1000 m). Climber on forest trees. Common.

Fl. & Fr. : July January.

Stems right twiner, unarmed, warty. Branches densely pubescent. Leaves opposite or some alternate, pubescent, 7 veined, very broadly ovate cordate or suborbicular or cordate hastate; upper ones ovate. Male spikes 1–2 nate, dense flowered on leafless branches. Female spikes 1–3 nate, in the axils of leaves. Capsule depressed with truncate base, winged; margins of wings thickened.

**BURI**: Dhain (462 m). Climber on bushes in the forest. Common.

*Fl. & Fr.*: September–January.


**PACHMARHI**: Dhupgarh (1250 m), Feb. '78, Pant 27155 (BSA).

**BURI**: Reserve forest (550 m), 26°12’–62°14’, Panigrah 6543 (BSA). On bushes in the forest. Rare.

*Fl. & Fr.*: September–February.

Collected mainly from M. P. after the type collection by Wight from Courtaulam, Tamil Nadu. New record for the area.

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95. **LILIACEAE** Juss.

1a. Leaves reduced to scales or spines with cladodes in their axils...

1b. Leaves well-developed, without cladodes in their axils:

2a. Scrambling or climbing by means of circinate leaf-tips. Flowers more than 5 cm across...

2b. Erect or scapigerous. Flowers less than 5 cm across:

3a. Rootstock a bulb or corm:

4a. Flowers on leafless scapes...

4b. Flowers in leafy racemes or solitary...
3b. Rootstock a short rhizome:

Ovules 2 in each cell, Seeds wrinkled ... Asphodelus 2

3h. Root - fibres ending in ellipsoid tubers. Racemes unbranched. Ovules 4 or more in each cell. Seeds not wrinkled ... Chlorophyllum 3

1. Asparagus L.


PACHMARHI : Dhubgarh (1250 m). BOKI : Reserve forest (550 m). In forest undergrowths. Common.

Fl. & Fr. : August January.

2. Asphodelus L.


PACHMARHI : Vicinity (900 m), Feb. '78, Pant 27218 (BSA), Roadside among bushes. Rare.

Fl. & Fr. : November March.

New record for the area.
3. **Chlorophyllum Ker Gawl.**

1a. Flowers in simple or branched racemes, remotely scattered, solitary or in pairs

\[ C. laxum \]

1b. Flowers in simple or shortly branched dense-flowered racemes

\[ C. tuberosum \]


Low herbs with root fibres ending in ellipsoid tubers. Leaves ovsicorvate, linear, acute, falcate, subdistichous, glabrous. Flowers few, greenish-white, in lax, simple or forked racemes. Capsules broadly obcordate, 3-winged.

**PACHMARHI**: Vicinity (1000 m). In rock crevices among the grasses. Common.

*Fl. & Fr.*: July September.


**BORI**: Dhain (462 m). In the forest undergrowth among grasses. Common.

*Fl. & Fr.*: July August.

4. **Gloriosa L.**


Climbing herbs, glabrous. Leaves sessile, scattered, opposite or in whorls of 3 each, ovate, long-acuminate, tip ending in a tendril like spiral. Base cordate. Flowers yellow, changes to orange and red on age, large showy, axillary, solitary or subcorymbose towards the end of the branches. Capsules linear-oblong.

**PACHMARHI**: Mahadev hill (1200 m). **BORI**: Dhain (430 m). On the bushes in the forest. Common.

*Fl. & Fr.*: August November.
5. **Iphigonia Kunth**


Small erect herbs with subglobose corm. Leaves sessile, grass-like, very acute or acuminate, base sheathing. Flowers purple, few or many in terminal erect racemes or more often solitary. Capsules oblong-ellipsoid, 3-grooved, obtuse.

**PACHMARHI**: Dhupgarh (1250 m). On hill slopes among the grasses. Common.

*Fl. & Fr.*: June September.

6. **Urginea Steinb.**


**PACHMARHI**: Vicinity (1000 m); Dhupgarh (1250 m).** HORI**: Reserve forest (550 m). In waste places in the forests. Common.

*Fl. & Fr.*: April May.

96. **COMMELINACEAE R. Br.**

1a. Inflorescence a cyme:

2a. Floral bracts inconspicuous, Staminodes present ... *Commelina 1*

2b. Floral bracts large, imbricated, Staminodes absent... *Cyperus 2*
1b. Inflorescence a panicle or a cluster of 1-5 flowers:

3a. Fertile stamens 6. Inflorescence dense, many-flowered. ... *Floccaria* 3

3b. Fertile stamens 9. Inflorescence lax or few-flowered. ... *Murdania* 4

1. **Commelina L.**

1a. All ovary cells 1-ovuled:

2a. Capsule 2-ovuled. ... *C. suffruticosa* 3

2b. Capsule 3-ovuled:

3a. Capsule 2-valved; posterior cell indehiscent, deciduous. Seeds adnate to the cell ... *C. undulata* 6

3b. Capsule 3-valved. Seeds free in the cell ... *C. paludosa* 4

1b. Two anterior ovary cells 2-ovuled; posterior one 1-ovuled:

4a. Capsule 3-ovuled; 2 lateral ones 2-seeded, loculicidally dehiscent; median one 1-seeded, 1-seeded:

5a. Spathes complanate ... *C. hasskarlil* 3

5b. Spathes erectulate ... *C. benghalensis* 2

4b. Capsule 1-ovuled with 2 superposed seeds ... *C. attenuata* 1


Much-branched herbs. Leaves linear, acute. Sheaths 1-1.5 cm long, ciliolate. Spathes narrowly ovate lanceolate, acute or caudate acuminate. Flowers small, blue. Capsules 1 -ovuled with 2 superposed seeds.

**PACHMARHI:** Vicinity (1000 m); Dhupgarh (1000 m). In moist sheltered places in the forest. Common.

*Fl. & Fr.*: August. October.


**Pachmarthi** : Vicinity (900 m). **Bori** : Reserve forest (550 m). In moist places in the forests. Common.

*Fl. & Fr.* : August - January.


**Bori** : Reserve forest (550 m); Dhain (450 m). In moist places in the forests. Common.

*Fl. & Fr.* : September - December.


Stout, subscandent, perennial herbs. Leaves ovate to elliptic-lanceolate, acuminate, often oblique at base. Sheaths with hairs at mouth and margin. Spathes subsessile or very short peduncled. Flowers blue. Ovary 3 - locular. Seeds smooth, 1 per locale. free.

**Pachmarthi** : Mahadev hill (1200 m); Dhupgarh (1250 m). In moist places in the forest. Common.

*Fl. & Fr.* : July - December.


**Bori** : Dhain (462 m). In moist places in the forest. Occasional.
Fl. & Fr.: July December.


Slender, erect or semierect, profusely branched perennial herbs. Leaves lanceolate, margins undulate. Spathes 3-5 together accompanied by 2-4 smaller leaves at the ends of the branches, triangular, closed at one end and beaked at the other, hairy. Cymes usually bipyramidal, outer 3-5 flowered, inner often sterile. Flowers blue to violet-purple. Capsules 2-3 per spathe, 3-celled, 2-valved, brown.

PACHMARHI: Vicinity (1000 m). In moist places in the forest. Common.

Fl. & Fr.: August October.

2. Cyanotis D. Don


Glabrous herbs. Stem branched from the base, rather succulent, creeping and rooting below, then ascending. Leaves fleshy, sessile, ovate-oblanceolate. Flowers blue in scorpioidly recurved cymes, longer than the bracteoles. Capsules oblong, trigonous, truncate.

PACHMARHI: Mahadev hill (1200 m). BORI: Reserve forest (550 m). In moist places in the forest.

Fl. & Fr.: July December.

3. Floccosa Lour.


PACHMARII: Jambudeep (1000 m); Dhupgarh (1200 m). In moist places in the forests. Common.

Fl. & Fr.: October February.

4. MURDANIA KOYIE


BURI: Dhain (430 m). In moist places. Occasional.

Fl. & Fr.: Agua: November.

97. ARBACEAE: Schnitz Schnitzenst

PHOENIX L.

1a. Stem 5 - 16 m high

1b. Stem very short or often absent:

2a. Stem short, bulbiform

2b. Stem 1 - 5 m high

Stem very short, sometimes bulb like. Leaves up to 2 m long; leaflets stiff, with acicular tips, 20–50 cm long. Petiole up to 30 cm long, spiny at base. Male spadix up to 60 cm long, with a 30–40 cm long, scurfy spadix which splits into boat-shaped valves. Fruiting spadix up to 100 cm long. Fruits ellipsoid.

**PACHMARHI**: Vicinity (1000 m); Dhupgarh (1230 m). In forest undergrowth. Occasional.

*Fl.* & *Fr.*: November – July.


Stem up to 5 m tall, with a spreading crown. Leaves up to 2 m long; leaflets opposite, folded, faintly nerved, with acicular tips. Male spadix up to 30 cm long. Female spadix up to 20 cm long. Fruit up to 1 cm long.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). In forest undergrowth. Common.

*Fl.* & *Fr.*: March – June.


Stem 10–20 m tall. Leaves pinnate, 2–4 m long; leaflets rigid, folded, with acicular tips. Male flowers white; spadix up to 1 m long; spathe scurfy, split into 2 boat-shaped valves. Female flowers similar to male flowers. Fruit oblong-ellipsoid, orange-yellow to reddish-brown when ripe. Seeds rounded at ends, grooved to the centre on one face, pale brown.

**PACHMARHI**: Vicinity (1000 m). On the edge of forests. Occasional.

*Fl.* & *Fr.*: November – May.

98. **ARACEAE** Juss.

1a. Leaves peltate, entire

1b. Leaves not peltate, variously dissected, not entire:

2a. Spadix without an apical, barren appendage:

3a. Neutral flowers present
2b. Spadix with an apical, barren appendage:
   4a. Male flowers shortly pedicelled. Plants usually dioecious
       ... Arisaema 2
   4b. Male flowers sessile. Plants monoecious
       ... Sauromatum 3

1. Amorphophallus Bl. ex Decne.


PACHMARHI: Vicinity (1000 m). In shady dark places in the forest. Occasional.

Fl. & Fr.: June - July.

2. Arisaema Mart.


Spathes greenish to purplish, fading white, overlapping for 4 - 5 cm; blade 7 - 10 cm long. Spadix sigmoid, 20 - 25 cm long, fertile at lower 2.5 - 6.5 cm long portion; lowest 1 - 2 cm pistillate and staminate portion 2 - 5 cm long; more or less separated from pistillate portion; appendix often purple.

PACHMARHI: Vicinity (1000 m). In shaded places in the forest. Occasional.

Fl. & Fr.: June - November.
3. PLESONIUM Schott


Perennial herbs with tubers. Leaf one, 3 partite; segments pinnatisect. Peduncle up to 50 cm long. Spathe erect, pale yellowish green, suffused with pink on the inner surface, ovate, obtuse, convolute below the middle. Spadix stipitate as long as the spathe, with female flowers below, neutral middle and male above.

**PACHMARHI**: Mahadev hill (1200 m); Dhupgarh (1250 m). In shaded places in the forests. Common.

*Fl. & Fr.*: July November.

4. **REMUSATIA Schott**


Perennial herb with tubers. Leaves peltate, ovate triangular, abruptly acute. Bulbils produced on erect, or suberect, 1 to many shoots. Bulbils in clusters, ovoid globose. Peduncle up to 20 cm long. Spathe 10–12 cm long; ovoid - oblong, green; limb golden yellow, ovate cordate. Spadix 2–3 cm long.

**PACHMARHI**: Vicinity (1500 m); Dhupgarh (1250 m). On moist shady hill slopes. Common.

*Fl. & Fr.*: July December.

5. **SAVROMATUM** Schott


Perennial tuberous herbs. Leaves 1 or 2, appear after flowering. Petiole 50-100 cm long, pedately parted; segments 3-10, elliptic - obovate or oblong. Peduncle 10-15 cm long. Spathe lanceolate, oblong, purple on the outside, dark purple on the inner side. Spadix as long as the spathe with a terminal appendage. Fruit ovoid, black.


Fl. & Fr.: April - August.

99. ERIOCaulACEAE Desv.

ERIOCAULON L.

1a. Leaves red or pinkish

3b. Leaves green:

2a. Plants more than 2 cm long. Involucral bracts hairy

2b. Plants less than 25 cm long. Involucral bracts glabrous:

3a. Anthers black:

4a. Involucral bracts about twice as long as the floral heads.

4b. Involucral bracts shorter than or as long as the floral heads

3b. Anthers not black

E. guinquangulare 4

E. polycephalum 2

E. xeranthemum 5

E. oryzeorum 3

E. cinereum 1


Plants glabrous. Leaves capillary, up to 5 cm long. Peduncles many, up to 6 cm long. Heads up to 3 mm across; bracts pale. Male florets: corolla lobes with an apical gland; anthers white or yellow; Female florets: sepals hyaline; petals strikingly linear, eglandular.

BORI: Reserve forest (550 m). In damp shaded forest undergrowth.

Fl. & Fr.: October - January.
Hook. f. var. **polycephalum** (Hook. f.) Fyson in J. Indian Bot. 2 : 309.
1921.

Leaves linear cuneiform, up to 20 cm long. Peduncles 1 many, up
to 50 cm, glabrous or pubescent; heads up to 8 mm across; receptacle
villous. Involutrural bracts obovate, sparsely hairy. Floral bracts obovate,
caudate. Male florets : sepals 3, free, ciliate at apex; corolla lobes hairy,
with apical gland; one lobe longer than floral bract. Female florets :
sepals 3, oblong, ciliate at apex; petals ciliate, cuneate, with apical gland.

**PACHMARHI** : Vicinity (1000 m). In damp shaded places in
forests. Common.

*Fl. & Fr.* : July December.

3. **Eriocaulon oryzeorum** Mart. in Wall. Pl. As. Rar. 3 : 28. 1832 ;

Leaves up to 8 cm long, linear, obtuse. Heads globose to oblong
ovoid, black. Receptacle conical or columnar, villous. Involutural bracts
glabrous, obtuse. Male florets : sepals 2, amethyst or glabrous. Female
florets : sepals 3, slender, caduceous; petals filiform to oblanceolate,
glabrous or ciliate.

**PACHMARHI** : Vicinity (1000 m). In damp shaded places in the
forest. Occasional.

*Fl. & Fr.* : September November.

Ind. 6 : 582. 1893 ; Babu, Herb. Fl. Dehra Dun 548. 1977.

Leaves linear, up to 6 cm long, red to pink. Peduncles many, up to
14 cm long; head 4 mm across; receptacle with short hairs. Involutural
bracts oblong, glabrous. Floral bracts obovate, acuminate, glabrous.
Male floret : calyx spathaceous, hairy at apex; corolla lobes hairy at
apex, with minute apical gland. Female floret : sepals 3, hairy at apex ;
petals oblanceolate, ciliate, with apical gland.

**BQRI** : Reserve forest (900 m). In wet places in the forest. Common.

*Fl. & Fr.* : November - January.

5. **Eriocaulon aeruthemum** Mart. in Wall, Pl. As. Rar. 3 : 29. 1832 ;
Leaves spreading, linear lanceolate, up to 4 cm long. Peduncles usually 2–3, almost twice as long as the leaves, 5-ribbed. Heads 4–6 mm across. Receptacles globose, glabrous; involucral bracts stellately spreading. Male floret: sepals 3, free or partially connate, obovate, hairy; petals minute, anthers black. Female floret: sepals 3 or 2, free, ob lanceolate, glabrous; petals 3, oblanceolate, ciliate, glandular.

**Pachmarhi**: Vicinity (1000 m). In marshy places. Occasional.

*Fl. & Fr.*: July August.

### 100 Cyperaceae Juss.

1a. Ovaries or nuts enclosed within a sac-like organ (utricule) ... *Carex* 2

1b. Ovaries or nuts not enclosed within a sac-like organ:

2a. Nuts borne on a 3-lobed or band-like disk ... *Scleria* 6

2b. Nuts not borne on a disk:

3a. Flowers with perianth consisting of one to several hypogynous bristles and or scales:

4a. Perianth scales alternating with bristles ... *Ligustrocarpus* 6

4b. Perianth of bristles only:

5a. Nuts beaked by the persistent style - base ... *Rhynchospora* 6

5b. Nuts not beaked by the persistent style - base ... *Scirpus* 1

3b. Flowers naked. Perianth absent:

6a. Nuts crowned by the persistent style - base which is articulated with the nut proper:

7a. Style 3 - ftd, base persisting like a minute button ... *Bulbostylium* 1

7b. Style 2 - ftd, base persisting like a conspicuous beak ... *Rhynchospora* 6

6b. Nuts not crowned by the persistent style - base; style - base continuous or articulated:

8a. Style articulated with the ovary, usually swollen at the base, and usually fimbriate ... *Fimbriostylis* 4
8b. Style continuous with the ovary, neither swollen nor semicircular:

9a. Glume distichous ... *Cyperus* 3
9b. Glume spiral ... *Scirpus* 7

1. **Bulbostylis Kunth**


Tufted annuals, up to 20 cm. Leaves glabrous, except at the sheath mouth. Inflorescence hemispherical, about 1 cm across; bracts filiform. Spikelets linear oblong, acute. Glumes red brown with strong green, curved, excurrent keel. Nut obovoid, trigonous, finely reticulate by isodiametric surface cells.

PACHMARHI: Vicinity (1000 m). In moist places. Common.

*Fl. & Fr.:* July November.

2. **Carex** L.


*Fl. & Fr.:* August December.

New record for the area.
3. CYPERUS L.

1a. Nuts lenticular; style 2 - fil.

2a. Inflorescence capitate of sessile glomerules, each spikelet maturing into a solitary nut:

3a. Keel of the glume distinctly winged

3b. Keel of the glume wingless:

4a. Rhizome densely caespitose. Heads (-1) 3 (-5), cylindrical, ovoid

4b. Rhizome horizontally creeping. Head solitary, subglobose or ovoid

C. pygmaeus 21

5a. Nuts with transverse wavy lines

5b. Nuts puncticulate or finely reticulate:

6a. Nuts linear-oblong with almost parallel sides. Leaves 2 - 4 mm broad

6b. Nuts obvoid or oblong. Leaves 1 - 2 mm broad:

7a. Inflorescence compressed into a head; spikelet 10 - 20 - flowered, 3 - 5 mm long

7b. Inflorescence simple or subcompound; spikelet 20 - 40 (-60) - flowered, 10 - 30 mm long

C. flavidus 10

1b. Nuts trigonous. Style 3 - fil.

8a. Rachilla of the spikelets caducous; (the spikelets thus fall off as a whole along with the persistent glumes:

9a. Inflorescence a lobed head

9b. Inflorescence antennate:

10a. Anthecia compound or decomposed, spike globose

10b. Anthecia simple. Spikes cylindrical:

11a. Rhizome emitting slender stolons covered with lanceolate, reddish brown spirate sheaths. Spikelets bearing 1 nut...

C. pygmaeus 17

C. kyllingia 13

C. ericae 25

C. brevifolius 2

C. diaphanus 6

C. polystachyos 19
11b. Rhizome not stoloniferous. Spikelets bearing 1 - 4 nuts

8b. Rachis of the spikelets persistent; the glumes acropetally caducous:

17a. Inflorescence cespitose:

13a. Annual herbs. Glumes long aristate, the arista about half as long as to equaling the main body

13b. Annual or perennial herbs. Glumes nuticous or shortly racemose:

14a. Spikelets oblong - lancolate, 1 - 2.5 cm long, 14 - 40 - flowered

14b. Spikelets ovate, 2.4 mm long, 8 - 12 - flowered

12b. Inflorescence anthelate with distinct rays:

15a. Spikelets spicate, the rachis several times longer than the spikelets:

16a. Glumes orbicular or broadly ovate, about as broad as long:

17a. Rachis of the spikes smooth; keel 3 - 5 - nerved, smooth, not winged

17b. Rachis of the spike scabrid on the angles; keel 7 - nerved, winged with serrate margin at the top

16b. Glumes linear - lanceolate or ovate - oblong, about half or less as broad as long:

18a. Rachis hispidulous

18b. Rachis glabrous:

19a. Spikelets penicillate, 2.5 mm broad

19b. Spikelets cylindric, 10 - 20 mm broad

15b. Spikelets digitate or very shortly spicate, the rachis obscure or much shorter than to about as long as the spikelets:

C. cypellicus 5

C. cuspidatus 4

C. niveus 14

C. pulchellus 20

C. tria 12

C. alatus 1

C. pilosus 18

C. nutans 15

C. imbricatus 11
20a. Spikelets digitate, 3-13 mm long. Rachilla visible between the widely spreading glumes...

20b. Spikelets shortly spicate, 6-60 mm long. Rachilla not as above:

21a. Anthela simple; glumes distinctly mucronate, micro 0.5-1.2 mm long...

21b. Anthela simple or compound. Glumes mucous or mucronate:

22a. Stems 4-8 mm thick in the middle. Leaves absent or solitary...

22b. Stems 1.5 mm thick in the middle. Leaves 2 to several:

23a. Spikelets acicular, ca 1 mm broad; glumes 1.5-2.0 mm long...

23b. Spikelets compressed, 1.4-3.6 mm broad; glumes 3.0-4.5 mm long:

24a. Spikelets 5-15 mm long, 8-10 = flowered; glumes 7-9-nerved...

24b. Spikelets 10-30 mm long, 10-40 (-100) flowered; glumes 5-7-nerved...

C. squamosus 23

C. pangorei 16

C. distans 7

C. esculentus 9

C. rotundus 22


Annuals. Stem triquetroeuf. Leaves as long as or longer than the stem. Spikes up to 3 cm long, in umbellate inflorescence. Bracts 6-8, unequal, one up to 30 cm long. Rays 4-8, unequal, up to 15 cm long. Spikelets greenish yellow. Glumes ovate, imbricate, 7-nerved, winged, serrulate in the upper margin. Stamens 2. Style 2, partite near the base. Nut obovoid, reddish brown, spiculate.

*Fl. & Fr.*: August December.

New record for the area.


**PACHMARHI**: Vicinity (1000 m). In moist places in and around forest. Common.

*Fl. & Fr.*: August December.


BORI: Dhain (460 m). In moist places in the forest. Common.

*Fl. & Fr.*: August November.


**PACHMARHI**: Vicinity (1000 m); Mahadev hill (1200 m). In moist places and hill slopes. Common.

*Fl. & Fr.*: July October.


PACHMARHI : Vicinity (1000 m). In moist places and around forests. Occasional.

Fl. & Fr. : September November.


PACHMARHI : Vicinity (1000 m), Saxena & Pandey 81302 (SFRI). In marshy places. Rare.

Fl. & Fr. : August October.


Tufted perennials. Stems up to 50 cm, trigonous, smooth. Leaves few; membranous side of sheath enlarged at mouth. Inflorescence twice un bellate; bracts spreading. Spikes branched, with few, distant spikelets. Spikelets spreading, linear with sharp tips and zig-zag rachilla. Glumes elliptical obtuse, dark red-brown with a membranous margin. Nut ellipsoid, trigonous.

PACHMARHI : Vicinity (1000 m). In shady places. Occasional.

Fl. & Fr. : October November.

Tufted perennials. Stems bulbous at the base ; sheaths brown, papery. Inflorescence, lobed with long spreading or reflexed bracts. Spikelets congested, ovate to lanceolate, acute, 3 - 6 flowered. Glumes broadly ovate, obtuse and apiculate, with several raised nerves. Nut trigonous, ellipsoid.

**PACHMARHI** : Madade hill (1200 m). On moist hill slopes. Occasional.

*Fl. & Fr.* : July October.


**PACHMARHI** : Chauragarth (1200 m). In open grasslands. Occasional.

*Fl. & Fr.* : August November.


**PACHMARHI** : * Vicinity (1000 m), 28-7-64, Pandgrahi 4619 (BSA).* On moist hill slopes. Occasional.

*Fl. & Fr.* : July October.

New record for the area.


**PACHMARHI**: Vicinity (1000 m). On grassy hill slopes. Occasional.

*Fl. & Fr.:* August - November.


**PACHMARHI**: Vicinity (1000 m). On wet soil amongst the grasses. Common.

*Fl. & Fr.:* July - November.


**PACHMARHI**: Vicinity (1000 m). In moist places amongst the grasses. Common.

*Fl. & Fr.:* July - November.


Perennials with woody rhizomes. Stems trigonous, nodose, clothed with leaf-sheaths up to 10–30 cm high. Leaves basal, linear. Bracts 2–3,

PACHMARHI: Vicinity (1000 m). In moist places in the forest. Common.

_Fl. & Fr._: May - July.


Perennials with woody rhizomes. Stems trigonous, up to 100-150 cm tall. Leaves basal. Inflorescence a decumbent umbel of spikes. Primary bracts leafy; secondary ones linear-filiform, shorter than the rays. Spikelets reddish-brown. Glumes slightly imbricate, mucronate, 2-3-nerved on either side of the keel. Stamens 3; anthers bearded at the apex. Nut pale white or straw-coloured, oblong.

BORI: Reserve forest (250 m), 22-12-62. _Panigarii_ 6316 (BBA). In swampy places in the forest. Common.

_Fl. & Fr._: July - December.

New record for the area.


PACHMARHI: Vicinity (1000 m). In marshy places. Common.

_Fl. & Fr._: August - December.


PACHMARHI: Vicinity (1000 m). In moist waste lands. Common.

Fl. & Fr.: July November.


PACHMARHI: Vicinity (900 m). Along the streams. Common.

Fl. & Fr.: June November.


Tufted annuals or perennials with short rhizomes. Stem slender, trigonous, triquetrous just below the inflorescence, smooth. Leaves 2–4 mm wide. Spikelets linear-lanceolate, acute. Glumes regularly half-imbricate, elliptic, acute, mucronulate with nerveless, membranous straw-coloured to golden-brown sides and narrow green keel. Nut 2-sided, laterally compressed, with flat to slightly convex sides, oblong, black.

PACHMARHI: Jambudeep (1000 m), Feb. 78, Pant 27206 (BSA). In marshy places. Occasional.

Fl. & Fr.: November February.

New record for the area.


Small tufted perennials. Stems bulbously thickened at the base. Leaves linear, sometimes exceeding stems; sheaths becoming fibrous. Inflorescence capitate, spherical, white with 3 slender reflexed bracts. Spikelets
numerous, sessile, confluent. Glumes lanceolate, obtuse or subacute with an indistinct rounded keel. Nut narrowly elliptic.

**Pachmarhi**: Vicinity (1600 m). In forest undergrowth. Common.

*Pl. & Fr.*: September November.


**Dori**: Reserve forest (550 m). In swampy places in the forest. Common.

*Pl. & Fr.*: September December.


**Pachmarhi**: Vicinity (1600 m). In moist waste lands. Common.

*Pl. & Fr.*: July November.


Small annuals with fibrous roots. Stems tufted, triquetrous to almost 3 winged, smooth. Leaves few, weak; sheaths inflated, purple. Inflorescence once anthelate; bracts exceeding rays. Spikelets congested in hemispherical or oblong spikes. Glumes elliptic, reddish brown with clear raised nerves and recurved arista. Nut ovate, punctulate.

**Pachmarhi**: Vicinity (1600 m).; Dhupgarh (1250 m). In moist places and hill slopes. Common.

*Pl. & Fr.*: July November.

Tufted annuals with purple fibrous roots. Stems weak, triquetrous. Leaves all bladeless or one with trigonous blade. Bracts 1 - 3, the longest exceeding the rays. Spikelets in dense clusters. Glumes oblong, purple - brown, incurved below, excurred above, spreading at maturity with a green midrib, keeled above and with obtuse membranous tip. Stamens 2 ; anthers obtuse. Nut obtusely trigonous to rounded, stipitate, warty.

BORI : Reserve forest (500 m), Feb. '78, Part 27260 (BSA). In moist places in the forest. Occasional.

Fl. & Fr. : September - February.

New record for the area.


Perennials with short rhizome. Stems nodose, trigonous. Leaves basal, as long as or longer than the stem. Spikelets compressed, obliquely lanceolate, straw - coloured in 3 - 6 dense, ovoid cylindric spikes, compacted into a compact head. Bracts 3 - 6, leafy, unequal. Lowest 2 glumes empty ; 3rd one fertile, lanceolate, mucronate, 3 - 4 nerved on either side of the keel ; 4th one empty. Stamens 2. Nut grey, oblong, apiculate.

PACHMARHI : Vicinity (1000 m). In moist places, Common.

Fl. & Fr. : July - February.

4. Fimbriatulus Vahl

1a. Nuts linear with almost parallel sides

... F. tetragona 6

1b. Nuts obvoid or scarboxicular :

2a. Stigmas 2. Nuts lenticular :

3a. Spikelets angular, 1.0 - 1.5 mm broad

... F. btsumbellata 1

3b. Spikelets terete, 2.5 - 3.0 mm broad

... F. dichotoma 2

2b. Stigmas 3. Nuts trigonal :

4b. Glumes spirally arranged. Spikelets terete or angular.

5a. Spikelets in clusters of 2 - 5, or a few, sometimes solitary; stamens 3

5b. Spikelets all solitary. Stamen 1 (rarely 2)


Tufted annuals. Stems flattened. Leaves flat with several equal nerves; ligule a fringe of short hairs; sheath membranous, hairy. Inflorescence of numerous oblong spikelets. Rachilla much elongating. Bracts hairy at base. Glumes ovate oblong, membranous, red-brown, with green, sharp, apiculate keel. Style fimbriate; outer layer transparent. Nut short stipitate, white or straw-coloured, obovoid with 3 - 7 longitudinal striæ.

**PACHMARHI:** Vicinity (1000 m). In waste places in forest. Common.

*Fl. & Fr. : July - December.*


**PACHMARHI:** Vicinity (1000 m); Mahadev hill (1200 m). In waste places and hill slopes. Common.

*Fl. & Fr. : July - December.*

Perennials with fiber covered short rhizome. Leaves spreading, elgulate, abruptly triangular tipped. Inflorescence sessile or once umbellate with few rays. Spikelets elliptic. Glumes obnuse, red brown with white margin. Nut trigonous, pale; surface cells quadrate, nearly isodiametric, some convex, producing an irregularly papillate verruculose surface.

**PACHMARHI**: Mahadev hill (1200 m), 27 4 64, *Panigrahi* 4562 (BSA). In waste places and hill slopes. Common.

**Fl. & Fr.**: July November.

New record for the area.


**PACHMARHI**: Vicinity (100 m). In moist places in the forests. Common.

**Fl. & Fr.**: July November.


**PACHMARHI**: Vicinity (1000 m). In forest clearings and moist places. Common.

**Fl. & Fr.**: September October.


**PACHMARHI:** Vicinity (1000 m). In open marshy places in salt forests. Occasional.

*Fl. & Fr.*: October November.

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**5. LIPOCARPHA R. Br.**


Annuals or perennials, Stem tufted, obtusely trigonous. Leaves stiff, spreading. Involutal bracts finally deflexed. Inflorescence lobes 5-6, rounded obtuse. Glumes rounded on the back, deciduous, enclosing 1-2 stamens and a nut wrapped round by 2 membranous scales, much exceeding the nut. Nut oblong, compressed.

**PACHMARHI:** Vicinity (1000 m). In marshy places in and around the forest. Common.

*Fl. & Fr.*: July December.

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**6. RHYNCHOSPORA VAHL**

Perennials with short rhizome. Stem tufted, trigonous, many leaved at the base and with some distant cauline leaves. Leaves shorter than the stems, with strong midrib; basal sheaths brown. Inflorescence paniculate, consisting of 3-4 distant umbels. Spikelets solitary or in small clusters, 2-4 flowered. Glumes 5-8, spiral. Style halfway bifid; base conical, glabrous. Nut obovate, biconvex, finely transversely wrinkled.

PACKMARHI: Vicinity (1000 m). In moist places in the forest. Occasional.

Fl. & Fr.: July - December.

7. SCIRPUS L.


BORI: Reserve forest (550 m). In moist places in the forest. Common.

Fl. & Fr.: July - December.

8. SCLERIA Berg.

1a. Hypogynous - disc obsolete, reduced to a narrow band ... S. lithosperma 2

1b. Hypogynous - disc well - developed, 3 - lobed:

2a. Annual herbs. Terminal partial panicles 2 - 4 cm long. Nuts cancellate ...

S. parvula 3

2b. Perennial herbs. Terminal partial panicles 4 - 10 cm long. Nuts smooth or faintly reticulate ...

S. levis 1

Tufted perennial. Stems scabrid on the angles. Leaves equally distributed along the stem, scabrid on the margins in the upper part; sheaths narrow, winged. Inflorescence narrow, terminal and 1-2 smaller lateral ones; primary bracts overtopping the inflorescence. Spikelets unisexual. Male spikelets oblong-lanceolate. Stamina 3; anthers linear. Female spikelets ovate, or sterile glume usually present; glumes ovate, acute or mucronulate. Disc deeply 3 lobed. Nut globose, not exerted from the glumes, pubescent, ultimately glabrescent, white.

PACHMARHI: Vicinity (1000 m). Along streams and marshy places. Common.

Fl. & Fr.: July November.


Perennials with nodulous rhizomes. Stems slender, triquetrous. Leaves rigid, linear; contraligule convex or triangular, brown hairy. Inflorescence slender with 2-3 distant, axillary, almost spicate panicles. Spikelets ferrugineous. Nut ovoid, obtusely trigonous, with a ferruginous glandular patch at the base of each face and dark ring at the base of the stipe.

PACHMARHI: Vicinity (1000 m). In moist places in the forest. Occasional.

Fl. & Fr.: July September.


PACHMARHI: Vicinity (900 m). In moist places. Occasional.

Fl. & Fr.: August December.
101. POACEAE Barnhart

1a. Spikelets 1 to many-flowered, breaking up at maturity above the more or less persistent glumes or if falling entire then not 2-flowered with the lower floret male or barren and the upper hermaphrodite:

2a. Arborescent. Leaves articulate with sheaths ... Dendrocalamus 15

2b. Otherwise. Leaves not articulate with sheaths:

3a. Spikelets in open or contracted spike-like panicles, less often racemes or spikes:

4a. Spikelets with one fertile floret, with or without 1 or 2 male or barren florets below it:

5a. Spikelets with 2 florets:

6a. Lower floret empty, epaleate. Glumes half the length of the spikelets ... Thysanolaena 54

6b. Lower floret male or empty, usually palaeeate. Glumes as long as the spikelets:

7a. Glumes unequal; lower one acute, upper one acuminate. Upper lemma awned ...

7b. Glumes equal, obtuse or mucronate. Upper lemma awnless ...

8a. Spikelets with 1 floret:

8a. Lemma awned ... Aristida 3

8b. Lemma unawned:

9a. Inflorescence a long curved second spike ... Microchloa 35

9b. Inflorescence an open or contracted panicle ...

4b. Spikelets with 2 or more fertile florets, if one, then with sterile florets above:

10a. Glumes 1.5 meter or more high, Kacchhia hairy ... Phragmites 43
10b. Culms less than 1 meter. Rachilla glabrous:

11a. Lemma 2-lobed or toothed or notched at apex, glabrous at base

11b. Lemma tip entire, acute or shortly awned, bearded at base:

12a. Inflorescence a solitary spike

12b. Inflorescence digitate:

13a. Spikelets with a fertile floret with or without reduced florets above:

14a. Spikelets without reduced florets, awnless

14b. Spikelets with 1 or more reduced florets, awned

13b. Spikelets with 2 or more fertile florets:

15a. Glume awned, margin densely ciliolate

15b. Glume not as above:

16a. Spikelets in open contracted, spike-like racemes or panicles:

17a. Spikelets in panicles

17b. Spikelets in solitary, second, raceme or spike...
16b. Spikelets in digitate or racemously arranged spikes or spike-like racemes:

18a. Rachis projected beyond terminal spikelet, 2nd glume short, awned or mucronate...

Dactyloctenium 15

18b. Rachis not projected beyond terminal spikelet, 2nd glume not awned or mucronate...

Eleusine 22

3b. Spikelets on opposite sides of the rachis of a solitary spike or spike-like racemes...

Triticeum 56

1b. Spikelets 2-flowered, falling entire at maturity; usually with female upper floret and male or barren lower one: frequently dorsally compressed:

19a. Spikelets bisexual or male or barren, and bisexual spikelets on the same inflorescence, if unisexual, then lemmas of the fertile one indurated:

20a. Spikelets paired, with 1 sessile and 1 pedicelled similar or dissimilar. Glumes as long as the spikelet and enclosing the florets, rigid. Lemmas hyaline or membranous; upper ones usually awned:
21a. Spikelets in similar pairs. Female joints thin, linear or slightly dilated at the top:

22a. Spikelets solitary, laterally compressed, Rachis continuous. Inflorescence of a single raceme or of several one-sided racemes ... \textit{Dimeria 20}

22b. Spikelets in pairs or in threes, mostly dorsally compressed or cylindrical. Rachis articulating:

23a. Spikelets in panicles or in compound racemes:

24a. Lemmas awned, toothed or clefted:

25a. Rachis of racemes tough or tardily breaking up. Upper lemma less clefted... \textit{Narenga 36}

25b. Rachis of racemes breaking up. Upper lemma clefted ... \textit{Spodiopogon 31}

24b. Lemmas awnless, neither clefted nor toothed:

26a. Stamens 1 or 2. Inflorescence a contracted, cylindrical panicle, small. Rachis tough ... \textit{Imperata 39}

26b. Stamens 3. Inflorescence large, open panicle. Rachis fragile ... \textit{Saccharum 47}

23b. Spikelets in racemes, 2 or few, digitate:

27a. Spikelets with 2-florets. Upper lemma 2-toothed ... \textit{Eulaliopsis 26}

27b. Spikelets with 1 floret. Upper lemma deeply clefted, awned in the sinus ... \textit{Eulalia 25}

21b. Spikelets in dissimilar pairs; sessile one bisexual; pedicelled one male or sterile or absent, if similar then the joints and pedicels thick and swollen:
28a. Joints of rachis and pedicels swollen, 3-sided, rounded or flattened:

29a. Upper lemma armed; sessile spikelets with male and bisexual flowers:

30a. Raceme 1-noded, reduced to 3 heteromorphous spikelets, enclosed in a boat shaped spathe...

30b. Racemes many-noded, espalthate...

Ischnaum 11

29b. Upper lemma unarmed; sessile spikelets with bisexual flowers only or rarely with male floret below:

31a. Raceme fragile; pedicelled and sessile spikelets different:

32a. Lower glume of sessile spikelets with a broad wing on each keel...

32b. Lower glume of sessile spikelets not winged at the keel...

Mansorita 33

31b. Racemes rough, its flattened spikelets formed from the fused pedicels and internodes; spikelets almost alike...

Rattiboeilla 46

Hemarthria 27

28b. Joints and pedicels narrow, neither thickened nor flattened often with a translucent longitudinal groove:

33a. Spikelets in racemes which are neither interrupted by spathes nor solitary at the ends of branches, usually in whorled panicles:

34a. Spikelets dorsally compressed, Lower glume smooth...

34b. Spikelets laterally compressed or tetete. Lower glume tuberculate...

Serythium 90

Vetiveria 27
33b. Spikelets in panicles of racemes interrupted by spathes, if not, then the racemes solitary or digitate:

33a. Upper lemma of the sessile spikelet awned from the back ...  

35b. Upper lemma awned from the tip or sinus, often reduced to the hyaline base of an awn:

36a. Lower glume of the sessile spikelets with infolded margins, 2-keeled; awn glabrous:

37a. Upper lemma of the sessile spikelets awned from the entire tip, often stipitate and passing into an awn:

38a. Racemes in panicles ...

38b. Racemes digitate or in short spikelet panicles:

39a. Joints and pedicels with a translucent longitudinal furrow. Pairs of spikelets heterogamous ...

39b. Joints and pedicels without a translucent furrow:

40a. Pairs of spikelets heterogamous. Upper lemma of the sessile spikelets 2-3 ...

40b. 1-3 pairs of spikelets homogamous. Upper lemma of the sessile spikelets reduced to the translucent base of an awn ...

37b. Upper lemma of sessile spikelets 2-cleft or lobed, awned from the sinus:
41a. Racemes 2-nate, combined into large spathate panicle. Plants aromatic ... **Cymbopogon** 12

41b. Racemes solitary at the ends of culms and their branches. Plants not aromatic:

42a. Pedicelled spikelets very much larger than the sessile. Upper glume awned. Joints and pedicels beeciforrm ... **Dictamnus** 18

42b. Pedicelled spikelets not conspicuously larger, often small to very small. Upper glume awnless. Joints and pedicels clavate, 3-toothed ... **Schizachyrium** 48

43a. Lower glume of the sessile spikelets without irregular sides, inflated and rounded, not keeled as above, if keeled then mostly at the top:

43b. Racemes surrounded at base by an involucre of homomous spikelets:

44a. Involucral spikelets pedicelled, deciduous. Callus of the filiform spikelets short, tenuocate or obtuse ... **Lezione** 32

44b. Involucral spikelets sessile, persistent. Callus of the filiform spikelets pointed ... **Schoenea** 33

45a. Spikelets solitary or paired, usually similar. Glumes shorter or as long as the spikelets, membranous. Lemmas especially upper one papery to very tough, rigid, awnless:

45b. Spikelets not subtended by an involucre of bristles or subtended by a solitary bristle, falling with or without bristles at maturity:

46a. Upper lemma transversely rugose. Brustles persistent ... **Setaria** 49

46b. Upper lemma smooth. Brustles cadu-
cuous ... **Pennisetum** 42

47. Spikelets in contracted or open panicles:

48a. Spikelets gibbous, laterally much compressed:

49a. Upper glume and lower lemma beaked, long ciliate ... **Rhynchospora** 43
49b. Upper glume and lower lemma entire at apex ...

48b. Spikelets not gibbous ...

47b. Spikelets in second (1-sided) spikes or spike-like racemes which are either digicate or scattered, rarely solitary :

50a. Lemma of the upper floret thinly cartilaginous, usually with flat, hyaline margins :

51a. Upper lemmas awnless ...

51b. Upper lemmas awned

50b. Lemma of the upper floret more or less crustaceous or coriaceous, usually with involuted margin exposing much of the palea :

52a. Lower glume turned towards the rachis, with the back of the upper lemma turned away from it (spikelets adaxial) ...

52b. Lower glume turned away from the rachis, with back of the upper lemma facing it (spikelets abaxial) :

53a. Lower glume usually absent ...

53b. Lower glume usually present, often much reduced :

54a. Upper lemma acute, not mucronate; upper florets transversely rugose ...

54b. Upper lemma mucronate or awned; upper florets smooth :
1. **Allotropis** C. Presl.


Annuals with culms hairy. Leaves ovate lanceolate, subacute, ciliate on the margins with bulbous based hairs; sheath and ligule hairy, Spikelets obvolute, elliptical. Lower glume ovate lanceolate, acuminate, 3 to 5 nerved. Upper glume ovate elliptic, mucronate, 5 nerved. Lower palea divided into 2 linear lobes.

**PACHMARHI** : Vicinity (1000 m). In waste lands and along water course. Common.

*Fl. & Fr.* : July October.

2. **Apluda** L.

Perennial grass. Culms tufted, geniculately ascending, erect or the branches rambling among the bushes. Leaves linear - lanceolate, narrowed from the middle to filiform tip and below into a slender petiole; ligule chartaceous, oblong, lacerate. Spikelets clustered on short peduncles; the clusters solitary or few and arranged in an elongate bracteate interrup ted leafy panicle. Sessile spikelets 3 -5 mm long.

PACHMARHI: Vicinity (1000 m); Dhupgarh (1250 m).

BORI: Reserve forest (500 m). On moist hill slopes and way sides of the forests. Common.

Fl. & Fr.: October - January.

3. ARISHTDA I.


Perennial grass. Culms stout, erect. Leaf blade involute, narrow; ligule a fringe of hairs. Inflorescence a contracted or effuse panicle. Spikelets 1 flowered, rachilla not produced beyond the floret. Glumes long-awned; G1 1.3 cm long; G2 with awn up to 1 - 4 cm.

PACHMARHI: Vicinity (1000 m); Jambudeep (1000 m). BORI: Reserve forest (550 m). In rock crevices and waste places. Common.

Fl. & Fr.: All seasons.

4. ARTHRAXON Beauv.

1a. Pedicel glabrous or O ... A. quartinianus 3

1b. Pedicel hairy:

2a. Lower glume keeled; keels tuberculate ... A. meeboldtii 2

2b. Lower glume rounded on the back, not keeled. ... A. lancifolius 1


Fl. & Fr.: September - December.


Annual herbs. Leaves ovate lanceolate; blade up to 2 × 0.5 cm. G1 2 keeled; keels with two rows of marginal tubercles which become spinulose and ciliate upwards.


Fl. & Fr.: August - October.


Annuals. Leaves lanceolate, cordate at base, hairy. Sessile spikelets 3 3.2 mm long with a minute callus. Pedicelled spikelets reduced to subulate points.

PACHMARHI: Vicinity (1000 m). In swampy places. Common.

Fl. & Fr.: September - November.

5. ARUNDINELLA Raddi

1a. Tip of pedicel with 2 bristles

1b. Tip of pedicel without any bristle

... A. setosa 2

... A. purpurea 1

Delicate annual herbs. Blades 20 x 2.6 cm, hairy. Panicle fan shaped. Spikelets less than 2 mm long. G2 often with few hairs on back.

**BORI**: Reserve forest (550 m). In shady places in the forest. Common.

**Fl. & Fr.**: September December.


Tufted perennial herbs. Leaf blade flat; sheath strongly compressed and keeled on the back; ligule very narrow. Inflorescence of digitate, spiciform, alternate racemes. Spikelets sessile, solitary, alternate; dorsally compressed, acute, 2 flowers, falling entire. G1 absent, G2 as long as the spikelet, membranous, with involute margin. L1 membranous, faintly nerved, epaleate. L2 herbaceous, involute at margin, hardening in fruit, enclosing a basally auricled, bisexual palea. Lodicules 2; stamens 3; styles 2, free; stigmas plumose.

**PACHMARHI**: Vicinity (1000 m); Dhupgarh (1250 m). On hill slopes and waste places. Common.

**Fl. & Fr.**: August October.

6. *BOTHRIOCILIA* O. Kuntze

1a. Lower rachises longer than the rachis. Racemes 2 - 8, overtopping the axis ...

1b. Lower rachises shorter than the rachis. Racemes 8 - many, not overtopping the axis :

2a. Primary axis of the panicle 6 - 7 cm long. Racemes simple, often the lower ones branched ...

2b. Primary axis of the panicle 5 - 10 cm long. Racemes usually branched ...

B. *kuntzeana* 3

B. *intermedia* 2

B. *giulbra* 1


**BORI**: Reserve forest (550 m); Dhain (460 m). On hill slopes. Common.

*Fl. & Fr.*: September - December.


**BORI**: Dhain (460 m). In shaded places in the forest. Common.

*Fl. & Fr.*: August - December.


Tall perennials with thickly bearded nodes. Leaves narrowly linear, smooth, glabrous, glaucous. Spike corymbose. Sessile spikelets narrow: G1 glabrous, thin; G2 lanceolate, acuminate, margins ciliate; G3 lanceolate, glabrous; G4 awned, base dilated. Pedicelled spikelets narrower; male; G1 keeled; keels ciliate at the entire tip; G2.5 - nerved; G3 nerveless; G4 small or 0.
BORI: Reserve forest (550 m). In shady places in the forest. Occasional.

Fl. & Fr.: October December.

7. BRACHYARIA Grieseb.

1a. Spikelets 1.2 - 2 mm long. Pedicels bristly ...  B. reptans 3
1b. Spikelets 2.5 - 3 mm long. Pedicels and rachis hairy or glabrous:

2a. Spikelets distant by less than 3 mm. Primary pedicels not more than 2 mm long. Pedicels and rachis with long colourless hairs ...  B. ramosa 2

2b. Spikelets distant by 10 - 16 mm. Primary pedicels 6 - 10 mm or more long. Pedicels and rachis without long colourless hairs. ...  B. deflexa 1


Annuals. Culms decumbent ascending, nodes pubescent. Leaves lanceolate, Ligule long - ciliate. Spikelets or pairs of spikelets or secondary racemes loosely scattered, distant by 10 - 16 mm. Primary pedicels 6 - 10 mm or more long. L. glume 5 - nerved. U. glume 7 - nerved. Pedicel and rachis devoid of long colourless hairs.

BORI: Reserve forest (550 m), 22 12 62, Phragmites 6296A (BSA). In shaded places and waysides. Rare.

Fl. & Fr.: August November.


Annuals. Culms decumbent ascending, rooting from the lower nodes. Leaves lanceolate, cordate, ciliate. Racemes 5 many. Rachis scabrid, often with long hairs. Spikelets spiculate. Pedicels with 1 - 3 needle like hairs at the top. L. glume ovate rounded, glabrous, 5 - nerved. U. glume 7 - nerved, pubescent. L. lemma 5 - nerved, glabrous,
eepaleate, empty. U. lemma bisexual, transversely rugose, apiculate. Palea similar to U. lemma.

**BORI**: Reserve forest on way sides. Common.

**Fl. & Fr.**: August November.


Annual or perennials. Culms erect-ascending from the creeping base, hollow, glabrous. Leaves ovato-lanceolate, with an amplexicaul base. Ligule long-ciliate. Spikelets: L. glume ovate, with a rounded or triangular tip, 0 to 3-nerved. U. glume as long as the spikelet, 7-nerved. L. lemma 5-nerved. U. lemma micronate, tuberculat, rugulate, glabrous.

**BORI**: Reserve forest (550 m). In the forest undergrowth. Common.

**Fl. & Fr.**: August December.

6. *Capillipedium Stapf*


**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). In forest undergrowth. Common.

**Fl. & Fr.**: September April.


Tufted grass, perennial. Leaves linear-lanceolate, clasping, acuminate; ligule membranous, ciliate. Racemes paniculate on slender peduncles. Female spikelets enclosed by a sheath of the spike. Male spikelets distichous on the rachis.

**BORI**: Dhain (462 m). In moist places in the forest. Common.

*Fl. & Fr.* : September - December.

10. **CHLORIS** Sw.


**BORI**: Reserve forest (900 m). In the forest undergrowth. Common.

*Fl. & Fr.* : October - December.

11. **Coix** L.

1a. Floating and creeping plants. Upper surface of the leaves densely covered with conspicuous glands ... *C. aquatica* 1

1b. Erect plants. Upper surface of the leaves without numerous conspicuous glands ... *C. gigantea* 2

Floating aquatic and creeping plants with succulent stems and floating roots at the nodes. Leaves linear-lanceolate, long acuminate; upper surface densely covered with conspicuous glands which bear bristle-like hairs. Ripe involucre abruptly constricted at the neck into a beak.

**Bori**: Reserve forest (550 m). In swamps of forests. Occasional.

*Fl. & Fr.*: October - February.


Erect aquatic grass, never floating. Leaves linear-lanceolate, long acuminate; upper surface glandular, glabrous. Ripe involucre gradually constricted at the neck.

**Bori**: Dhain (462 m). Marshy places near river sides. Common.

*Fl. & Fr.*: October - February.

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12. **Cymbopogon** Spreng.


Sweet-scented grass. Leaves linear, acuminate. Panicles long, decomposed, contracted, subtended by a spatheate bract 1.5 - 2 cm long. Sessile spikelets 3 - 5 mm long.

**Pachmarhi**: Vicinity (1000 m); Dhupgarh (1250 m). On hill slopes and along river banks. Common.

*Fl. & Fr.*: October - February.

Contains sweet-scented essential oil.

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Culms slender, prostrate, widely creeping, forming matted tufts, with slender or ascending flowering branches. Leaves narrowly linear or lanceolate, finely acute to pungent; ligule a very fine ciliate rim. Spikes digitate on a slender peduncle. Spikelets 1.5–2.5 cm.

**PACHMARHI**: Vicinity (1000 m). In waste lands and road sides. Common.

*Fl. & Fr.*: June–October.

14. **CYRTOCCOCUM STAFF**


**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (900 m). In forest undergrowth under moist conditions. Common.

*Fl. & Fr.*: September–December.

15. **DACTYLOCTENIUM WILD**


Annuals of variable habit. Culms sometimes prostrate, rooting from the nodes, branched, glabrous. Leaves linear, tapering to a fine point. Ligule a slightly ciliate line. Spikes 2–6, digitately radiating. Spikelets numerous, 3–5-flowered, spreading at right angles to the rachis.

**PACHMARHI**: Vicinity (1000 m). On hill slopes and waste places. Common.

*Fl. & Fr.*: June–December.
16. Dendrocalamus Nees


Deciduous densely tufted bamboo with strong culms, solid or with a small cavity. Culm-sheaths covered on the back with golden brown stiff hairs. Leaves linear, gradually narrowed upwards into an acuminate twisted point.

PACHMARHI: Mahadev hill (1200 m). BORI: Reserve forest (550 m); Dhain (462 m). In the forests, gregarious in Bori forest. Common.

*Fl. & Fr.*: Not recorded.

17. Dichanthium Wille.

1a. Peduncle below inflorescence hairy ... *D. aristatum* 2

1b. Peduncle below inflorescence glabrous:

2a. Lower glume of the sessile spikelet without a median nerve. Sheaths compressed ... *D. caricosum* 3

2b. Lower glume of the sessile spikelet with a median nerve. Sheaths terete ... *D. annulatum* 1


Sarmentose grass. Culm nodes usually patently hairy. Leaves linear, acuminate; sheaths terete; ligule membranous. Recemes 2 9. G1 of pedicellate spikelet glabrous, of sessile spikelet without wings or keels.

BORI: Reserve forest (550 m). In forest undergrowth. Common.

*Fl. & Fr.*: September-December.


Perennial herbs; nodes of culms usually patently hairy, sometimes glabrous. Leaves linear, acuminate; ligule a rim of hairs. Racemes 1-6; peduncle hairy.

Bori : Reserve forest (550 m). Along river banks and waste land in the forest. Common.

Fl. & Fr. : October January.


Pachmarhi : Vicinity (1000 m). In forest undergrowth and roadside. Occasional.

Fl. & Fr. : September December.

18. Dicentra Kunth


Much fastigately branched grass, becomes red on drying. Leaves narrowly linear, acuminate; ligule elongate, acute. Sessile spikelets laterally compressed. Pedicellate spikelet with a large Gl which with its flattened villous pedicel conceals the inner sessile spikelet.


Fl. & Fr. : September December.

1a. Hairs on the spikelet not clavate:
   2a. U. glume less than one third of the length of the spikelet or often reduced to a minute, triangular scale ... D. setigera 3
   2b. U. glume usually more than one third of the length of the spikelet, well developed ... D. ciliaris 1

1b. Hairs on the spikelet clavate - tipped:
   3a. Upper glume absent ... D. stricta 4
   3b. Upper glume present ... D. ternata 2


Annual grass, glabrous. Leaves linear, acute; ligule membranous. Racemes 2 - 8, subdigitate, alternate, subwhorled; peduncle hairy at joints. Spikelets oblong, hairy, pedicels winged, scabrid.

PACHMARHI: Vicinity (1000 m). BORI: Reserve forest 1000 m. Near water courses and waste places. Common.

Fl. & Fr.: August December.


Erect annuals; culms wiry, rarely branched. Leaves linear, acuminate; ligule short, membranous. Racemes usually 2 - 3 or up to 7, subdigitate, short peduncled. Spikelets elliptic oblong, obtuse, hairy; hairs clavate tipped. U. glume present.

PACHMARHI: Vicinity (1000 m). In waste places. Occasional.

Fl. & Fr.: July October.

Slender grass. Leaves linear. Spikelets elliptic, acute, glabrous or shortly pubescent on the margin and lateral intercepts. U. glume 1/3 of spikelets or reduced to scale.

PACHMARHI: Mahadev hill (1200 m). Dhupgarh (1250 m).
BORI: Reserve forest (550 m). On hill slopes and forest clearings. Common.

Fl. & Fr.: July - November.


Annual grass. Leaves erect, linear, acuminate; ligule short, rounded, membranous. Racemes 3-15; erect, subdigitate or alternate. Spikelets broadly elliptic, tomentose with minute clavellate hairs.

Fl. & Fr.: October - December.

20. Dimeria K. Br.


Much tufted grass with leaves mainly near the base of the culm. Leaves linear, hairy on the margins, acuminate. Racemes more than one. U. glume narrowly winged all along the keel; rachis narrow, 0.75 cm wide. Racemes rarely divergent. Spikelets 3.5 - 4 mm long.

BORI: Reserve forest (550 m). Feb. ‘78, Pant 27285 (RSA) In forest undergrowth. Rare.
Fl. & Fr.: October - February.


Annuals; culms slender, decumbent or shortly creeping below; nodes glabrous. Leaves narrowly lanceolate or linear, acuminate; ligule absent. Spikes rather distant, 1–2 cm long. Spikelets 2.5–5 mm long.

**PACHMARHI**: Vicinity (1000 m). In moist places in the forest and roadsides. Common.

*Fl. & Fr.*: June–November.

22. **Eleusine Gaertn.**


Erect annuals. Culms tufted, slightly compressed, glabrous. Leaves as long as culm, linear; ligule membranous, slightly hairy. Spikes usually 2–7, digitate. Spikelets 2.5–3 mm long, 3–6-flowered, glabrous.

**PACHMARHI**: Dhupgarh (1300 m). **BORI**: Dhain (462 m). On moist hill slopes. Common.

*Fl. & Fr.*: July–October.

23. **Eragrostiella Bor**


**PACHMARHI**: Vicinity (1000 m). In waste places and forest clearings. Common.

*Fl. & Fr.*: July–January.

1a. Lemmas falling from below upward:

2a. Spikelets 2 mm or more wide ... *E. unioloides* 5

2b. Spikelets 1 - 1.5 mm wide, rarely up to 1.7 mm wide:

3a. Pedicel with white bands ... *E. tenuifolia* 4

3b. Pedicel without white bands:

4a. Annuals ... *E. gaugertica* 3

4b. Perennials ... *E. atrovirens* 1

1b. Lemmas falling from above downward:

5a. Panicle effuse. Plants viscidous ... *E. viscosa* 6

5b. Panicle contracted. Plants not viscidous ... *E. diarrhena* 2


Perennial grass, sometimes glaucescent. Panicle more or less effuse. Spikelets shortly pedicelled, oblong, acute in outline. Lemmas elliptic-oblong, acute; lateral nerves strong.

PACHMARHI: Vicinity (1000 m); Mahadev hill (1200 m). In moist places in and around forests. Common.

*Fl. & Fr.*: July - December.


Tufted perennials with stout, erect culms. Panicle contracted; branches mostly solitary. Spikelets densely clustered. 6 14-flowered. Keels of palea non-ciliate, Lemma about 1 mm long.

BORI: Reserve forest (550 m). Along river bank. Occasional.

*Fl. & Fr.*: August - December.

Annuals. Culms erect. Leaves linear, glabrous, acuminate. Panicle oblong, erect or nodding with age. Spikelets linear to linear oblong, longer than the pedicels, 8–24 flowered, slaty grey.

**Bori** : Reserve forest (550 m); Dhain (462 m). Along river bank and streams. Common.

*Fl. & Fr.* : September–January.


Perennial grass. Culms tufted, terete, and branching from near the base; nodes glabrous. Leaves complicate or convolute; glabrous, acuminate; ligule a short hairy rim; sheaths compressed. Panicles lax; branches slender, alternate. Spikelets linear, 9–13 flowered, breaking up from below upwards, olive–green to slaty–black.

**Pachmarhi** : Vicinity (1000 m). On hill slopes and clearings. Occasional.

*Fl. & Fr.* : August–November.


Tufted annual grass. Leaves convolute, acuminate. Panicles spreading, alternate, branched from near the base. Spikelets ovate to ovate-lanceolate, 10–30 flowered, white to pink or reddish–purple, breaking up from below upwards.

**Pachmarhi** : Vicinity (1000 m); Mahadev hill (1200 m). **Bori** : Reserve forest (550 m). On moist hill slopes; forest edges and waste lands. Common.
Fl. & Fr.: July December.


Perennial tufted grass. Culms and leaves visceous. Panicles green to purplish, spreading. Keels of pales more or less ciliate. Lemmas not ciliate on the margins.


Fl. & Fr.: October January.

25. Eulalia Kothth


Tufted perennial grass. Leaves flat or convolute, linear - lanceolate, finely acuminate. Kacemes little spreading, 3 - 7, digitate, sub - digitate or fascicled, silky, easily breaking up at maturity; rachis and pedicels white - hairy. G1 white hairy on keels; G2 with golden brown hairs on the keel.


Fl. & Fr.: September December.

26. Eulaliopsis Honda


Perennial grass. Culms woolly at base. Leaves with a rounded base and tubercle based hairs on the lower surface. Racemes 2 - 4, whitish-brown. G1 3 - 4 toothed, ciliate in the upper half with a tuft of hairs at the margin. G2 ciliate in the upper half, with a tuft of hairs on the keel. Upper lemma hidentate, ciliate in the upper portion with an awn.

**PACHMARHI** : Vicinity (1000 m). On hill slopes and forest undergrowth. Common.

*Fl. & Fr.* : July - November.

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27. *Hemarthria* R. Br.


Perennial grass. Culms rooting at nodes, glabrous. Leaves linear, acute; ligule a narrow fimbriate membrane. Racemes solitary or 2 - 5 from leaf-sheath, narrow, internodes as long as the spikelets. Sessile spikelets 3 - 4 mm long. Pedicellate spikelets rather longer and narrower than the sessile ones, otherwise similar.

**PACHMARHI** : Jambudeep (900 m). In marshy places and near streams. Common.

*Fl. & Fr.* : September - November.

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Perennial grass with densely tufted culms. Leaves mainly at the base of culm, linear, obtuse or abruptly short acuminate; ligule short ciliolate. Racemes with the lower 2–6 spikelets sessile, awnless, male or neuter; the upper sessile spikelets narrow, long-awned, female. Pedicellate spikelets much longer than the sessile ones.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). On hill slopes and in forest undergrowth, Common.

*Fl. & Fr.*: July December.

26. **Imperata** C.vrill.


Perennial grass with stoloniferous rootstocks, often creeping. Culms tall, slender; nodes hairy or not. Leaves linear, erect or flat, acuminate. Penicles not more than 20 cm long, dense or loose, spikelike, subcylindrical, silvery-white. Spikelets 4–5.5 mm long.

**PACHMARHI**: Vicinity (1000 m), 25 7 64, *Pandharni* 4486 (BSA)

**BORI**: Reserve forest (550 m), Feb. '78, *Pant* 27263 (BSA). On exposed areas having full sunlight. Common.

*Fl. & Fr.*: July - February.

New record for the area.

30. **Isachne** R. Br.

1a. Spikelets 1.2–1.5 mm long, Pedicels with white-banded glands. ... *I. globosa* 1

1b. Spikelets about 1 mm long, Pedicels without glands ... *I. gracilis* 2

Tufted grass. Leaves lanceolate, acute, sheaths smooth. Pedicels white, gland banded. Glumes shorter than the spikelets. Lemmas dissimilar. 11 elliptic, rounded, membranous, 12 ovate, acute, chartaceous, tubercled.

**Pachmarhi**: Vicinity (1000 m). On moist hill slopes. Occasional.

*Fl. & Fr.*: August September.


A very delicate grass. Leaves elliptic - acute, very thin. Pedicels white. Spikelets about 1 mm long. Florets unequal in size and different in texture.

**Pachmarhi**: Vicinity (1000 m), *Sacena 7909 (SFR1)*

On shaded hill slopes. Rare.

*Fl. & Fr.*: August September.

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32. **Ischaemum L.**

1a. Margins of the lower glume of the sessile spikelet expanded below and top above the middle:

2a. Keel of the upper glume of the sessile spikelet winged above the middle

2b. Keel of the upper glume of the sessile spikelet not winged above the middle

1b. Margins of the lower glume of the sessile spikelet narrowly and evenly turned from base to apex

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Personal grass. Leaves linear, flat, acuminate; ligule membranous. Racemes 3-5, digitate. Keel of upper glume of the sessile spikelet not
winged above the middle. Lower lemma of the pedicelled spikelet acuminate or aristate.

**PACHMARHI**. Vicinity (1000 m). *Saxifraga* 7845 (SRRI). On moist hill slopes. Rare.

Fl. & Fr. : October - February.


Fl. & Fr. : August - January.


Slender annual grass. Leaves linear - lanceolate, base cordate or sagittate, lower leaves long - petiolate. Margins of the lower glume of the sessile spikelet narrowly and evenly intruded from base to apex.

**PACHMARHI** : Vicinity (1000 m), 28 12 62, *Panigrahi* 6661 (BSA). Near water sources. Rare.

Fl. & Fr. : October - January.

52. *Iseliema Anders*

Annual or perennial grass. Culms tufted, compressed, branched; nodes hairy. Leaves flat, linear lanceolate, acute; ligule a dense hairy ring. Tubercles present on the proper spathe. Racemes on a slender peduncle excised from the spathe.

BORI: Reserve forest (500 m). On hill slopes. Occasional.

Fl. & Fr.: September. January.

33. MANISURIS L.

1a. Lower glume of sessile spikelets not awned

1b. Lower glume of sessile spikelets with two divericate awns

M. clarki 1

M. forficulata 2


Annual grass. Leaves lanceolate with cordate base. Lower glume of the sessile spikelets umbonate, ovate - obtuse, winged on both sides above the middle. Pedicelled spikelets like the sessile but smaller and less gibbous.

PACHMARHI: Vicinity (1000 m), Saxena 8209 (SFR1). On hill slopes Rare.

Fl. & Fr.: September. December.


Tufted annual grass. Leaves flat, hairy. Gl of sessile spikelets chartaceous, lanceolate, terminated by a pair of unequal divericate awns, margins with basally acute wing that tapers on to the base of awns; base of glume on the back and margin with 4-5 rows of hooked, apically minutely bearded tubercles.

PACHMARHI: Vicinity (1000 m), 8 10 60, Joseph 11336 (RSA).

In forest clearings and waste places. Rare.

Fl. & Fr.: September. December.
34. MELANOCENCHIS NEES.


Annual, slender, densely tufted grass. Leaves flat or convolute, linear-lanceolate, acute; ligule a hairy ridge. Spikes filiform. Clusters of spikelets purplish green.


*Fl. & Fr.*: July September.

35. MICROCHLOA R. BR.


Annual grass. Culms terete; nodes glabrous. Leaves narrowly linear, convolute, glabrous; ligule short, ciliate. Spike solitary, terminal, curved. Spikelets sessile, oblong-lanceolate, green tinged with purple, 1 flowered. Glumes subequal, lanceolate-oblong, 1 nerved, keeled, acute.


*Fl. & Fr.*: August - November.

36. NARENGA BOR


PACHMARCI : Vicinity (1000 m). In swampy places and near nala. Common.

Fl. & Fr.: September – December

37. OPLISMEMUS P. Beauv

1a. Awn capillary, barbelleate ... O. burmanii 1
1b. Awn stiff, smooth but viscid ... O. compositus 2


Slender annual grass. Leaves ovate or ovate-lanceolate, acuminate; ligule a rim of hairs. Spikelets solitary or 2-5 at node; pedicels short, hairy. Awns longer than glumes, pale.


Fl. & Fr.: September – November


Perennial grass. Leaves ovate, acute or acuminate, hairy. Spikelets 2 to 3 at node. Awns longer than glumes, often reddish

PACHMARHI : Dhupgarh (1250 m). RORI : Reserve forest (900 m). Under shade along river banks and in forest undergrowth. Common.

Fl. & Fr.: September – December

38. OROPETUM Trin.

Perennial tufted grass. Leaves filiform, convolute; margins with distant white hairs; apex acute. Spikes straight or curved, often purple. Spikelets deeply sunk into the hollow of the rachis, 1-2 flowered. Lower glume asymmetrical, 1-nerved, acute. Lemmas bearded at the base, 3-nerved, truncate or minutely 2-3-toothed at apex. Palea subequal, 2-keeled.

**PACHMARHI**: Vicinity (1000 m), July 64, *Panigrahi 4491* (BSA). On hill slopes. Rare.

*Fl. & Fr.:* July-December.

New record for the area

39. **PANICUM** L.

1a. Leaf blade ovate, oblong - lanceolate, asymmetrical at the base

1b. Leaf blade linear - lanceolate, symmetrical at the base:

2a. L. glume cuspidate, acuminate. Spikelets wide - open during anthesis

2b. L. glume not cuspidate - acuminate. Spikelets not wide open:

3a. Spikelets lanceolate, acute. Plants aquatic or marshy

3b. Spikelets ovate - oblong to elliptic. Plants terrestrial:

4a. Spikelets obtuse. L. glume half or three - fourth of the length of the spikelet. Perennials

4b. Spikelets acute. L. glume half to one - fourth of the length of the spikelet. Annuals

Weak perennial grass. Leaves ovate, oblong lanceolate, acute—acuminate, amplexicaul, asymmetrical at the base. Panicle effuse. Spikelets sparsely hairy.

**PACHMARHI**: Vicinity (1000 m). In moist shady places in forest. Occasional.

*Fl. & Fr.*: September—December.


*BORI*: Reserve forest (550 m). In forest undergrowth. Common.

*Fl. & Fr.*: August—December.


Free floating, perennial grass with spongy culms. Leaves linear—lanceolate. Panicles more or less contracted. Spikelets lanceolate, glabrous.

**PACHIIMIRH**: Vicinity (1000 m). In marshy places. Common.

*Fl. & Fr.*: August—November.


Annual grass. Culms erect, tufted; nodes glabrous. Leaves linear, acute; ligule short, membranous, fimbriate. Panicle effuse, narrow; branches capillary. Spikelets ovate, acute, turgid, solitary.

**PACHMARHI**: Vicinity (1000 m); Mahadev hill (1200 m).

*BORI*: Reserve forest (1000 m). On hill slopes and forest undergrowth. Common.

Annual grass. Culms slender; nodes glabrous, often purple-tinged. Leaves thin linear, acute, hairy on both surfaces; margin ciliate; ligule short, membranous, fimbriate. Panicles distant, aovoid, acuminate, sometimes with purple tinge, glabrous.

**PACHMARHI**: Vicinity (1000 m). In forest undergrowth. Occasional.

*Fl. & Fr.*: August - November.

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40. *Paspalidium* Stapf


Annual grass. Leaves sub bifarious, narrowly linear, acuminate or obtuse; ligule a ridge of long hairs. Spikes distant, sessile. Spikelets glabrous, sessile or nearly so, 2 - seriate, glabrous.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Dhain (462 m). In shaded moist places. Common.

*Fl. & Fr.*: July - October.

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41. *Paspalum* L.

1a. Spikelets broadly elliptic, acute. Aquatic grass

1b. Spikelets rotundate - elliptic, broadly obovate - elliptic to almost orbicular, obtuse. Land grass:

2a. Annuals. Lower lemma 5 - 7 nerved

2b. Perennials. Lower lemma 3 - 5 nerved:

... *P. distichum* 2

... *P. scrobiculatum* 4
3a. Spikelets 2-ranked. Lower lemma 3-5-nerved .... P. commersonii 1

3b. Spikelets in two rows. Lower lemma 3 nerved, but side nerves often double .... P. orbiculare 3


**PACHMARHI**: Vicinity (1000 m). In wet places under sal forest. Common.

*Fl. & Fr.*: July – November


Perennial, aquatic grasses with rhizomes and long creeping stolons. Leaves flat or involute. Racemes up to 9 cm long. Spikelets elliptic, twice as long as broad. Upper glume covered with a very short pubescence. Lower lemma with a prominent middle nerve.

**PACHMARHI**: Vicinity (1000 m), *Himalat* 33334 (SFRI).

In swamps and stagnant water. Rare.

*Fl. & Fr.*: January – December.


Perennial grass. Racemes often more than 2. Spikelets short, ovate-elliptic or orbicular, in two rows. Lower lemma 3 nerved but the lateral nerves double.

**PACHMARHI**: Vicinity (1000 m), *Saxena* 7889 (SFRI). On hill slopes. Rare.

*Fl. & Fr.*: July – December.


PACHMARHI: Vicinity (1000 m); Mahadev hill (1200 m). On hill slopes and wady places. Common.

Fl. Fr.: July – November

42. Pennisetum Rich.

1a. Lemmas homomorphous; lower not 3 - lobed. Upper floret not deciduous. Rachis ribs not winged:
   2a. Rachis of the spikes villous  ...  P. orientale 3
   2b. Rachis of the spikes glabrous  ...  P. hohenackeri 1

1b. Lemmas heteromorphous; lower often 3 - lobed. Upper floret deciduous. Rachis ribs winged below the pedicels:
   3a. Spikelets solitary and pedicelled or in groups of 2 – 5, with one sessile and the others pedicelled ...  P. pedicellatum 4
   3b. Spikelets sessile, solitary:
      4a. Bristles densely plumose or at least the inner plumose  ...  P. setaceum 5
      4b. Bristles glabrous, scaberulous  ...  P. hordeoides 2


PACHMARHI: Vicinity (1000 m). BORI: Reserve forest (550 m). In forest undergrowth and along river bank. Common.

Fl. & Fr.: July - January.


**BORI**: Reserve forest (550 m). In forest undergrowth. Occasional. **Fl. & Fr.**: October - February.


**PACHMARHI**: Vicinity (900 m). On hill slopes. Occasional. **Fl. & Fr.**: August - December.


Annual grass. Leaves flat, linear - lanceolate. Spikes reddish - purple; rachis angular. Spikelets solitary, pedicellate or 2 - 3 together, oblong - lanceolate, acute with one sessile and other pedicellate. Lower glume hyaline, lanceolate with silky hairs on the back, nerved or 1 - nerved which ends below the acute apex.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (550 m). On hill slopes and near marshy places. Common. **Fl. & Fr.**: July - December.


Annual grass. Leaves flat, linear - lanceolate. Peduncle and rachis of spikes glabrous. Spikelets sessile, solitary. The bristles are densely plumose or at least the inner plumose.
BORI: Dhain (462 m), 24 12 62, Panigrahi 6437 (BSA). On edge of forest. Rare.

Fl. & Fr.: October December.

43. Phragmites Trin.


Perennial reeds. Rhizomes creeping, woody. Culms erect, woody at base, branched. Leaves linear-lanceolate, acuminate with a rounded base. Panicle compound, effuse, plumose. Spikelets 3-5-flowered, linear, not jointed on the pedicels. Rachilla with long silky hairs above the lowest lemma and not exceeding it, jointed between the lemma and produced beyond the uppermost.


Fl. & Fr.: October January.

44. Pseudosorghum A. Camus


Annual grass. Leaves flat, lanceolate with a strong mid vein, apex acuminate or cuneate. Panicle ovate oblong. Racemes slender, 3-4, mostly appressed to one another, the lower branched, upper simple, alternate. Sessile spikelets elliptic lanceolate, awned. Upper lemma hyaline, cleft at apex into two linear - acute lobes, awn from the sinus.

BORI: Reserve forest (550 m). On moist undergrowth of teak forest. Occasional.

Fl. & Fr.: September December.
45. **Rhynchelytrum Nees**

1a. Pedicels of the spikelets with a few long hairs. Lower glume 0.6 mm below the upper, bearded at the base, pilose elsewhere.  

\[ R. \text{ repens} 1 \]

1b. Pedicels of the spikelets without long hairs. Lower glume 0.8 mm below the upper, bearded at the base, glabrescent upwards.  

\[ R. \text{ villosum} 2 \]


Annual or perennial grass. Leaves flat, linear, glabrous or pubescent, acute. Panicles ovate to pyramidal, lax, silvery white to purple. Spikelets solitary or paired, ovate to broadly oblong, densely silky with greyish-brown hairs; pedicels with a few long hairs. Lower glume densely villous at the base, pilose above.

**PACHMARHI**: Mahadev hill (1100 m). On hill slopes. Occasional.

**Fl. & Fr.**: July - December.


Annual or perennial grass. Leaves linear, flat, acuminate. Panicles pyramidal, lax, white to purple. Spikelets solitary or paired, densely silky; pedicels without long hairs. Lower glume bearded at the base, glabrescent upwards.

**PACHMARHI**: Vicinity (1000 m). August '49. **Narayanaswami s.n. (CAL)**. On hill slopes. Rare.

**Fl. & Fr.**: July - December

46. **Rottboellia L.f.**


**BORI**: Reserve forest (550 m); Dhain (430 m). In moist places in the forest. Common.

*Fl. & Fr.*: October - December.

47. Saccharum L.


Perennial, erect grass. Culms 1-2 m tall. Leaves linear, coriaceous, involuted, finely acuminate; ligule ovate, membranous. Panicles oblong-lanceolate, 20-50 cm long, reddish or purple with age, primary branches verticillate or alternate. Sessile spikelets linear-lanceolate, awnless. Pedicels of pedicellate spikelets finely ciliate.

**PACHMARHI**: Vicinity (1000 m). **BORI**: Reserve forest (900 m). Along river banks, swampy places and forest clearings. Common.

*Fl. & Fr.*: October - February.

48. Schizachyrium Nees


Annual grass. Leaves flat or involute, linear, glabrous or sparsely pilose. Racemes slender, concealed in a narrow spathe. Sessile spikelets linear-lanceolate, compressed, awned. Pedicellate spikelets reduced to aristate glumes.
PACHMARHI: Vicinity (1000 m), 27 12 62, Panigrahi 6626
(BSA). On hill slopes. Rare.

Fl. & Fr. : August December.

49. Setaria P. Beauv.


PACHMARHI: Vicinity (1000 m); Mahadev hill (1200 m.) In waste places and on hill slopes. Occasional.

Fl. & Fr. : September - December.


Annual grass. Leaves flat, linear-lanceolate, thin, acuminate, anicles narrowly oblong - acuminate, spiciform or lobed, erect; rachis slender, angular, scabrid; branches very short, with sessile, solitary
spikelet; involucral bristles 1–7, unequal. Spikelets ovate-oblanceolate, glabrous.

**Pachmarhi**: Vicinity (1000 m). In waste places and roadside. Common.

*Fl. & Fr.*: July – January.


Annual grass. Leaves scabrid, with a contracted base, white-margined, up to 2 cm broad. Rachis densely hairy. Spikelets solitary, ovate-elliptic, obtuse.

*Bori*: Reserve forest (1000 m). On hill slopes and waste land. Common.

*Fl. & Fr.*: August – November.


Annual grass. Leaves with a slightly contracted base, glabrous. Panicles cylindric, dense, green, yellow or sometimes purplish; rachis pubescent; branches reduced to subsessile involucres each supporting a solitary perfect spikelet, frequently with another spikelet. Spikelets broadly oblanceolate to elliptic, pale-green, glabrous, acute.

**Pachmarhi**: Vicinity (1300 m). *Bori*: Reserve forest (550 m). On hill slopes and along streams. Common.

*Fl. & Fr.*: July – January.


Annual grass. Leaves linear-lanceolate, base subcordate, pilose or hispid, finely acuminate. Panicles narrowly oblong, dense, rachis angular, scabrid; branches short, very close, terminating into a bristle; involucral bristles retroflexly barbed. Spikelets elliptic, pale-green, glabrous, obtuse.
PACHMARHI : Vicinity (1000 m). On moist shady hill slopes. Common
Fl. & Fr. : July - December.

50. SORGHUM MOENCH

1a. Nodes bearded. Primary branches of the panicle simple ... S. nitidum 2
1b. Nodes glabrous. Primary branches of the panicle branched ... S. miliaceum 1


Perennial grass with creeping rootstock. Culms erect; nodes glabrous. Leaves up to 3 cm broad. Panicle effuse, with patent branches, up to 50 cm long; lower primary branches up to 30 cm long. Sessile spikelets elliptic-lanceolate, acute. Pedicelled spikelets lanceolate, acute.

BORI : Reserve forest (500 m). In forest undergrowth and forest clearings. Common.
Fl. & Fr. : September - December.


Perennial grass. Culms decumbent-ascending, rooting below; nodes bearded. Leaves linear-setaceous, glabrous or thinly hispate, white margined. Panicles up to 30 cm long; lower branches whorled. Sessile spikelets elliptic-lanceolate, changing to dark brown on maturity. Pedicelled spikelets reduced to glumes.

BORI : Reserve forest (550 m); Dhain (430 m). Near streams and along wayside. Common.
Fl. & Fr. : September - November.
51. *Sporobolus R. Br.*

1a. Stamens 3:

2a. Panicle effuse

2b. Panicle contracted

1b. Stamens 2


**PACHMARHI**: Vicinity (1000 m). In waste places and hill slopes. Common.

*Fl. & Fr.*: July September.


**PACHMARHI**: Vicinity (1000 m). In moist places and hill slopes. Common.

*Fl. & Fr.*: July August.


**PACHMARHI**: Dhupgarh (1300 m). On hill slopes and wastelands. Occasional

*Fl. & Fr.*: July September.

53. **Themeda Forsk.**

1a. involucral spikelets less than 6 mm long.
   Awn up to 3.5 cm long. Hermaphrodite spikelet solitary or geminate ... *T. quadrivalvis* 1

1b. involucral spikelets over 6 mm long.
   Awn over 5.5 cm long. Hermaphrodite spikelet always solitary ... *T. triandra* 2


Annual grass. Leaves flat, linear-lanceolate, margin scabrid; acute.
Spathe boat-shaped, margins hairy. Involutural spikelets subsessile, linear-lanceolate. Lower glume many-nerved; keels 2, winged. Hermaphroditic spikelets one or two on a short stipe.

*BORI*. Reserve forest (550 m). In forest undergrowth and clearings. Common.

*Fl. & Fr.*: August - January.


Robust annual grass. Leaves flat, linear, glabrous; margin scabrid; acute. Spathe boat-shaped, margins with a few bristles. Involutural spikelets subsessile, oblong-lanceolate. Lower glume many-nerved; keels 2, winged with stiff bristles; margins narrowly inflexed. Hermaphroditic spikelets solitary on short stalks.

*PACHMARHI*: Vicinity (1000 m); Dhupgarh (1250 m). *BORI*: Reserve forest (550 m). On hill slopes and along waysides. Common.

*Fl. & Fr.*: September - January.

54. *Thysanolaena* Nees


Reed-like perennial grass. Leaves lanceolate, with a cordate, semi-amplexical base and acuminate apex. Panicle effuse, decompound, with uniform branches. Spikelets 1 to 2-nasse, minute, greenish or purplish, 2-flowered, elliptic-lanceolate, acuminate, ciliate.


*Fl. & Fr.*: November - April.

55. *Tripsogon* Roem. & Schult.

1a. Lemma 2 - lobed:

2a. Median awn longer than the lemma ... *T. capitatus* 2

2b. Median awn shorter than the lemma ... *T. liabense* 3

1b. Lemma 4 - lobed ... *T. bromoides* 1

Tufted perennial grass. Leaves convolute. Racemes spiciform; rachis stiff, flattened. Spikelets sessile, 1 cm long; upper glume 2-lobbed at the tip; lobes acute, with a short arista from the center.

**Pachmarhi**: Vicinity (1000 m). **Bori**: Reserve forest (900 m)
On hill slopes. Common.

_Fl. & Fr._: July September.


**Pachmarhi**: Vicinity (1000 m). On hill slopes. Occasional.

_Fl. & Fr._: July October.


Tufted perennial grass with wiry roots. Leaves usually flat, sometimes rolled, green, not glaucous; ligule obsolete. Median awn shorter than the lemma; lemma 2-lobed.

**Bori**: Reserve forest (550 m). 26 12 62, _Panigrahi_ 6570 (*BSA*). On hill slopes. Rare.

_Fl. & Fr._: August December.

56. **Triticum** L.

Annual cultivated grass. Calxa hollow. Leaves flat, linear-lanceolate, scabrous; margins scabrid; apex acute. Spikes erect, curved with age, irregularly 4-sided. Rachis zig-zag, tip flattened. Spikelets distichous, solitary, Imbricate, laterally compressed, 3-flowered, the upper most sterile. Grains oblong, ventrally grooved, free within lemma and palea.

**BORI:** Reserve forest (550 m). Cultivated and as escape on hill slopes.

*Fl. & Fr.*: December - March.


**PACHMARHI:** Vicinity (10000 m). In moist places along waysides. Common.

*Fl. & Fr.*: July November.

1. *Jasminum* L.


Scandent or twining shrubs. Leaves opposite, pinnately 5 - 7 foliolate, elliptic or ovate, acute or acuminate, 0.8 - 5 cm long. Flowers white, fragrant, in ax, terminal dichotomous cymes.

**PACHMARHI:** Vicinity (1000 m).

In forest undergrowth. Occasional.

*Fl. & Fr.*: June October.
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