TECHNICAL BULLETIN No. 10

GOVERNMENT OF MADHYA PRADESH

FOREST DEPARTMENT

FAMILIES

RANUNCULACEAE, DILLENIACEAE, MAGNOLIACEAE, ANONACEAE, MENISPERMACEAE, BERBERIDACEAE, NYMPHACEAE, PAPAVERACEAE, FUMARIACEAE, CRUCIFERAE, VIOLACEAE, CAPPARIDACEAE, POLYGONACEAE

IN

MADHYA PRADESH

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FAMILIES - DILLENIACEAE, MAGNOLIACEAE, ANONACEAE, MENISPERMACEAE, BERBERIDACEAE, NYMPHACEAE, PAPAVERACEAE, FUMARIACEAE, CRUCIFERAE, VIOLACEAE, CAPPARIDACEAE AND POLYGONACEAE IN MADHYA PRADESH.

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Madhya Pradesh, though a largest State of the Indian Union and presenting some very interesting features to its flora due to its Central position, yet has no "Flora" for the State. A number of check lists and papers on the Flora of the region have been published in the past by Wood, Hole, Witt, Biscol, Haines, Kanover, Sagreiya, Mooney, Narayana S-wamy, Panigrahi, Maheshwari, Subramanyan, Joseph, Tiwari and others but still a good deal remains to be done to bring out the scattered information in a consolidated form ; to check the identity of plants by making fresh collections and to note the distribution, local names and other field data. With this view the State Forest Research Institute started the botanical explorations in the State and compilation of the flora in the year 1964. The present account of the thirteen families is the outcome of five years intensive exploration and study of plants. The explorations were concentrated mainly in Bastar Circle, Raipur, Amarkantak, Pachmarhi, Jabalpur, Indore, Patalkot, Gwalior Division, Guna Division, Shivpuri Division, Tikamgarh Division, and Chitrakot. Earlier twoo such Bulletins on families Lentibulariaceae and Acanthaceae have already been published.

In the text, the keys to the Genera and to species, have been based mainly on broad morphological characters as far as possible for the easy application by the foresters.

Nomencalture has been brought uptodate in accordance with the latest International Code of Botanical Nomenclature.

In the citations references to earlier works reporting the species have been abbreviated for economy of space. Vernacular names given are those gathered in the field and confirmed. The description of the species has been condensed to the characters which are important from diagnostic point of view. The distribution, flowering and fruiting periods given are based mainly on personal observations.

The specimens examined have been cited under each species. These are presented in Herbarium ,S.F.R.I. at Jabalpur, M.P. Where a species has been included on the authority of previous work, a reference to that has been made.

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1. RANUNCULACEAE.

RANUNCULACEAE

Key to the Genera.

A. Climbing; leaves opposite

B. Leaf simple or compound with terminal leaflet 1 Clematis

BB. Leaf compound with terminal tendril 2 Naravelia

AA. Erect; leaves radical or alternate:

B. Leaves 3-pinnate, large 3.Thalictrum

BB. Leaves 2-3 pinnatisect or 3 foliolate, much smaller.

C.Sepals petaloid; petals none 4.Nigella

CC.Sepals sepaloid; petals 5 5.Ranunculus

1. CLEMATIS Linn.

Key to the Species.

A. Leaves simple ----------C.Smilacifolia

AA. Leaves compound (rarely simple in C.triloba).

B. Filaments hairy ---------- C.roylei

BB. Filaments glabrous.

C. Leaves simple or 3 foliate, lamina broad-ovate or slightly elongate-ovate or nearly orbicular; tepals 1.5-2.5 cm x 0.4-1.0 cm (flowers more than 2.0 cm in diam.); achenes ovate ---------- C.triloba

CC. Leaves never simple, usually 5-7 foliolate or rarely 3-foliolate, lamina usually broadly or narrowly ovate - lanceolate; tepals 0.4-0.75 cm x 0.1-0.35 cm. (flowers less than 2.0 cm in diam.); achenes narrowly or broadly oblong or oblong- lanceolate ---------- C.gouriana

Clematis smilacifolia Wall; FBI.1:3; Mooney,FI.Bailad. 244; Sab. S Henry 209; Tiwari (1968): 583.

vern. Pasaran (Mand.), Pande Tonda (Bastar), Dupan (Darbha Bastar), Gajpasaran (Baiga-Amarkantak).

Tall climber. Leaves opposite, simple, ovate or broad-ovate, 2.5-18.5 cm. long, glabrous, entire or remotely serrate. Panicle 2-many flowered, occasionally with only 1 mature flower. Flowers 2.5-3.7 cm in diam. Tepals 4-5, spreading brownish, 1.2-2.2 cm long, velvety tomentose. Achenes elongate ovate or elongate-obovate, 5-10 mm long, compressed, margined, hairy with feathery styles upto 7.5 cm long.

In forest along streams in hilly regions: Bastar, Amarkantak. FI. Oct.-Nov. Fr. Dec.- Feb.

Saxena 1261, 4675, 4928, 5413; Singh 4219 Saxena and Singh 7704.

A decoction of the stem is used for rhxumatism. Paste of the root and leaves is applied over ailing part in rheumatism.

Clematis roylei Rehder. C.nutans Royle; FBI. 1:5; Wood 77; Mooney, Fl.Bailad. 244

The climber with ribbed, silky-cubescent branches. Leaves pinnate or bipinnate; leaflets ovate or lanceolate, 2-7.5 cm long, undivided or 3-5 lobed or partite, irregularly, rarely entire, more or less villous or sericco-villous or appressedly pubescent or puberulus on both the surfaces. Panicles axillary, leafy. Sepals pale-yellow, erect with recurved tips, not ribbed. Filaments hairy.

Sonkhar (Seoni), Baragaon (Wood). FI.Sept. Khotele 1676.

Clematis trilobe Heyne; FBI.1:3; Witt 1; Rao 235, Witt(Berar vern.Bander site (Chhindwara, Pach.), Karai, Kari (Nimad), Banai siti (Patalkot),Jameli Bheda (Patalkot)

Slender climber; branches serico-villous or tomentose, olderones glabrescent. Leaves opposite, simple or pinnately trifoliate; leaflets ovate to elliptic-ovate or orbicular, simple or shallowly or deeply 2-7 lobed, 2.5-7.5 cm long entire or few-toothed, pubemlous or villo-pubescent on both surfaces. Inflorescence axillary, 1-several flowered. Flowers white, 3-5 cm in diam. Tepals 4-8, 1.5-2.5 cm long, villous outside. Filaments glabrous. Achenes ovoid or elongate-ovate, 3-5 mm long, slightly compressed, sericco-villous, with feathery styles upto 4.5 cm long.

In forest in the hilly districts: Pachmarhi, Nimar, Betul, Chhindwara. Fl. Sept.- Nov. Fr. Nov.-Jan.

Saxena 398; Saxena and Khotale 7905; Shukla 9630.

The root is applied on boil (Patalkot). The leaves are used in asthma (Pach.)

Clematis gouriana Roxb.exDC.; FBI.1;4;Witt 1;

Mooney, Fl.Bailad. 244; Sub. and Henry 209.

Vern. Bander siti (Chhind.)

Large evergreen climber with furrowed branches. Leaves pinnate, bipinnate or biternate; leaflets ovate oblong or lanceolate; 2.5-9 cm long, entire or distantly toothed, glabrous or pubescent on the nerves beneath. Flowers fragrant, 1.2-1.5 cm in diameter, axillary and terminal leafy panicles. Tepals white, spreading, 4-7.5 mm long. Achenes narrowly or broadly oblong or oblong-lanceolate with long feathery styles.

Common: Amarkantak, Bailadita, Patalkot, Jabalpur. Fl. Oct.-Nov. Fr.Dec.-Jan.

Saxena 342, 1227, 4722; Saxena and Khotale 5851; Saxena and Singh 6266; Shukla 8643 .

2. NARAVELIA DC.

Naravelia zeylanica DC.; FBI. 1:7; Rao 235; Mooney, Fl.Bailad. 244; Sub. & Henry 209.

Tall climber with pubescent or tomentose branches. Leaves opposite pinnate with a single pair of leaflets; leaflets broadly or orbicular-ovate, 12-13 x 6-8 cm, sub-tomentosely villous beneath, toothed; the terminal leaflet converted into a branched tendril. Panicles axillary and terminal. Flowers yellowish - green or whitish, 1.2-2 cm in diameter. Petals spreading equal to or shorter than the tomentose sepals. Achenes villous with hairy styles 5 cm long.

Dhupgash, Bailadilla (Bastar) Fl.Sept. Fr.Dec. Feb

3. THALICTRUM Lim.

Thalictrum foliosum DC ; FBI. 1:14; Rao 235; Mooney 19; Mooney, Fl.Bailad. 243.

Vern. Kadu chiravata (Patalkot)

Herb. 1-2.6 m high. Leaves pinnately decompound;leaflets orbicular or ovate-oblong, obtusely 3-8 toothed or 3 lobed with the lobes entire or coarsely crenate-toothed. Flowers in much branched panicles. Sepals white or pale-green, 2.5-3 mm long. Anthers pointed, 3 mm long. Achenes almost sessile, with short hooked beak.

Frequent in shady places or in forest in the hilly districts: Pachmarhi, Amarkantak, Bailadila, Patalkot, Jashpur and Sargunja. Fl. & Fr. July - Sept.

Saxena 4670; Khotele 8071; Shukla 9712

The root is used in jaundice along with the root of murjista (Rubia cordifolia)

Doubtful Species.

Thalictrum Chelidonii DC. ; Mooney, Fl.Bailad. 249

4. NIGELLA Linn.

Nigella sativa Linn.

Erect herb, 30-60 cm. high. Leaves 2-3 pinnatisect 2.5-5 cm long; segments linear or linear lanceolate. Flowers solitary terminal, long peduncled pale blue, 2-2.5 cm in diam. Carpels (3-)5 Capsule 1.25 cm long.

Occassional weed of cultivation, sometimes cultivated; Indore. Fl & Fr. Feb.- April

Pandey Sn.

5. RANUNCULUS Linn.

Key to the species.

Glabrous; achenes turgid, not margined R.sceleratus

Hairy; achenes flattened and with an intramarginal rib ----------R.pennsylvanicus

Ranunculus sceleratus Linn.; FBI 1:19; Kenover 16 & 56

Erect glabrous annual herbs, 15-30 cm high. Radical leaves long-petiolate, 2-4.5 cm across, deeply 3-lobed; segments 3 or more lobed, obtusely toothed near the tip; cauline leaves shortly petiolate, 3 partite, segments, linear narrow, lobed and toothed. Flowers about 6 mm in diameter, Yellow. Achenes glabrous, turgid, not margined in oblong heads.

Gwalior (Kanover) Fl. & Fr. Jan.- March.

Ranunculus pennsylvanicus Linn.f.; FBI. 1:19; Mooney 20

Erect hairy annual herb, 20-60 cm high. Radical and lower stem leaves long petiolate 3-foliolate; leaflets long stalked and deeply cut into linear segments; uppermost leaves sessile ternatisect. Flowers 2.5 cms across, yellow. Achenes glabrous, flattened, distinctly margined.

Sarouja (Mooney) Fl & Fr. May- Aug.

Cultivated.

Delphinium Sp.

Erect herbs with pinnatisect leaves. Flowers blue or rarely white, spurred.

Frequently planted in gardens for ornamental purpose. Fl. Cold season.

2. DILLENIACEAE.

DILLENIACEAE

DILLENIA Linn.

Key to the species.

Flowers solitary, 7-10 cm in diameter, fruit 5 cm in diameter ---------- D.aurea.

Flowers fasicled, 2.5-3.7 cm in diameter; fruit 2 cm in diameter---------- D.pentagyna

Dillenia aurea Smith; FBI 1:37; Witt 2; Panigrahi 117;

Vern. Kalla or Kallei (Gond), Karmata (Bastar).

Small tree about 7 m high. Leaves oblong or obovate, 30-45 cm long, crenate-spinulose denticulate, rufous-silky on both sides when young, glabrous above when old. Flowers Yellow, 7-10 cm; diameter, solitary, terminating lateral branches, appearing before the leaves. Fruit globose, 5 cm in diameter.

Frequent in sal forests. Chindwara, Raipur, Bastar Sarguja. Fl. April-May. Fr. May - June.

Saxena 5492.

Dillenia pentagyna Roxb.; FBI. 1:38; Rao 235; Jain 64; Witt 2; Heiner 2; Mooney, FI. Bailad 236.

Vern. Karmatta (Gondi), Mici (Maria) Rauli (Hind), Sua or Sua mukho (Gond Hoshangabad) Kalla or Kali (Gond- Chhind.), Mirchi (Baiga-S.Madla), Rai kalla (Bastar).

Moderate-sized tree. Leaves oblong-lanceolate 30-60 cm long, denticulate, decurrent into short winged sheathing petioles. Flowers 5-8, loosely fasicled on the branches, Yellow, 2.5-3.7 cm across, appearing before the leaves. Fruit ~~pendulous~~ Pendulous, globose 2 cm in diameter.

Occasional in Sal forests; Bailadilla, Pachmarhi, Balaghat Bilaspur, Raipur etc. Fl. April-May Fr. June

Saxena 403.

Cultivated Species.

Dillenia indica Linn ; Witt 2; Mooney 2?

A medium sized evergreen tree. Leaves oblong-lanceolate, 20-30 cm long, serrate. Flowers white , 10-15 cm across. Fruit round, 7-10 cm across, hard.

Planted in gardens: Jabalpur, Sarguja.

Fl. June- July. Fr. Feb.

3. MAGNOLIACEAE.

MAGNOLIACEAE.

Cultivated.

Magnolia grandi flora Linn. ; Panigrahi 118.

Evergreen tree. Leaves elliptic-oblong, 12-20 cm long shining above, more or less rusty-tomentose beneath. Flowers white, about 15 cm across, enclosed in bud in a silky spathaceous bract. Fruit a woody cone. Seeds bright red.

Planted: Jagdalpur FI. Nov.

Michelia champaca Linn.; Maheshwari 28; Biscoe 7; Witt 3; Rao 235; Sastry 270; wood 78; Mooney 20.

Vern. Champa.

Tall evergreen tree. Leaves lanceolate or oblong-lanceolate, 17-25 cm long. Flowers Yellow, strongly scented, 5-6 cm across, each enclosed in the bud by a greyish yellow deciduous bract. Fruit a lax spike of woody ~~carpels~~ carpels

Planted in gardens: Pachmarhi, Jabalpur, Chhindwara, Indore, Jashpur and Sarguja. FI. April-Sept. Fr. Dec.-Feb.

Khotele 8249.

4. ANONACEAE.

ANONACEAE.

Key to the Genera.

A. Outer petals much longer than the sepals:

B. Outer petals thick, rigid, connivent; inner minute or 0; ripe carpels connate in a fleshy many seeded fruit — 1. Anona

BB. Outer petals spreading, flat or only concave at the base:

C. Inner petals spreading like the outer — 2. Polyalthia

CC. Inner petals dissimilar to the outer clawed and connivent in a vaulted cone — 3. Mitrephora

AA. Outer petals small and like the sepals — 4. Miliusa

1. ANONA Linn.

Key to the species.

Fruit tubercled; flowers solitary — A. squamosa

Fruit smooth ; flowers 2-3 together — A. reticulata

Anona squamosa Linn; FBI.1:78; Maheshwari (1960) 556; Witt 4; Witt (Berar) 1; Biscoe 8; Haines 3; Seb. & Balak 490; Tiwari (1968) 677

Vern. Sarifa, Sitafal[1], (Custard- Apple).

Shrubs or small tree. Leaves oblong or oblong lanceolate, 5-15 cm long, obtuse or acute or sub-acuminate, pellucid-punctate. Flowers solitary drooping leaf-opposed or 2-4 together on shoot, extra-axillary branchlets Yellowish-green Sepals minute, triangular, pubescent, connate at base. Petals fleshy, outer 2.5 cm long, inner minute or wanting Fruit globose 5-10 cm across, Yellowish-green, tubercled.

Common throughout the State- Cultivated and also run wild near inhabited sites. Naturalized in the hills around Jabalpur. Fl. May- July. Fr. Dec.- Jan.

Saxena 143; Pandey S.n.

Anona reticulata Linn.; FBI 1:68.; Maheshwari 29; Haines 3;

Vern. Ramphal (The Bullock's Heart or the Custard Apple of the West Indies).

Small or medium-sized tree. Leaves thin, oblong-lanceolate, 10-18 cm long, acute or obtuse, minutely pellucid-punctate. Flowers 2-3 together, leaf opposed, yellowish. Sepals small triangular, tomentose. Outer petals 3 cm long, inner minute. Fruit globose, 10-15 cm across, smooth, yellowish-red when ripe.

Occasionally planted in gardens: Bastar, Nimar, Indore etc. Also found in semi wild state in Bastar.

Saxena 1271; Khotale 8005 ; Pandey s.n.

2. POLYALTHIA Blume

Key to the species.

A. Leaves obtuse or rounded — P.suberosa

AA. Leaves long-accuminate;

B. Branchlets pubescent; petalsovate — P.cerasicides

BB. Branchlets soon glabrous — P.longifolia

Polyalthia suberosa Benth. & HK.f; FBI.1;65. Mooney, Fl. Bailed. 239

Vern. Panilin (Sukma-Bastar)

Shrub or small tree. Leaves petiolate, oblong or oboblong 5-12 cm long, obtuse, glabrous and shining above. Flowers greenish-white, 1 cm in diameter, on slender pedicels solitary or 2-3 cm (or upto 5 in the specimen - Saxena 5669) on extra axillary branch, only distinguishable when young from a continuation of the peduncle by its colour and slightly greater thickness. Drupels broadly ellipsoid, 6-7.5 mm in diameter, reddish

Bastar(Dantewada, Bailadilla Sukma). Fl. April-May. Fr.Aug.-Dec.

Saxena 5669; Khotale 8002

Polyalthia cerasicides Benth. & HK.f.; FBI.1:63.

Vern. Chikl, Chhoti Kanai (Bastar).

Small or moderate-sized tree with young branches tomentose. Leaves oblong-lanceolate, 7-15 cm long, pubescent beneath; upper surface pubescent except the midrib. Flowers axillary, long pedicelled solitary or 2-3 together from woody tubercles. Drupels 6 mm across, dark red.

North Bastar (S.D.N.Tiwari in Working Plan). Fl. April-May

Fr. May-Aug.

Polyalthia longifolia Benth & HK.f.; FBI. 1:62;

Maheshwari 29; Haines 3; Seb. & Balak 490;Biscoe 8;

Hole 508; Witt 3.

vern. Asok.

Large evergreen tree. Leaves lanceolate, 7-22 cm long acuminate, shining, glabrous, margins undulate. Flowers yellowish-green, 2.5-3.7 cm across in fascicles or shortly pedunclate umbels.

Ripe carpels ovoid, 1.8 cm long.

Cultivated throughout the State in gardens; forms a fine avenue; also planted near temples. Fl. March- April

Sheik. s.n.

3. MITREPHORA Blume

Mitrephora heyneana Thw. FBI. 1:77; Panigrahi 118.

Small tree. Leaves ovate-lanceolate, 5-10 cm long narrowed to an obtuse tip glabrous. Flowers yellow 3.7 cm across, pedicelled, solitary or in leaf opposed subracemose cymes; peduncle very short. Carpels 6-9, ovoid or sub-globose,subsessile.

Bastar - kutumsar. Fr. Feb.

4. MILIUSA Lesch.

(incl. Saccopetalum)

Key to the species.

Inner petals flat; ovules 1 or 2 — M.velutina

Inner petals saccate at the base; ovules 6 or more — M.tomentosa

Miliusa velutina HK.f. & Thoms.; FBI.1:87: Witt 4; Witt (Berar) 1; Haines 3.

Vern. Domsal (S.Mandla), Kari, Kutki (Gond), Gidamukh.

Medium sized tree; young branches tomentose. Leaves shortly peticled, ovate-oblong or sub-rotand, variable in size 12-25 cm long, obtuse or acute, both surfaces pale-tomentose. Flowers blackish purple, 1.25 cm across, on slender tomentose pedicels, solitary or 2-3 form a short tomentose leaf opposed peduncle. Inner petals flat. Ripe carpels globose or oblong, 1.25-1.5 cm in diameter, bluish purple.

Scattered but no where common. Jabalpur, S,Mandla, Hoshangabad Betul, Seoni, Balaghat, Bilaspur. Fl. April - May Fr. July - Aug.

Hewitson s.n.

Miliusa tomentosa (Roxb.) J.Sinclair; Seb.& Balak. 490; Tiwari (1968) 577. Saccopetalum tomentosum HK.f.& Thoms; FBI.1:88; Mooney, Fl. Bailad. 237; Witt 4; Witt(Berar)1; Haines 3; Sastry 270; Hole 508; Wood 78; Brandis 11; Biscoe 8.

Vern. Kari.

Large tree; young branches tomentose. Leaves ovate or ovate-oblong, 5.5-15 cm long, obtuse pubescent beneath, pubemulous or quickly glabrescent between the nerves above. Fruit an umbel of roundish, black, fleshy carpels, 15-25 mm in diameter.

Throughout the area in forests. Fl. March-May. Fr.June

Note: The proceeding two species are often confused in sterile state from Glochidion velutium due the same local name (Karii of the latter species in some regions.

5. MENISPERMACEAE.

MENISPERMACEAE.

Key to the Genera.

A. Fls.umbelled; Sepals of male flowers 6; petals distrct — 1. Stephania

AA. Male fls.Cymose; female fls.clustered in the axils of large possistent bracts; which are racemose sepals of mail flowers 4; petals connate — 2. Cissampelos

AAA. Fls.panicled, racemed or axillary,if racemed without large bracts(or in short cymes in Cocculus)

B. Seed ovoid or reniform — 3. Tinospora

BB. C.petals 6; stamens distrct

CC. petals none; stamens mono-adelphous — 4. Anamirta

BB. Leaves not cordate, rarely sub-cordate seed horse-shoe-shaped or hooked

C. Leaves glabrous — 5. Tiliacora

CC. Leaves villous or pubescent — 6. Cocculus

1. STEPHANIA Lour.

Stephania japonica (Thunb.) Miers

S.hernandiflora (Willd.) Walp.; FBI 1: 103

Slender climber. Leaves peltate-ovate,3.5-14 cm long glaucous pubemulose beneath. Flowers small in compound cymose umbels. Male flower; Sepals 6-10, free; petals 3-5. Female flower: Sepals 3-5; petals 3-5. Drupe glabrous endocarp horseshoe-shaped, compressed, margins tubercled.

Habitat: Bhelgaon- Narainpur (Bastar).

Enclosure 2175(?)

2. CISSAMPELOS Linn.

Cissampelos pareira Linn.; FBI 1:104; Tiwari (1968) 581; Sab. & Balak. 491; Haines 5; Witt 6; Mahesh BCBSI.352; Rao 235; Mahesh JBNHS (1961); Mahesh (1960) 556; Hole 508, Kanjilal 14.

Vern. Pahadmul, safed padh, Sethpal, Bodel (Madia), Gaiphed bute (Bastar), Keripar (Pach.), Bichhukand (Pach.), Padin (Katni) Koda Kuri (Bastar), Kadu Parha (Chh.), Bondum (Bastar), Patha or pahadmul (JBP), Pat Jadi (Bastar), Beola, Bersia (Bastar).

Dextrorse climber upto 5 m long, more or less hairy or tomentose. Root-stock perennial. Leaves long-petiolate, ovate or orbicular, lamina 2.5-10 cm long, usually ~~entire~~ pettale. Flowers minute, greenish-yellow. Male- flowers in pedunculate branched cymes, clustered in leaf-axils or on long axillary shoots with small leaves and small axillary cymes. Female-flowers clustered in the axils of orbicular bracts, arranged in long, axillary racemes. Drupe orange-red, sub-globose, compressed hairy, endocarp with transverse ridges.

Fairly common throughout the state especially in open and rocky valleys; often climbing over shrubs and thickets.

Fl. July - Sept. Fr. Oct.- Dec.

Saxena 1328, 1591, 1624; Saxena & Khotale 8145, 8220; Khotale 3042, 6219, 9077; Shukla 2780, 5205, 9769; Khotale & Shukla 7359; Singh 3070, 4384, 6641, 6676; Pandey s.n.

The root is applied and orally administered in snake-bite and scorpion stings (Pach., Bastar).

3. TINOSPORA Miers.

Leaves glabrous, not lobed	T.cordifolia
Leaves tomentose, often 3 lobed	T.malabarica

Tinospora cordifolia Miers; FBI. 1:97; Seb. & Balak. 491; Witt 5; Mahesh. 29; Haines 4; Sastry 270; Phatak 167; Dethie Bahadur 27; Pariarahi 118; Mooney, Fl. Bailad. 245;

Vern. Gulbel (Chhind.), Gurmari (Sang.)

Large climber with succulent corky stem; branches often sending down long unbranched slender roots. Leaves petioled, 5-10 cm in diameter cordate, acute or acuminate, glabrous.

Flowers small, yellow in slender racemes which are axillary, terminal or ~~from~~ fan old wood. Male-flowers clustered in the axils of minute subulate bracts, pedicels filiform. Female flowers usually solitary on the racemes which elongate in fruit. Drupels red, pisiform, 3, with sub-terminal style.

Occasional: Chachai, Indore, Saugar, Nimar, Kutursar(Baster), Bundelkhand. Fl. Aug.- Dec. Fr. Cold season.

Tinospora malabarica Miers; FBI 1:96;

Kanjilal 10.

Vern. Gihob

Large climber. Leaves orbicular, ovate or somewhat obovate, deeply cordate, 10-22 cm long grey tomentose beneath. Flowers yellowish-green in racemes usually from old wood. 6 mm across. Dupels scarlet or orange.

This is often confused with the preceding species.

Bundelkhand - climbing over tall trees in cool situations Fl. Feb.- March. Fr. May - June

4. ANAMITTA Colebr.

Anamitra paniculata Colebr.

A.cocculus W.& A.; FBI.1:98; Phatak 165

Large woodi climber. Leaves broadly ovate to suborbicular base truncate or broad cordate 10-25 cm long, glabrous and shining ab above, pale beneath with tufts of hairs in the axils of nerves. Flowers greenish yellow, 6 mm in diameter, in large panicles from old wood attaining 35 cm sepals 6. Petals none. Male flower filaments ~~[illegible]~~ united into a column on which in authers form a globose head. Female flower: carpels 3. Dupels black, globose, 1.25 cm in diameter 2-3 together, style scar near the base.

Gwalior (State). Fl. April-May Fr. June

5. TILIACORA Colelor.

Tiliacora acuminata (Lamk.) Miers

Tiliacora racemosa Colebr.; FBI. 1:99; Kanjilal 11.

Extensively woody climber. Leaves ovate lanceolate, 5-15 cm long, acute or acuminate, glabrous, dark-green and shining above. Flowers yellow, 5 mm across, in lax axillary panicles or racemes upto 30 cm long. Male flowers 3-7 together in cymes from ultimate branches. Female flowers usually solitary or sometimes in twos; carpels several 3-12 on a short gynophore with terminal recurved subulate styles. Drupes reddish 10-12 mm long.

Bundelakhand (Kanjilal) Fl. April-June.

Fr. June - Dec.

6. COCCULUS DC.

Key to the species.

Leaves tomentose or hairy; male flowers in axillary panicles — C.hirsutus

Leaves glabrous when mature; male flowers in sessile axillary clusters — C.laeba

Coculus hirsutus (Linn.) Diels; Seb. & Balak. 491; Haines 5; Mahesh BCBSI. 352; Sastry 270; Jain 62.

C. villosus;DC:; FBI 1:101; Mahesh. Ind. For.(1962) 117; Mahesh (1960) 556; Ma 508; Kenover 16, f.57; Kanjilal 12.

Climber, more or less villous. Leaves triangular to oblong-ovate 2.5-7.5 cm long, obtuse rounded or emarginate, usually mucronate, pilose, ultimately glabrescent above, undersurface densely villous, base truncate, rounded or cordate. Flowers minute, yellowish-green Male flower in short compound compact cymes, much shorter than the leaves. Female flowers 1-3 from short peduncles. Drupes pubescent sub-reniform, compressed, 3.5-4 mm across.

Fairly common throughout the State, over hedges and in waste places. FI. Nov. - April Fr. Dec.- May.

Saxena 3665; Khotele 8709; 8958; Indorkar 4110; 4194, 11452; Singh 4214; 10821, 11281; Shukla 4855, 9172.

Cocculus laeba DC ; FBI 1:102; Kanjilal 13.

Climber more or less glabrate. Leaves variable, linear-lanceolate to oblong ovate or elliptic-ovate, 1.5-4.5 cm long, rounded or obtuse and usually mucronate at the apex base cuneate, truncate or rounded, adpressed pubescent when young, glabrate with age. Flowers minute. Male-flowers in dense clusters in leaf-axils. Female flowers solitary or in twos from the leaf axils. Drupes purple roundish 3.5-4 mm across.

Bundelkhand (Kanjilal) FI. & Fr. Throught the year.

6. BERBERIDACEAE.

BERBERIDACEAE.

BERBERIS Tourn. exl.

Berberis asiatica Roxb. exDC.; FBI 1:110; Ahrendt in Jour. Bot. Suppl. 1942:98, 1942; Chatterjee on Rec. Bot. Surv. Ind. 16:12, 1953; Rao 235; Mooney 21.

Vern. Darhaldi.

Shrub 1-3 m high with more or less glabrous branches. Leaves clustered in the axils of simple or 3-fid. spines, obovate or oblong-obovate, margin usually with large distant spinous teeth, thickly and rigidly coriaceous, upper surface with a very prominent primary and secondary reticulate venation. Flowers yellow, in simple racemes. Berries ovoid blue-black with glaucous bloom, stylose.

Occasional in open situations in hilly regions: Pachmarhi, Patalkot, Sarguja.

Fl. Feb.- April. Fr. May - June.

Saxena & Khotele 7956; Shukla 8647.

7. NYMPHACEAE.

NYMPHAEACEAE.

Key to the Genera.

Leaves raised above water surface, orbicular centrally peltate — 1. Nelumbo

Leaves floating, usually cordate — 2. Nymphaea

1. NELUMBO Adans.

Nelumbo nucifera Gaertn.; Seb. & Henry 209; Tiwari 582; Khatale 177; Nelumbium speciosum Willd.; FBI 1:116.

Vern. Kamal (The sacred Lotus).

Aquatic herb with long creeping rootstock. Leaves orbicular, centrally peltate, 60-90 cm in diameter, entire, raised upto a meter high above water surface. Flowers solitary white or rose 10-15 cm across fragrant. Carpels sunk in a torus oblong.

Throughout the State in ponds but not common.

FI . April - Aug.

2. NYMPHAEA Linn.

Key to the species.

Leaves entire or wavy; anthers with long appendages — N. stellata

Leaves sharply toothed; anthers without appendages — N. nouchali

Nymphaea stellata Willd.; FBI 1:114; S. [illegible]ni 231; Sub. & Henry 209.

Floating aquatic herb. Leaves orbicular or elliptic, cleft to the base, entire or sinuate, glabrous. Flowers white blue, rose or purple willy scented, upto 20 cm in diameter. Anther apices appendaged or foliaceous. Fruits globular.

Common throughout the State: Jabalpur, Bastar.

Saxena 202; Khotale 3161, 6477

Nymphaea nouchali Burm.f.; Sub. & Henry 209;

Seb. & Batak. 522. N.pubescebt Willd.;

Panig 119. N.lotus HK.f. & Thoms. FBI 1:114 (non Linn.)

Floating aquatic herb. Leaves orbicular ovate 15-30 cm or more in diameter, saggitate when young, sharply toothed, pubescebt beneath, usually deeply cordate. Flowers white or pink, 12-25 cm in diameter, without appendages. Berries globose, ripening under water.

Common throughout the area:

Raipur, Bastar, Katni, Dhar. FI & Fr. Throughout the year.

Saxena 1678.

8. PAPAVERACEAE.

PAPAVERACEAE.

Key to the Genera.

Plants prickly; sepals 2; petals 4. — 1. Argemone

Plants not prickly; sepals 2; petals 6 — 2. Papaver

1. ARGEMONE Linn

Key to the species.

Flowers yellow — A.mexicana

Flowers white — A.ochroleuca

Argemone mexicana Linn; FBI 1:117;

Tiwari 582; Phatak 187; Witt 7; Mahesh & Ind. For. (1962) 117; Mahesh BCBSI 352; Kanover 17,f.58; Sastry 270; Hole 508.

Vern. Katai (Bast.), Pila-dhatura (Chh. & Bast.) Ajan, Badshar, Siyar Kanta (Amkt.), Kateli (Gwal).

Thistle like prickly, glabrous herb, 30-100 cm high. Lower leaved crowded in a rosette petiolate, higher ones amplexicaule, very variable in shape, sinuate-pinnatifid, glaucous, prickles both scattered along the margin and on the nervation of the undersurface. Flowers 2.5-5 cm across, terminal, sessile or on very short peduncles. Sepals 3, green with a very acute terete horn below the apex and a few prickles. Petals 6, bright yellow capsule oblong-avoid, 2.5-4 cm long prickly.

Fairly common in waste places, along roadsides in fields etc. throughout the state. Fl. Mainly Feb.- June

Saxena 1051; Singh 6684, 11230;

Shukla 9268; Khotele & Shukla 7242 Pandey s.n.

The seed oil is used in skin diseases and the plant juice in eye-trouble.

Argemone ochroleuca Sweet, paingrahi 119.

Like the preceding species except the flowers which are whitish. Cytologically this is also distinct (Mathotra Curr.Sci 29:282, 1960.)

Rare : Jabalpur - Ratan Nagar in waste places, Raisen. FI. April - May.

2. PAPAVER Linn.

Papaver somnifera L.; FBI.1:117

vern. Post,Afim (opium poppy)

Herb, 0.6-1.2 m high, glaucous. Leaves amplexicaule, oblong, lobed, lobes toothed and serrate. Flowers white, sometimes purpleor scarlet. Capsuld globose, 2.5 cm in diameter, glabrous, opening by small valves under the lobes of the persistent stigma. Seeds usually white, small.

Cultivated in Nimar tract. Occasionally met with as an escape. FI. & Fr. Jan. - April

9. FUMARIACEAE.

FUMARIACEAE.

FUMARIA Tourn. Ex Linn.

Fumaria indica (Haussk.) Pugsley.

F.vaillantii var indica Haussk.

F.parviflora W.& A.; Kenover 17 f.59; Phatak 97.

F.parviflora subsp. vaillantii HK.f. in FBI.1:128,1872.

Diffuse annual herb, 10-60 cm long. Leaves pinnately much divided into narrow flat segments. Flowers in numerous short racemes. Sepals 2, much smaller than the corolla tube. Petals rose with deep purple tips, too outer dissimilar, the upper produced at the base into a short spur, less than 1/3 the length of the petals, lower one flat, narrow; two inner narrow, cohering by their tips; keeled at the back. Fruit a globose nutlet, 2-2.5 mm in diam., 1-seeded, indehiscent.

Occasional weed of cultivation: Shivpuri, Indore, Saugar, Gwalior, Sidhi etc. Fl. & Fr. Jan. - Feb.

Saxena s.n. ; Saxena & Khotele 12038, 12043.

10. CRUČIFEPAE.

CRUCIFERAE.

Key to the Genera.

A. FIS. small, about 2-3 mm across:

B. Pods didymous — 1. Coronopus

BB. Pods subglobose — 2. Cochlearia

BBB. Pods linear or oblong:

C. Leaves simple — 3. Rorippa

CC. Leaves pinnate — 4. Cardamine

AA. FIS. larger, 10-25 mm across :

B. FIs. usually yellow; silique long; seeds 1-seriate — 5. Brassica

BB. FIS. white or cream, veined with dark purple; silique rather short, turgid; seeds 2 - seriate — 6. Eruca

1. CORONOPUS Boehm.

Coronopus didymus (Linn.) Sm.

Sevebiera pinnatifida DC.

Prostrate or diffuse annual aromatic herb. Leaves finely 1-2 pinnatifid. Flowers minute, white, in numerous leaf-opposed racemes. Pods didymous, 2-2.5 mm broad, consisting of two wrinkled indehiscent globose lobes which separate on falling. Seed one in each lobe, reniform.

Sapgar - weedin Botanical Garden. Fl. Jan - Feb.

2. COCHLEARIA Linn.

Cochlearia cochlearioides (Roth) Sant.

C.flava Buch. - Ham.; FBI 1:145 Seb. & Balak. 522; Panigrati 119

Erect or diffusely branched herb, 10-35 cm long. Leaves lanceolate, pinnatifid, 10-13 cm long lower petiolate; upper smaller and auricled; lobes sinuate-toothed. Flowers small white,

Yellow or Violet, in racemes. Pods sub-globose, 5 mm long with convex turgid valves. Seeds reddish, rugose.

On river banks, near lakes etc: Saugar, Mokandpur, Rewa, Katni, Pupnagar. Fl. & Fr. Jan. - March.

3. RORIPPA Scop.

Key to the Species.

A. Pods short-oblong — R.palustris

AA. Pods linear-oblong:

B. Radical leaves usually lyrately pinnatifid — R.montana

BB. Radical leaves pinnatisect or 2-pinnatisect — R.indica.

Rorippa palustris Bess.

Nasturtium palustre DC.; FBI. 1:133

Glabrous herb, 15-30 cm high. Leaves lyrate pinnatifid 2.5-7.5 cm long. Flowers minute, Yellow, in elongate racemes. Pods oblong, 3.5-8 mm long.

Jabalpur - along roadside and river bank.

Fl. & Fr. Oct. - March.

Indorkar 12335 ; Singh & Indorkar 7654.

Rorippa montana (Wall.exHK.f. & T.) Small

Nasturtium montanum Wall. ex HK.f. & T; FBI. 1: 134.

Erect herb, 10-55 cm high. Lower leaves stalked, 2.5-10 x 0.8 - 3.5 cm, usually lyratehy pinnatifid, toothed,sometimes undivided, ovate, obovate or spathulate; upper leaves sessile, smaller, ovate or ovate-lanecolate, sinuate-toothed. Flowers white, 1.5-2 mm across. Pods linear, 1.8-2.8 cm long. seeds in two rows.

Rate along roadsides: Sagar, Jabalpur. Fl & Fr. Jan - Feb.

Indorkar 12467.

Rorippa indica (DC.) Hiern; Panigrahi 119;

Mahesh. JBNHS (1960) 375; Sastry 270; Mahesh (1960) 556.

Nasturtium indicum DC. FBI. 1:134; Seerwani 230

vern. Khubkalars (Khandwa)

Erect herb 15-25 cm high, often branched from near the base. Radical leaves pinnatisect or 2-pinnatisect lobes toothed; upper leaves lyrate frequently with small auricles, rarely simple coarsely toothed. Flowers small, yellow, in racemes. Pods linear or linear-oblong, 1.25-1.8 cm long.

Common in damp places throughout the area.

Fl. & Fr. Dec.- Feb.

Khotele 5001; Singh 11207; Indorkar 4143, 12305

4. CARDAMINE Linn.

Cardamine hirsuta Linn.var. Sylvatica (Link) HK.f. & T.And

in FBI 1:138; Panigrahi 119 (Sp).

Suberect or decumbent, glabrous herb, 7-30 cm long. Leaves pinnatifid; petiole not auricled; leaflets petiolulate, toothed. Flowers small, white. Pods linear, erect, 1.2-2.3 cm long.

Borie (Panigrahi) Fl. & Fr. July - Dec.

5. BRASSICA Linn.

Key to the Species.

A. Pods more or less spreading

B. Cauline leaves auricled.

C. Leaves always glabrous, green above glaucescent beneath; pods rather slender B.napus

CC. Leaves hairy when young, glaucous on both surfaces; pods usually stout B.campestris

BB. Leaves sessile or petiolate not auricled B.juncea

AA. Pods appressed to the axis of the racene B.nigra

Brassica napus Linn. (sensu ampl.)

B.compestris Linn. subsp. Compestris & Subsp. napus HK.f. & T. And. in FBI. 1:156.

B.napus L. var. dichotoma prain

vern. Tori, Toria, Lahi, Jangli (Bastar) Sarot (Bastar); (Indian Rape).

Erect herb. Leaves stem-clasping, glabrous, glaucescent beneath. Flowers yellow, about 1.2 cm in diameter. Pods 5-5.5 cm long. Seeds about 20 in a pod.

Commonly cultivated and also found as an escape.

Fl. & Fr. mainly cold season

Khotele 5236, 8531, 8839; Khotele & Shukla 5381

Shukla 9276; Indorkar 12304

Brassica compestris Linn. var. Sarson Prain

vern. Sarson (India colza)

Herb with glabrous, glaucous, stem-clasping leaves. Flowers Yellow, about 1.2 cm in diameter. Pods 5-8 cm long in seeds 30-80 in a pod.

Widely cultivated; often found as an escape. Fl. & Fr. mainly cold season.

Brassica juncea (Linn.) Czerm & Coss; FBI.1:157, propaste.

vern. Rai (Indian Mustard).

Erect herb. Leaves sessile or petiolate, not auricled, by rate or undivided, upper leaves 5-6 mm long, entire, lower leaves larger. Flowers yellow, about 1.2 cm across. Pods about 5-6.2 cm long. Seeds about 40 in a pod.

Widely cultivated, often found as an escape. Fl. & Fr. mainly cold season.

Khotele 3814, 3074; Sheik s.n.

Brassica nigra Koch; FBI. 1:156; Sastry 270; Pathak 61.

vern. Tikki. (Black Mustard).

Rigid herb, 0.4-1m high. Leaves petiolate lower lyrate, upper entire. Flowers yellow in naked racemes. Pods erect, subulate, nearly glabrous, appressed to the axis of the raceme.

Cultivated in some parts of the state; occasionally found as escape: Indore, Gwalior.

Cultivated Species.

Brassica oleracea Linn. var. botrytis Linn

vern. Phool gobhi (Cauliflower).

Brassica oleracea Linn. var. capitata Linn.

vern. Bandhagobhi (cabbage).

Brassica oleracea Linn. var. caulorapa DC.

vern. Ganthgobhi.

6. ERUCA Adans.

Eruca sativa Mill.; FBI. 1:158

vern. Duar, Tara.

Erect, branched herb, 30-60 cm high. Leaves lyrate-pinnatifid 7-20 cm long lower larger, mostly with linear-oblong segments, rarely sub-entire. Flowers white or yellow often veined with purple. 1.3 cm in diameter, on pedicels shorter than the calyx. Pods erect and appressed to the stem, turgid, 2-2.5 cm long. Seeds many in two rows, reddish-brown.

Cultivated in the northern districts as a cold season crop with Brassica spp. and others; also met with as an escape.

Fl. & Fr. Cold season.

The oil from the seed is used mainly for burning and sometimes adulterated with Mustar and oil.

Cultivated.

Raphanus sativus Linn.

vern. Muli (Reddish).

Annual herb with long thick fleshy roots; Leaves lyrate or pinnatisect. Flowers white or lilac with purple veins. Pods terete, indehiscent, more or less constricted between the seeds, prolonged beyond the valves in a pointed beak about half the length of the pod; seeds separated by pith.

Commonly cultivated throughout the State. Fl. & Fr. Jan. - Feb.

Khotele 8838; Indorkar 4132.

11. VICIACEAE.

VIOLACEAE.

Key to the Genera.

Leaves lanceolate; sepals not produced at the base 1. Ionidium

Leaves sagittate or hastate; sepals produced at the base 2. Viola

1. IONIDIUM. Vent

Hybanthus enneaspermus (Linn.) F.Muell.; Rao 235;

Tiwari 584. Ionidium suffruticosus (Linn.) Baill ex Lansey; FBI 1:185. I.heterophyllums vent.; Duthie 54.

Hybanthus suffruticosus (Linn.) Baill. ex Lansey; Panigrahi 119.

vern. Dincharo (Orchha)

Diffuse perennial herb or under shrub. Leaves subsessile, linear-lanceolate, 1.7-2.5 cm long, serrate; stipules subulate, gland-tipped. Flowers axillary, solitary, pink or orange. Sepals 5, subequal, not produced at the base. Petals 5, lower larger, clawed saccate and with a large oval or orbicular limb. Capsule 3-valved, sub-globose, few-seeded.

Frequent in open pastures and way sides: Orchha, Trathgash (Bastar), Sagar, Shivpuri, Pachmarhi, Seoni, Chhindwara etc.

Saxena 1839 ; Singh 11223

2. VIOLA Linn.

Viola patrinii DC.; FBI 1:183; Mooney 22.

Perennial herb; root-stock short. Leaves all radical long-petiolate, very variable, sagittate or hastate, 2.5-7.5 cm long, crenate. Flowers on long peduncles upto 15 cm long, direct from the root-stock, lilac, the anterior petal with Spur; clistogamous flowers colourless and much smaller, Capsule oblong, 6-12 mm long.

Rare in shady valleys: Pachmarhi, Sarguja Fl. & Fr. Aug.- Oct

Saxena & Khotele 8168.

12. CAPPARIDACEAE.

CAPPARIDACEAE.

Key to the Genera.

A. Leaves simple

B. Herbs without thorns — 1. Cleome (Partly)

BB. Shrubs often climbing

C. Sepals free:

B. Stamens free; often armed — 2. Capparis

BB. Stamens at the base connate with the gynophore — 3. Cadaba

CC. Sepals united at base; unarmed — 4. Maerua

AA. Leaves palmately compound or dissected:

B. Herbs — 1. Cleome (Partly)

BB. Trees — 5. Crateva

1. CLEOME Linn.

Key to the species.

A. Leaves simple

B. Prostrate; stamens 10-12 — C. simplicifolia

BB. Erect; stamens 6 — C. monophylla

AA Leaves palmately compound or dissected:

B. Stamens sessile on the disk:

C. Fls. yellow; Capsule glandular-pubescent — C. viscosa

CC. Fls. rose or violet; capsule glabrous.

D. Leaves 3- foliolate — C. felina

DD. Leaves 5-9 foliolate — C. chelidonii

BB. Stamens on the gynophore — C. gynandra

Cleome simplicifolia (Camp) HK.f. & Thoms. in FBI. 1:169;

Seb. & Balak. 522; Sastry 270; Panigrahi 119; Duthie 48.

Prostrate branched stigose herb. Leaves simple, obovate-oblong or lanceolate, 2.5-5 cm long, obtuse or acute. Flowers violet 6 mm across in elongating racemes; bracts leafy. Stamens 10-1 Capsule torulose, 1.8-3 cm long.

Occasional weed: Indore, Gwalior, Saugar, Satna etc.

Fl. & Fr. Aug. - Dec.

Cleome monophylla Linn.; FBI. 1:168; Panigrahi 119;

Mahesh, BDBSI. 352; Mahesh, JBNHS (1962); Sub. & Henry 209;

Glandular-pubescent branched herb with 30-60 cm high. Leaves ovate-lanceolate or oblong-lanceolate, 2-5 cm long. Flowers purplish in elongating leafy racemes; bracts stalked, leafy. Stamens 6. Capsule linear, 5-10 cm long, glandular pubescent.

Common weed of pastures and cultivated lands: Jabalpur, Asirgarh, Saugar, Patalkot, Bastar etc. FI & Fr. June- Jan.

Khotele 6596, 8004, 8421, 8456; Indorkar 11401; Shukla 2678, 0178.

Cleome viscosa Linn.; FBI. 1:170; Mahesh. BCBSI. 352;

Kenoyer 18, f. 60; Rao 235; Tiwari 578; Phatak 38.

Erect annual herb, about 0.3-1(1.6) in high, viscid and stinking. Leaves 3-5 foliate; petiole 1-6 cm long; leaflets diminishing upwards in size, subsessile or shortly petiolulate, oblanceolate-elliptic, entire, acute to obtuse, glandular-ciliate. Flowers yellow, few, solitary in the axils of the upper leaves. Siliques linear cylindric, attenuate to the apex, 3-10 cm long, glandular-pubescent or scaberulous, strongly longitudinally striate

Fairly common in wastelands. FI. & Fr. July- Oct.

Saxena 134; Khotele 8727, 8776; Tomar 4189; Shukla & Indorkar 2681; Shukla 2676; Singh 7611; Pandey s.n ; Mancharlal s.n.

Cleome felina Linn.f.; FBI. 1:170; Sastry 270.

Erect, much branched herb, 30-60 cm high. Leaves 3-foliolate; leaflets obovate, obtuse, 1.25-2.5 cm. Flowers purplish, axillary, solitary, long pedicelled. Stamens 28-32. Capsule linear-oblong 2.5-3.7 cm long, glabrous.

Rare in dry rocky river bed: Kalakund (Indore). FI.& Fr. Rainy season.

Cleome chelidonii Linn.f.; FBI. 1:170; Rao 235; Panigrahi 119; Duthie 49. Polanisia chelidonii DC.

vern. Jalhurhul (Indore)

Branched herb, 15-80 cm high; stem angular with sparse, appressed, stiff bulbous-based hairs. Leaves 5-9 foliolate or the upper only with 3 or 1 leaflets; leaflets obovate 4-1.25 cm long, rounded or sub-acuminate to acute. Flowers light red-purple or whitish, in corymbiform racemes. Petals 12-21 mm long. Stamens 30-40 (-55). Fruit linear, 6-8 cm long, glabrous. Seeds wasty by scattered scales.

Occasional in marshy places: Raipur, Indore.

Fl. & Fr. July - Sept.

Hewitson s.n.; Manohallal s.n.

Cleome gynandra Linn.; Jacobs in Fl.Males.(ser.1) 6:101, 1960

Gynandropsis pentaphylla DC.; FBI.1:171; Kenoyer 18; Wood 80

G.gynandra Brig.; Mahesh. JBNHS.(1961) ; Witt 7

vern. Hurhur.

Erect herb, 15-80 cm high, glandular-pubescent to glabrous. Leaves to foliolate, the lowest and upper 3-foliolate; leaflets obovate, 2-7.5 cm long, obtuse to acuminate. Flowers white or purple 7.5-18 mm in diameter, in long, corymbose racemes. Bracts foliaceous stamens 6. Androgynophore 9-16 mm long. Fruit cylindrical 2-11 cm long, scarbrid to glabrous.

Frequent along roadsides, near houses: Indore, Jabalpur etc.

Fl. July- Aug. Fr. Sept.

Saxena 151, Shukla 5306; Manoharlal s.n.; Pandey s.n.

2. CAPPARIS Tourn. ex Linn.

Key to the Species.

A. Mature branches leafless — C.decidua

AA. Mature branches leafy:

B. Flowers solitary or nearly so — C.grandiflora

BB. Flowers 1-several in vertical supra-axillary lines — C.zeylanica

BBB. Flowers in terminal corymbs or subumbels or racemes.

C. Small tree, flowers 1.8- 2.5 cm across — C.grandis

CC. Climbing shrubs; flowers 0.8-1-2 cm across — C.sepiaria

Capparis decidua (Forsk) Edgew.; Panigrahi 119

C.aphylla Roth; FBI. 1:174; Hole 508; Biscoe 9

vern. Karil (Gwalior)

Leafless, much branched, shrub or small tree, straggling, or suffruticose; thorns paired, short, straight or recurved. Juvenile leaves linear, caducous. Flowers scarlet, 2.5 cm in diam. in many flowered corymbs on short lateral shoots. Fruit red globose or ovoid, 1.7 cm long.

Common in drier parts of the State; often on steep slopes or on old walls: Gwalior, Indore, Mahoba.

Fl. Nov.- May. Fr. Sept.- Dec.

Fruits are cooked and also prickled.

Saxena 10905; Pandey s.n.

Capparis grandiflora Wall.; FBI. 1:174; Seb. & Bal. 522

Branched spreading shrub 8.6-1 m high; thorns recurved; branches tomentose. Leaves ovate 2.5 cm long, acute mucronate, shining above, brown-pubescent beneath. Flowers white large, 7 cm in diameter, solitary axillary; pedicels 1.5 cm long. Fruit oblong 5 cm long, slightly granular.

Jukehi forest near Katni. Fl. May

Capparis zeylanica Linn. (non FBI); Seb. & Balak. 522;

Sastry 270; Panigrahi 119; Tiwari 578.

C.horrida Linn. f.; FBI. 1:178; Hole 508, Haines 6;

Biscoe 9; Kanjilal 18.

vern. Tel; Ardanda; Afua (Indore), Kamalwa, Harsir,

Harwa, Vlatkanta (Sang.), Kauthar, Kharbiswa, Kantewali Ondhi (JBP.)

Climbing shrub; innovations brown red to greyish-tomentose; thorns recurved. Leaves ovate or elliptic, rarely obovate, 4-10 x 2-6 cm. Flowers pink or white, 2.7-5 cm across, supra axillary; solistary or 2-4 above one another in a vertical line. Sepals more or less densely tomentellous outside. Fruit reddish brown when mature, globular to ellipsoid about 2.5-4 cm in diameter on a stout gynophose.

Common in open places: Jabalpur, Indore, Bastar, Chhindwara etc.. Fl March Fr. June.

Khatale 5270, 8960; Shukla 4501,5304, Indorkar 9301 ; Jaikar s.n.; Pande s.n.; Srivastava & Shukla 12521.

Capparis grandis Linn.f.; FBI. 1: 176; Haines 6;

Sastry 270; Biscoe 9; Witt(Ber.) 3

vern. Pacher (Indore)

Small tree with pubescent branches, thorns recurved or 0. Leaves lanceolate to broadly ovate or obovate, 5-7.5 cm long, acute obtuse or retuse usually velvety on both sides. Flowers white, 1.8-2.5 cm in diameter, in terminal corymbs or racemes. Fruit subglobose, 3.7 cm across, dotted.

Nimad, Khandwa, Indore. Fl. Feb.- April Fr.Aug.- Oct.

Capparis sepiaria Linn.; FBI. 1: 177; Panigrahi 119; Seb. & Balak. 522; Haines 7; Sastry 270; Kanjilal 18; Kenover 18.

vern. Kanthar (Indore)

Mush-branched shrub, often climbing; young branches greyish puberulous, sooner or later glabrescent twigs zigzag; thorns recurved. Leaves elliptic, sometimes obovate or ovate 1.5-5 cm long, top mostly rounded usually notched, rarely blunt. Flowers white, 0.8-1.2 cm across, in few-20 flowered suburbels. Fruit (sub) globular, 1-1.5 cm in diameter, blackish when ripe.

Common in drier places: Gwalior, Indore, Rewa

Fl. May Fr. July

Sayers 10912; Pandey s.n.

3. CADABA Forsk.

Cadaba indica Lam ; FBI. 1:172; Witt 8; Witt(Berar)2.

Straggling much branched unarmed strub. Leaves elliptic-oblong, 2.5-3.7 cm long. Flowers greenish white, in few flowered terminal racemes. Stamens 4, their bases connate with the gynophore (androgynophore). Fruit cylindrical, 2.5-3.7 cm long.

Nimad (witt) Fl. Nov.- March Fr. Jan.- April

4. MAERUA Forsk

Maerua ovalifolia camb.

M.arenaris HK.f. & Th in FBI. 1:171; Witt 7; Witt(Berar) 2; Duthie 50.

vern. Tamaran.

Woody unarmed climber. Leaves ovate or elliptic,acc 2.5-7.5 cm long, acute or retuse. Flowers greenish-white,in few-flowered terminal racemes. Sepals united at base and lined by the disk. Petals 4, inserted on the edge of the disk. Stamens many, inserted high up on the gynophore. Berry fleshy, deeply constricted between the seeds.

Found in hedges: Nimar, Betul. Fl. Nov.- Feb. Fr. Jan.-April

5. CRATEVA Linn.

Key to the species:

Leaflets with (7-)10-15(-22) pairs of nerves	C.nurvala
Leaflets with fewer than 11 pairs of nerves	C.adansonii

Crateva nurvala Ham. var. nurvala.

C.nurvala Ham.; Jacobs in Fl. Males.(Ser.1) 6:68, 1960

C.religiosa (non.Forst.f.) var. nurvala (Ham.)HK.f. & Thoms in FBI.1:172, p.p.

C.religiosa auct non Forst.f.; Witt(Beran)2; Witt.8; Tiwari 578; Biscoe 9; Kanjilal 20; Hole 508; Sastry 270.

Vern. Barna, Barasoipal (Saug.), Kanei (JBP.), Barana, Baran (Chhind.)

Moderate-sized tree. Leaves 3-foliolate; leaflets lanceolate sometimes oblong,(4.5-)9-15(-28) cm long, acute; lateral leaflets often slightly oblique; nerves(7-)10-15(-22) pairs; petiole long; petiolules (0-)3-6(-10) mm long. Flowers large, yellowish-white in 20-100 flowered corymbose clusters. Stamens purple. Fruit ellipsoid, barely ovoid 5-5.5 cm long on a thickened gynophore; pericarp thick, covered with a thin dull, yellow-greyish crust breaking into minute particles which peel off sooner or later, leaving the surface smoothish.

Frequently cultivated throughout the State: Jabalpur, Indore, Nimar, Betul etc. Fl. March - April Fr. June - July

Crateva adansonii DC. Subsp. odora (Ham.) Jacobs; Panigrahi 119

C.Odora Ham.

Small tree. Leaves 3-foliate; leaflets petiolutate, petiolules 4-6 mm long; lamina elliptic to oblong, rarely lanceolate, acuminate, mostly red-brownish when dry; with fewer than 11 pairs of nerves. Flowers in few to-40- flowered corymbose clusters. Fruit globular, 3.5-4 or more cm in diameter, at maturity red when fresh, brown when dry.

Jagdalpur, Rewa. (Panigrahi) Fl. Feb.- March
Fr. April - June

13. POLYGALACEAE.

POLYGALACEAE.

Key to the Genera.

All sepals petaloid; Stamens 4-5; Capsule toothed on the margins — Salomonia

Outer sepals not petaloid; Stamens 8; Capsule not toothed on the margins — Polygala

SALOMONIA Lour.

Salomonia ciliata (L.)DC. Prodr. 1:324, 1824.

S.oblongifolia DC; Q FBI.1:207

Herb, 5-8 cm high with winged stem. Leaves sessile or subsessile, elliptic or ovate-lanceolate, entire, mucronate. Flowers pink, very small, in dense terminal spikes. Sepals all tretaloid. Petals 3, not crested. Stamens 4-5. Capsule 2-celled, margins toothed with filiform teeth.

Rare in forest clearings in moist situations:

Bastar. Fl. & Fr. Sept. - Oct.

Khotele 3039; Khotele & Shukla 7207.

POLYGALA Linn.

Key to the Species.

A. Wing sepals deciduous — P.furcata

AA. Wing sepals persistent:

B. Wing sepals pointed at apex, broader near base:

C. Racemes longer than the leaves — P.elongata

CC. Racemes shorter than the leaves;

D. Flowers greenish — P.rosmarinifolia

DD.Flower yellow or pink — P.chinensis

BB. Wing sepals rounded at apex, broader above middle.

C. Capsule glabrous:

DØ. Racemes terminal,capsule winged — P.longifolia

DD.Racemes extra axillary;

capsule wingless — P.brachystachya

CC. Capsule pubescent at least on margin:

D. Wing sepals 5 mm broad or broader

E. Leaves 5 times as long as broad or longer — P.persicarifolia

EE. Leaves 3 times as long as broad or shorter — P.crotalarioides

DD. Wing sepals 2 mm broad — P.erioptera

Polygala furcata Royle; Mukherjee in Bull.Bol.Soc.Beng. 12:24; 1958; Sub. & Henry 209.

P.triphylla Bach. Ham. ex D.Don(non Burm.f.); Haines, Bot. Bihi & Orissa 42; Mooney 23.

P.triphylla var. glancescens Benn. in HK.f.Fl.Brit. Ind. 1:201, 1872 p.p. excluding Syn. Semiocardium hyalinum; Mooney, Fl. Bailad. 243.

Herb, 10-25 cm high, branched from above. Leaves elliptic, 2-6 VI-3.5 cm glabrous, acute. Racemes terminal 2-8 cm long. Flowers yellow, second. Wing sepals long oblong elliptic. Keel 2-lobed, lobes crested. Capsule suborbicular, broadly winged, wing unequal. Seeds pubescent, tuberculate, carunele with a very small black shining umbo.

Occasional in forest. Amarkantak, Bailadilla, Jashpur.

Fl. & Fr. Sept.- Oct.

Saxena 10152; Khotele 10026, 10112, Saxena & Singh 7453

Polygala elongata Klein-; Mukherjee, l.c.36; FBI.1:203.; p.p.; Kapoor 273; Rao 235.

Herb, 15-45 cm high. Leaves subsessile, linear or linear-oblong, 2-6 cm long, mucronate. Flowers Yellow, in elongate lateral racemes which are 6-20 cm long and more or less lax-flowered. Outer sepals 2 mm long, lanceolate, acute; wings 5 mm long, green, ovate, tip rounded and apiculate, somewhat oblique, Capsule glabrous, very olbique, retuse at top. Seeds pyriform, clothed with short silky hai strophiola 3-lobed, very shortly appendaged, smooth

Common in forests: Pachmarhi, Khandwa, Bastar, Hoshangabad.

Fl. & Fr. Sept.- Oct.

Saxena & Khotele 8248, 8274; Khotele 6526;

Khotele & Shukla 7393; Singh 7166.

Polygala rosmarinifolia W. & A; Mukherjee, l.c.38; FBI.1:204

Sub. & Henry 209.

Annual herb; branches long, twiggy. Leaves linear or oblong-linear, obtuse, shortly mucronate, glabrous or slightly pubescent particularly on the margin. Racemes much shorter than the leaves, extra axillary few flowered. Flowers small greenish. Wing membranous or thin, ovate, acute slightly oblique, carina crested. Capsule roundish, oblique, emarginate with 2 short appendages.

Bastar (Sub & Henry, l.c.). Fl.

Polygala chinensis Linn; Mukherjee, l.c. 39; FBI.1:204; Mahesh. Ind.For. 1962: 118; Duthie 68.

P.glomerata Lour.

vern. Chutari (Gwalior), Bignori (Gond.)

Herb with a slender woody root-stock; branches usually procumbent, pubescent with curled hairs. Leaves subsessile, obovate or oblanceolate, often elliptic or orbicular, usually ciliate, 1-4 cm long. Flowers yellowish-green, subsolitary or in short lateral racemes not exceeding 2 cm in length. Wing sepals 5 mm long very oblique, straight on upper side, rounded on the lower side, acuminate. Capsule broadly oblong, oblique-tipped, margined and ciliate, scarcely notched at the apex or not. Seeds ellipsoid hirsute; strophiole white, 3-toothed, lateravals often longer.

Fairly common in open grassland, in forest, cultivated lands, wastelands etc. Fl. & Fr. July - Dec.

Saxena 254, 374; Singh 7164, 10878 Indorekar 12487;

Khotele 3038; Shukla 9193

Polygala longifolia Poir.; Mukherjee, l.c. 40

P.heptalea DC.; FBI. 1:202.

Erect or suberect usually slender herbs, 25-50 cm long; rootstock woody; branches few or none; stem and branches angled. Leaves subsessile, linear, basal leaves lanceolate, 1.5-3.5 cm long. Racemes elongate 3-6 cm terminal, dense-flowered, subsecund. Flowers pink, 3 mm long. Wones petaloid, narrowly obovoid. Wing petals obovate, membranous. Capsule oblong-obovoid, retuse, somewhat oblique above, margined and slightly winged, nearly as long as the wing sepals. Seeds densely hairy, caruncle 3-fid to the base, sinuses very narrow curved.

Bededongar, Pharasgaon (Bastar); Jashpur (Mukherjee,l.c.) Fl. Dec.

Khotela 8521.

Polygala brachystachya DC.

(non.Bl.); Mukherjee,l.c. 43; Sub. & Henry 209

P.telephioides Thw., (non willd.); FBI.1:205; Duthie 60.

Herbs; stem diffuse, branching from the base, pubescent, angled towards the extremity. Leaves ovate-oblong, 15 x 6 mm, obtuse, more or less mucronate. Racemes short about 1 cm long, rarely longer, leaf-opposed. Flowers small, 3 mm long appear to be in clusters on the short racemes. Alae foliaceous, oblique, ovate, glabrous, slightly longer than capsule. Wing petals subglabrous oblique, falcate, faint blue. Carina crested. Capsule orbicular oblong, equal wingless, glabrous, scarcely pubescent along margin emarginate. Seeds silky, 3-fid to the base, sinuses very narrow, curved.

Bastar (Sub. & Henry,l.c.) Fl.

Polygala persicarifolia DC.

Mukherjee, l.c. 45; FBI.1:202; Mooney 23; Sastry 271.

Erect herb, 15-45 cm high; stem pubescent. Leaves subsessile, lanceolate or lanceolate-oblong, 2.5-5 cm long, acute, glabrous or pubescent. Flowers rose coloured or white in terminal and extra axillary racemes. Outer sepals ovate-oblong, 3 mm long, slightly deflexed; wings membranous broadly ovate or suborbicular with 3-5 conspicuous looping nerves, glabrous. Corolla much longer than the wings; wing petals obovate, membranous, crest abroad membranous appendage with a multifid linb. Capsule elliptic oblong, ciliate, emarginate shorter than wings, margins thickened. Seeds oblong clothed with dense subappressed hairs. ~~Capsule~~ Caruncle 3 fid to the base.

Found in hilly districts: Amarkantak, Patalkot, Pachmarhi, Manpur, Khudia (Jashpur).

Fl. & Fr. Sept.-Oct.

Saxena 997, 7708, 10443; Saxena & Khotele 8135; Shukla 9636

Polygala crotalarioides Buch. Ham. ex DC.

Mukherjee, l.c. 46; FBI. 1:201

P.crotalarioides var. glabrescens coll.et.Hemsl.

P.crotalarioides var. glabrescens Haines; Mooney 21.

Perennial herb, pubescent with spreading hairs; branches upto 50 cm long; root stock woody. Leaves subsessile, obovate or oblanceolate, rounded or obtuse at apex often apiculate, pubescent with spreading hairs. Racemes axillary, 1-5 cm long, density-flowered. Flowers lilac or white with purple tips, 6-7 mm long. Sepals persistent. Wing sepals obovate, ciliate rounded at apex, longer than the capsule keel petal crested. Capsule obovate-orbicular, 5-6 mm across, margined, ciliate. Seeds dark brown, hairy; strophiole deeply 3-fid, lateral segments shorter than the middle.

Weed of meadows and cultivated fields.

Jashpur (Mooney), Khandwa (Mahesh), Nimar (Mahesh.)

Fl. & Fr. Aug.- Oct.

Polygala erioptera DC.; Mukherjee, l.c. 47; FBI.1:203; Panigrahi 119.

Herb, branches sub-erect or diffuse, 15-35 cm long, pubescent. Leaves linear, linear-oblong or more rarely elliptic, 1-3 cm long, hairy on both sides. Flowers yellow, 4-5 mm long in short few-flowered axillary or extra axillary racemes throughout the stem. Outer sepals ovate, 1.5 mm long, pubescent, wings obovate or elliptic, 3-5 mm long, with a strong green midrib and membranous ciliate margin. Wing petals sepaloid, densely pubescent, triangular and falcate; crest dorsal or may bifid or linear. Stamens arranged in two bundles. Capsule oblong, pubescent. Keel and ciliate, not winged, shorter and narrower than wings, obliquely emarginate. Seeds oblong densely pilose, strophiole galeate, horney, smooth, 3-fid to the base.

Indore (Occasional, Gwalior (Panigrahi)

Polygala erioptera DC. var. vahliana (DC) Cholat, Mukherjee, l.c.47; Sastry 220; Sob & Balak 522.

Dwarf procumbent herbs, branches from the base, pubescent. Leaves oblong or linear-oblong, 1-2 cm long, thick densely pubescent especially on lower surface, margin recurved, obtuse. Sepals and petals densely hairy. Flowers pinkish in the specimens cited (or yellow) Capsule ovate-oblong densely hairy.

Along river banks: Jabalpur, Chitrakut, Rewa, Choral (Indore).

Fl. Feb.- March

Saxena & Indorkar 12808; Indorkar 12471.

Doubtful species.

Polygala abyssinica Fresen; Tiwari 583 .

Cherian