

FLORA OF VISAKHAPATNAM DISTRICT, ANDHRA PRADESH

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Visakhapatnam district, one of the northern most districts of Andhra Pradesh, lies between 17°12' to 18°33' N latitudes and 82°18' to 83°22' E longitudes. The Eastern ghats run diagonally through the district from North East to South West. There are peaks between 1300 m to 1700 m. Samvarikonda near Gudern village is ca 1670 m and Dhara Hill is 1365 m.

The underlying rock is mostly gneiss and the soil formed is mostly laterite and rocky in the hilly areas and laterite in the plains. The coastal belt is sandy. In the densely wooded parts the ground is covered with a thick layer of humus.

The temperature in the plains is hotter than in the hilly areas. The average maximum temperature is 37.8°C and the average minimum temperature is 15.6°C. Min. temp. touches 10°C in Ananthagiri and Araku. The rainfall is considerably more in the hilly areas as compared to the plains. The annual rainfall is 873 mm in plains and upto 1125 mm in the hilly areas.

The vegetation of the district can be broadly represented in the following categories : i) Coastal vegetation, ii) Vegetation of the plains and iii) Vegetation of the agency area.

i) The coastal vegetation is roughly of 3

types : a) vegetation of open coast, b) the vegetation of the saline marshes and c) vegetation of the rocky coast.

The plants of the open coast are *Spinifex littoreus* Merr., *Ipomoea pes-capra* Sweet and *Launea sarmentosa* Alston, all acting as sand binders. Next to this zone are found *Pandanus fascicularis* Lamk., *Borassus flabellifer* Linn., along with plantations of *Casuarina equisetifolia* Frost. Next to this zone, in open places, *Calatropis gigantea* R. Br., *Trachys muricata* Pers., *Phyla nudiflora* (L.) Greene, *Tephrosia purpurea* (L.) Pers., *T. villosa* (L.) Pers. etc. are found.

The plants found in the saline marshes are bushes of *Avicinnia alba* Bl., *Sesuvium portulacastrum* L., *Acanthus ilicifolius* Linn. etc.

In the rocky coastal areas *Synostemon bacciformis* (L.) Webster, *Streblus asper* Lour., *Echinops echinatus* DC., *Pisonia aculeata* Linn., *Maba bukifolia* Pers., *Plectronia parviflora* Bedd. etc. are found.

ii) In the plains *Borassus flabellifer* L., *Phoenix sylvestris* Roxb., *Anacardium occidentale* L., *Tamarindus indica* L., *Cassia fistula* L., *Wrightia tinctoria* R. Br. etc. are found along with the shrubby vegetation comprising of *Carissa spinarum* L., *Eugenia bracteata* Roxb., *Holarrhena antidysenterica* (L.) Wall., *Corisandra pinnata* Gamble, *Cap-*

paris zeylanica L., *Zizyphus oenoplia* Mill., *Jatropha gossypifolia* L., *Pavetta indica* L. etc.

The herbs of the plains and cultivated fields are mostly weeds. On open waste places and road sides etc. the commonly found weeds are *Cassia occidentalis* L., *C. tora* Linn., *Croton bonplandianum* Baill., *Indigofera ennaephylla* L., *Catharanthus roseus* (L.) G. Don, *Euphorbia hirta* L., *Argemone mexicana* L., *Gomphrena decumbens* Jacq., *Tribulus terrestris* L., *Phyllanthus fraternus* Webster etc. The weeds of the fields are different due to more availability of water. Among them mention may be made of *Bacopa monnieri* (L.) Pennel, *Scoparia dulcis* L., *Ammania baccifera* Linn., *Eclipta prostrata* (L.) L., *Trianthema postulacastrum* L., *Hygrophila auriculata* (Schumacher) Heine., *Sphaeranthus indicus* L., *Ludwigia parviflora* Roxb. etc.

iii) The vegetation of the agency area was subject to indiscreet destruction due to shifting cultivation practised by the native tribals and grazing and burning as well over a number of years. As a result the present forests are of secondary origin. They are either (a) Southern secondary moist mixed deciduous forests or (b) dry savannah forests.

a) *Southern moist mixed deciduous forests* : Survivors of the primary forest are occasionally encountered here and there, especially in damp hollows. More of the soft quick growing trees are common in these forests whereas shrubs and thin grass form the ground cover. Wild mango is a characteristic of this type. Evergreen elements are found scattered.

The top canopy is made by *Mangifera indica* L., *Michelia champaka* L., *Schleichera oleosa* (Lour.) Oken, *Bombax ceiba* L., *Syzygium cumini* Skeels, *Albizia chinensis* (Osbeck) Merr., *A. odoratissima* (L. f.) Benth., *Toona*

ciliata Roem., *Terminalia tomentosa* Wight & Arn., *T. bellirica* (Gaertn.) Roxb., *T. chebula* Retz., *Tamarindus indica* L., *Pterocarpus marsupium* Roxb., *Ficus racemosa* L., *F. cunia* Ham. etc.

The lower canopy is chiefly made up of *Phyllanthus emblica* L., *Lagerstroemia parviflora* Roxb., *Mallotus philippensis* Muell.-Arg., *Feronia limonia* (L.) Swingle, *Callicarpa arborea* Roxb., *Lannea coromandelica* (Houtt.) Merr., *Dillenia pentagyna* Roxb., *Gmelina arborea* Roxb., *Wrightia tinctoria* R. Br., *Careya arborea* Roxb., *Bridelia retusa* (L.) Spreng., *Cassia fistula* L., *Buchanania lanzan* Spreng. etc.

The shrubby layer is composed of chiefly *Woodfordia fruticosa* (L.) Kurz, *Leea robusta* Roxb., *Zizyphus oenoplia* (L.) Mill., *Casuarina elliptica* Willd., *Tabernaemontana divaricata* (L.) R. Br. ex Roem. & Schult., *Grewia rothii* DC., *Mimosa rubicaulis* Lamk., *Gardenia gummiifera* L. f., *Solanum erianthum* D. Don, *Clerodendrum serratum* Spr., *Sarcococca trinervia* Wight, *Securinega virosa* (Roxb. ex Willd.) Pax & Hoffm., *Murraya paniculata* (L.) Jacq. etc.

The undergrowth comprises of herbs and undershrubs such as *Barleria cuspidata* Heyne ex Nees, *B. cristata* L., *Neopeltandra suberosa* Gamble, *Pilea microphylla* (L.) Leibm., *Byttneria herbacea* Roxb., *Knoxia sumatrensis* (Retz.) DC., *Curcuma pseudomontana* Grah., *Acalypha alnifolia* Klein ex Willd., *Pouzolzia indica* Gaud., *Cynoglossum meeboldii* Brand., *Tephrosia purpurea* Pers., *Breynia retusa* (Dennst.) Alston, *Zingiber roseum* Rosc., *Curculigo orchioidea* Gaertn., *Leucas linifolia* Spr., *Crotalaria calycina* Schr. etc.

Woody climbers such as *Phanera vahlii* (Wight & Arn.) Benth., *Hiptage benghalensis* (L.) Kurz, *Acacia sinuata* (Lour.) Merr., *A. intsia* Willd. etc. are common. *Gnetum ula*

Brogn. is also found near Sunkarimetta, Dharakonda etc.

Some of the ferns commonly found in localities favourable for their growth are *Pyrrosia porosa* Wall., *Adiantum caudatum* Linn., *Hemionites arifolia* (Burm.) Moore, *Lygodium flexuosum* (L.) Sw., *Cyathea spinulosa* Wall. ex Hook., *Dryopteris sparsa* (D. Don) O. Ktze., *Microlepia pilosella* (Hook.) Moore and *Thelypteris* sp. etc.

These forests are found in some parts around Sunkarimetta, Araku Valley, Jolaput and to a larger extent around Kilagada, Minumuluru and Gangarajumadugula.

b) *Dry Savannah Forests* : In these forests, the trees are few, stand far apart singly or in small groups in more or less heavy grass in which certain fire resistant plants persist. Bushy stemless *Phoenix humilis* Royle var. *pedunculata* Becc. is characteristic of these forests. The trees are often unarmed and hollow. *Phyllanthus emblica* L., *Terminalia chebula* Retz., *T. bellirica* (Gaertn.) Roxb. and *Syzygium cumini* Skeels are common associated with *Cassia fistula* L., *Anogeissus latifolia* (Roxb.) Wall. ex Bedd., *Pterocarpus marsupium* Roxb. etc.

The commonly found grasses are *Artisida setacea* Retz., *Arundinella bengalensis* (Spr.) Druce, *Bothriochloa pertusa* (L.) A. Camus, *Brachiaria ramosa* (L.) Stapf, *B. setigera* (Retz.) Hubb., *Cymbopogon flexuosum* (Nees ex Steud) Wats., *Eragrostis coarctata* Stapf, *Hackelochloa granularis* (L.) O. Ktze., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Ischaemum indicum* (Houtt.) Merr., *Panicum maximum* Jacq., *Paspalum scrobiculatum* Linn., *Setaria pallidifusca* (Schumach.) Stapf & Hubb. etc.

Such forests are found in several parts around Paderu, Sujanakota, Jolaput, Araku etc. and to a limited extent near Gangarajumadugula and Minumuluru.

Among the cultivated crops, mention may be made of rice in wet-land crops and millets, chillies etc. in dry land crops. Groundnuts are cultivated in a few places in the plains. Coffee is grown by the Forest department in Ananthagiri, Chintalpalli and Minumuluru.

The economic plants of these forests are *Phanera vahlii* (Wt. et Arn.) Benth. for leaves, *Thysanolaena maxima* O. Ktze for brooms, *Tamarindus indica* L. for its fruits, *Sapindus emarginatus* Vahl and *Acacia sinuata* (Lour.) Merr. for their fruits used as soapnuts, *Premna herbacea* Roxb. for its roots used in medicine etc.

The most interesting feature of the flora is the occurrence of many Himalayan and Assam plants here. *Saussurea heteromalla* (D. Don) Hand-Mazz., *Polygala furcata* Royle, *Sloanea sterculiaceae* (Benth.) Rehder & Wilson, *Sapium eugeniaefolium* Hook. f., *Eriocaulon luzulifolium* Mart., *Melasma avense* (Benth.) Hand-Mazz., *Bulbophyllum densiflorum* Royle, *Forrestia mollissima* (Bl.) Koor-ders var. *glabrata* (Hassk.) Baker, *Tinospora malabarica* (Lam.) Miers., *Chirita hamosa* Wall. ex R. Br., *Eulophia explanata* Lindl., *Meyna spinosa* Roxb., var. *pubescens* Robyns, *Thalictrum foliolosum* DC., *Dillenia aurea* Sm., *Prunus jenkinsii* Hook. f., *Enhydra fluctuans* Lour., *Argyreia roxburghii* Chois. var. *ampla* Cl., *Raphidophora decursiva* (Roxb.) Schott, *Parabaena sagittata* Miers, *Abelmoschus cirinitus* Wall., *Tetrastigma bractolatum* (Roxb.) Planch, *Flemingia prostrata* Roxb., *Mucuna nigricans* (Lour.) Steudel, *Pimpinella bracteata* Haines, *Thladiantha cordifolia* (Bl.) Cogn., *Paederia foetida* L. Mant., *Richardia scabra* L., *Anaphalis adnata* DC., *Lysimachia aliernifolia* Wall., *Lysimachia decurrens* Forst., *Evolvulus nummularius* (L.) L., *Calli-carpa macrophylla* Vahl, *Verbena officinalis* L., *Polygonum barbatum* L. ssp. *gracile* Danser, *Polygonum orientale* L., *Bridelia pubescens* Kurz, *Cudrania cochinchinensis* (Lour.)

Kudo & Masam., *Ficus auriculata* Lour., *F. rumphii* Bl., *Boehmeria scabrella* Gaud., *Habenaria furcifera* Lindl., *Alocasia fornicata* (Roxb.) Schott., *Arundinella bengalensis* (Spr.) Druce etc.

About 40 plants hitherto supposed to be found in Western Ghats are found here. They are, *Stephania japonica* (Thunb.) Miers., *Pittosporum floribundum* Wt. & Arn., *Polygala persicarifolia* DC., *Drymaria cordata* (L.) Willd., *Oxalis latifolia* H. B. K., *Rhamnus virgatus* Roxb., *Tetrastigma sulcatum* (Lawson) Gamble, *Crotalaria evolvuloides* Wt., *Desmodium heterocarpon* (L.) DC., *Erythrina stricta* Roxb., *Glycine javanica* L., *Tephrosia pulcherrima* (Baker) Gamble, *Uraria lagopoides* DC., *Syzygium malabaricum* Gamble, *Osbeckia truncata* D. Don ex Wt. & Arn., *Ludwigia hyssopifolia* (G. Don) Exall, *L. peruviana* (L.) Hara, *Trichosanthes cucumerina* L., *Bupleurum mucronatum* Wt. & Arn., *Knoxia mollis* Wt. & Arn., *Anaphalis elliptica* DC., *Artemisia nilagirica* (Clarke) Pamp. var. *indica* (Willd.) Maxim. (*Artemisia vulgaris* auct non L.), *Erigeron canadensis* L., *Wedelia urticifolia* DC. var. *wightii* DC., *Lobelia zeylanica* Linn., *Jasminum cordifolium* Wall, *Rauwolfia serpentina* (L.) Benth. ex Kurz, *Dicliptera zeylanica* Nees, *Xenanthus pulneyensis* (Clarke) Bremek. *Scutellaria rivularis* Wall., *Achyranthes aspera* L. var. *rubrofusca* Hook. f., *A. bidentata* Bl., *Polygonum strigosum* R. Br. var. *pedunculare* (Wall. ex Meism.) Steward, *Mallotus rhamnifolius* Muell.-Arg., *Phyllanthus rheedii* Wt., *Debregeasia longifolia* (Burm.) Wedd. (*D. velutina* Gaud.), *Pilea trinervia* Wt., *Pouzolzia bennettiana* Wt. var. *tomentosa* Hook. f., *Girardinia zeylanica* Don, *Habenaria longicorniculata* Graham, *Goodyera procera* Hook., *Carex hebecarpa* C. A. Mey var. *ligulata* Kükenth, *Eleocharis congesta* D. Don, *Cyperus triceps* Endl. var. *cylindricus* (Nees) Kükenth, *Lipocarpha chinensis* (Osbeck) Kern.

(*L. argentea* R. Br., ex Nees), *Coelachne simpliciuscula* (Steud.) Munro ex Benth., *Eragrostis nigra* Nees, *Garnotia stricta* Brogn., *Sporobolus piliferus* (Trin.) Kunth, *Tectaria polymorpha* (Wall.) Copel., *Microlepia platyphylla* (Don) J. Sm., *Lastrea syrmatica* Willd., *Dryopteris cochleata* (D. Don) C. Chr. etc.

6 species of *Nothopegia* Bl. are distributed in Western ghats [*N. colebrookiana* Bl., *N. travancorica* Bedd., *N. aureo-fulva* Bedd. ex Hook. f., *N. heyneana* Gamble, *N. racemosa* (Dalz.) Ramamurty and *N. beddo-meii* Gamble]. Of these six, two are from Eastern ghats [*N. heyneana* Gamble and *N. racemosa* (Dalz.) Ramamurty]. However any theory on the distribution of these plants needs a considerable attention to further collections and data.

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