CHAPTER II

BIODIVERSITY POTENTIAL

" The one process ongoing in the 1990s that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats. This is the folly that our descendents are least likely to forgive us".

E. O. Wilson. Harvard University, United States.

INTRODUCTION

Human beings are dependent for their sustenance, health, well-being and enjoyment of life on fundamental biological systems and processes.

Biological Diversity or 'Biodiversity', the result of 4 billion years of evolution, is the natural wealth of the world; the millions of plants, animals and micro-organisms, the genes they contain and the intricate ecosystems they help build into the living environment (WWF, 1989).

Biodiversity has been defined by various organizations as -

- The variety and variability of living organisms (IUCN General Assembly, Costa Rica, 1988) ;
- The totality of genes, species and ecosystems (Global Biodiversity Strategy, WRI - IUCN - UNEP, 1992) ;
- The variability among living organisms which includes diversity within species, between species and their ecosystems (Biodiversity Convention, Rio de Janiero, 1992 ; Pandya & Oza, 1994).

Considering the importance for Conservation of Biodiversity for human survival, a global treaty was signed by over 150 States on 5th June 1992 at the UN Conference on Environment and Development (UNCED), held at Rio de Janiero, Brazil. This Global Convention on Biodiversity recognizes the vital point made in the World Conservation Strategy (1980), Caring for the Earth (1991), the Global Biodiversity Strategy (1992), that biodiversity and biological resources should be conserved for reasons of ethics, economic benefit and human survival (Glowka, 1994). The Convention recognizes *in-situ* conservation as the primary approach to biodiversity conservation.

For our study purpose, 'Biodiversity' would mean the diverse plant and animal life forms found in JWLS, which play a vital role in the sustenance of the local

communities. The Forest tree species are considered as Plant Diversity and Avifauna and Mammals as Animal Diversity.

Plants are the primary producers in ecosystems and are the basic food source of all animals. Therefore, the animal diversity of a region would depend on the plant diversity. Out of 1.4 million known species of living organisms, about 250,000 are higher plants and 1.03 million are animals, of which the best studied and completely known groups are of birds - 9,000 species and mammals - 4,000 species (WWF, 1989).

Irrespective of size of the natural forest area, a species-rich region must be accorded protection. JWLS is one such region which has always been closely associated with local tribal people and has retained remnants of its glorious past. Keeping this in view, the study area was selected to ascertain the biodiversity potential of the bioregion. This is a pioneering attempt to assess the biodiversity of JWLS. Only macro-level species constituting the nucleus of the forest areas, birds and mammal species, which are closely interlinked with the presence of plants, are considered here as Biodiversity. The Human Component of Biodiversity and its impact are presented in Chapter III.

METHOD

The study was conducted over a period of 3 years (1992 - 1994), which included intensive and extensive field survey of the Sanctuary environs.

An inch:mile scale map of the sanctuary was procured from the State Forest Department (FD), Baroda. This map was overlaid on the 1:50,000 scale Survey of India (SOI) topomap, to demarcate the boundary of JWLS.

Reconnaissance and familiarisation of the sanctuary area and its people was the initial and essential step. Contacts were established with the Royal family of Jambughoda, community workers, old knowledgeable people like Sarpanchs and older residents of the

area.

Field trips were undertaken once in every fortnight for over 2 years. During the monsoon, the visits were irregular due to inaccessibility caused by flooding. State transport buses were available till Jambughoda. The forest areas were worked out with the help of the sanctuary map (Figure I. 2). On occasions, we travelled in our private vehicles. Each trip lasted for a few days and occasionally for a day. A working schedule commenced from early morning till late in the evening. The field notes were recorded on the basis of instructions practised by Santapau, 1955.

The study was conducted keeping the following parameters in view :

Plant Diversity :

1. The forest tree species of JWLS were identified using morphological features and are enumerated in detail along with Results.

2. An attempt to prepare an artificial key with reference to bark characteristics, emphasizing on colour, texture and form was made for 24 forest tree species. This is supported by photographic evidence.

3. Tree species of two similar habitats in the Panchmahal District, namely Pavagadh (Chavan & Oza, 1966), and Ratanmahal Sloth Bear Sanctuary (Bedi, 1968) were compared using Sorenson's Index of Similarity (Mueller - Dombois, 1974).

Animal Diversity :

As and when the areas were worked for tree identification and vegetation, the birds and mammals sighted were recorded. Indirect evidences like bird-calls, pug marks, scats and pellets were also considered.

Interactions with the local people yielded information on various aspects of use of certain tree species for fuelwood, fodder for livestock, construction, farm implements, medicinal purpose or any other use. Interesting information on some tree species was

also gathered during the talks with the aged tribals.

RESULTS

PLANT DIVERSITY

In all 105 forest tree species were identified in **'Jambughoda Wildlife Sanctuary'** and are enumerated in detail.

Vegetation was predominantly deciduous with *Tectona* as the dominant species. The common associated tree species of *Tectona* are *Aegle, Albizia, Anogeissus, Butea, Dalbergia, Diospyros, Lagerstroemia, Madhuca, Mitragyna* and *Terminalia.*

Madhuca was a dominant tree on the outskirts of villages and the foothills of forests. Jambughoda and Sankheda taluka areas in JWLS had larger number of *Madhuca* as compared to those of Halol taluka areas in JWLS. Epiphytic orchids, *Aerides crispum* and *Vanda tesellata* were commonly found on *Madhuca*. Very rarely the orchids occurred on other host trees.

Semi-parasitic *Dendrophthoe falcata* var. *falcata* was abundant in the region and was found on numerous hosts, such as *Mangifera, Butea, Buchanania, Anogeissus, Tectona, Ailanthus, Madhuca, Cassia siamea* and *Cassia fistula*. Semi-parasitic *Viscum articulatum* was found on only one tree - *Miliusa tomentosa* in the Gandhra forest near Sambhar kobro (Jambughoda taluka).

The undergrowth of the forest was generally very poor and was well represented only in certain areas : Dhanimataji hill, Jhand, Lambhiya, Malbar, Koiwav and 'Ranna'. The species observed were *Helicteres, Nyctanthes, Carissa, Grewia, Casearia* and *Flacourtia.*

On steep stony slopes, *Euphorbia neriifolia, Sterculia, Azadirachta and Ficus* sp. were commonly seen. Along forest streams and kotars, *Syzygium, Alangium, Pongamia, Miliusa, Albizia, Haldinia* and *Ficus* were seen. Exotics like *Lantana* and

Prosopis juliflora were found in outskirts of villages and in open wastelands - Dhanpuri, Nathpuri, Sadada, Jimiapura, Sodhra, Sagva, Jesingpura and Gajipura.

Nineteen species were rare in JWLS: *Artocarpus gomezianus* ssp. *zeylanicus, Bauhinia racemosa, Careya arborea, Cochlospermum religiosum, Crataeva nurvala, Dalbergia sympathetica, Dillenia pentagyna, Dendrocalamus strictus, Dolichandrone falcata, Erythrina suberosa, Firmiana colorata, Holoptelea integrifolia, Hymenodictyon orixense, Kydia calycina, Mallotus phillippensis, Oroxylum indicum, Spondias pinnata, Streblus asper* and *Tecomella undulata.*

An artificial key for 24 forest tree species was prepared on the basis of bark characteristics such as colour, texture and form of which *Diospyros, Terminalia, Erythrina, Bombax, Morinda, Oroxylum, Hymenodictyon* and *Ailanthus* are of significant interest.

The forests of the Pavagadh region are in close proximity with those of JWLS (Geographical position - 22°26' to 22°30' N lat. and 73°29' to 73°33'E long., Chavan & Oza, 1966). The Ratan Mahal forests lie to the north-east of JWLS, between 22° 30' to 22° 40' N lat. and 74 ° 0' to 74 ° 12' E long. (Bedi, 1968).

On comparing the tree species of JWLS (n=105 sps.) with those of Pavagadh (n=82 sps.), only 67. 38% similarity occurred while compared to Ratanmahal the similarity was high i.e. 81.65% (n=113 sps.).

The tree species restricted only to JWLS and not found in Ratanmal and Pavagadh were : *Spondias pinnata, Hymenodictyon orixense, Artocarpus gomezianus, Delonix elata, Dalbergia paniculata, Ixora arborea* and *Tecomella undulata.*

In order to draw a parallel of the floristic elements existing in JWLS in particular and Western India in general, we have tried to ascertain the geographic climate range of the Genera (Willis, 1983) and present the analysis. However, certain genera have their geographical range extended into other regions and are marked with an astreik (*).

S.E. As., Indomal., Aust.

*Dillenia, Miliusa, Flacourtia**, Kydia**, Firmiana**, Aegle, Garuga**, Azadirachta, Soymida, Zizyphus**, Schleichera, Buchanania, Lannea**, Mangifera, Spondias, Butea, Ougenia* (India), *Pongamia, Prosopis**(India), *Careya, Alangium**, Madhuca, Nyctanthes, Holarrhena**, Oroxylum, Gmelina**, Tectona, Emblica, Holoptelea**, Ficus**, Streblus.*

African

*Flacourtia**, Bombax**, Firmiana**, Balanites, Boswellia, Zizyphus**, Lannea**, Moringa, Delonix, Tamarindus, Anogeissus, Alangium**, Hymenodictyon, Mitragyna**, Schrebera, Salvadora**, Holarrhena**, Wrightia**, Dolichandrone**, Gmelina**, Bridelia**, Mallotus, Holoptelea, Phoenix.*

Asiatic

*Kydia**, Bombax**, Ailanthus, Garuga**, Cassine, Syzygium, Lagerstroemia, Gardenia, Mitragyna**, Salvadora**, Wrightia**, Dolichandrone**, Tecomella, Bridelia**, Phoenix**, Borassus.*

Warm

*Bauhinia, Albizia, Diospyros, Cordia, Ficus**.*

American

*Annona, Zizyphus**, Prosopis**.*

Trop.

Crataeva, Cochlospermum, Casearia, Sterculia, Grewia, Dalbergia, Erythrina, Pterocarpus, Cassia, Acacia, Pithecellobium, Terminalia, Ixora, Morinda, Xeromphis, Manilkara, Kirganelia, Trema.

Of the areas worked out, the important Biodiversity-rich areas in JWLS have been identified (Figure II. 1).

FIGURE II.1

Map of JWLS showing Biodiversity Potential Areas

 Biodiversity-rich Areas in JWLS *

BIODIVERSITY RICH AREAS IN JAMBUGHODA WILDLIFE SANCTUARY

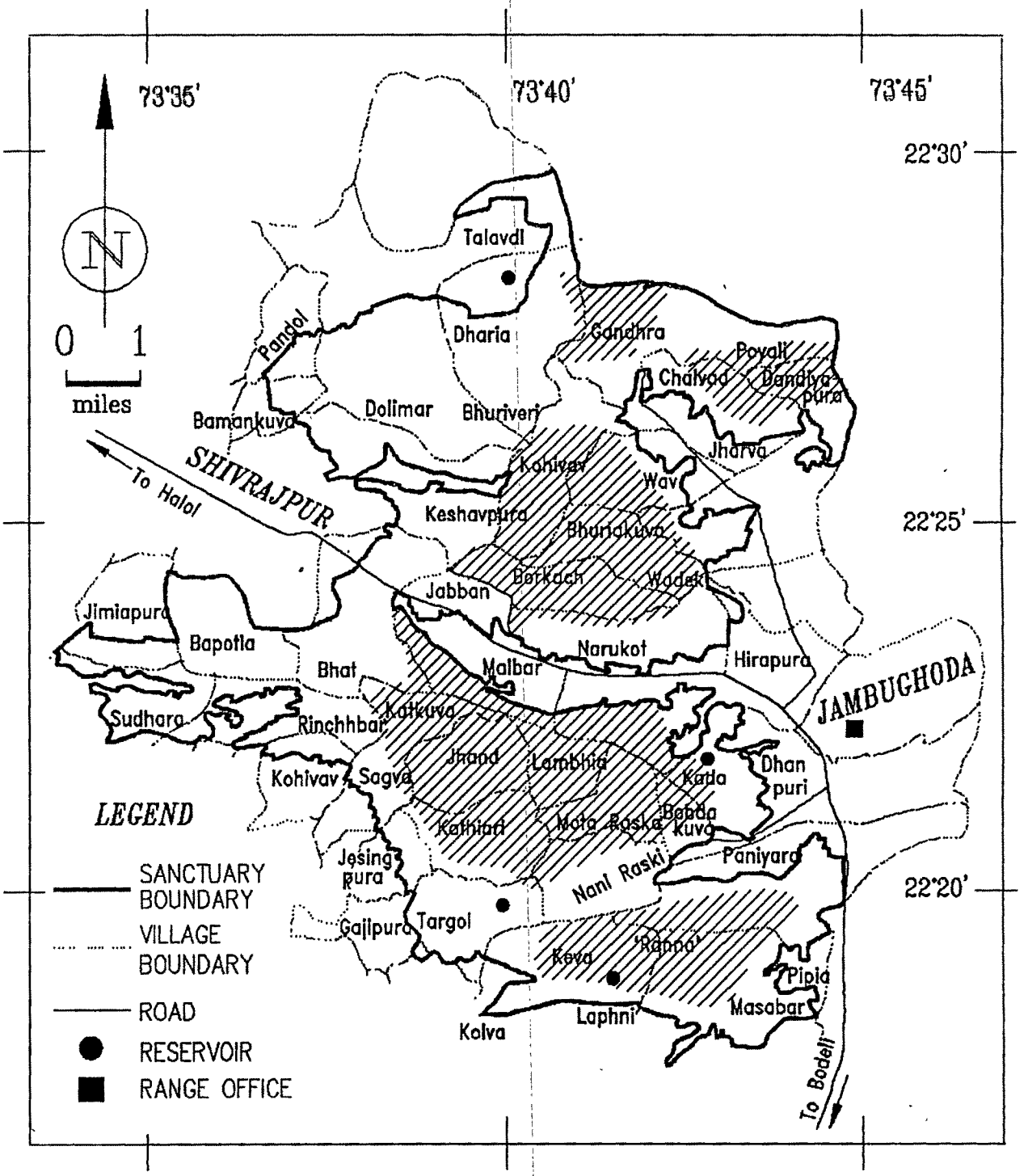

PLATE II . 1

II. 1. 1 - Nucleus of Biodiversity Richness

II. 1. 2 - Biodiversity - rich Dhanimataji hill with Kada Reservoir in the foreground

INVENTORY OF FOREST TREE SPECIES OF JAMBUGHODA WILDLIFE SANCTUARY

CLASSIFICATION AND PLAN OF DESCRIPTION :

The plants enumerated are classified according to Bentham and Hooker's System of Plant Classification (1862-1883). However, there is slight modification in the arrangement of some families based on certain latest floras. A number key is provided for identification of families of the forest tree species of **Jambughoda Wildlife Sanctuary (JWLS).**

An indented artificial key, based on external morphological characters, is provided for genera and species within a family. The enumerated species are arranged in alphabetical sequence.

The nomenclature of the species has been brought up-to-date as far as possible, to conform with the Articles of the ***International Code of Botanical Nomenclature*** (Voss, 1988). Recent monographs and floras of Western India were also referred. Each species name is followed by the name of the author which are correct except those that come under *Article 33 of the International Code of Botanical Nomenclature.*

The species are arranged in chronological order. In the references given after the name or synonyms of plants, we have followed the Guide to the citation of botanical literature of the *Code,* but of course with a little degree of change to suit our needs.

The names of plants in this work vary to a certain degree from the names given by Cooke in his ***Flora of the Presidency of Bombay*** (1901-1908). To give reasons for the changes made, after the correct name necessary synonyms are provided.

Abbreviations of floras are elaborated in a separate list. Index of latin names and

common vernacular names are provided after the References.

The generic taxon is accompanied with its world distribution based on J. C. Willis, *A Dictionary of the Flowering plants and Ferns* (8th revised edition by H.K. Airy Shaw, 1973).

The Nomenclature is followed by :

1. Short description :
   (a) Size of tree - small (3-10m); medium or moderate (8-18m) and large (15-25m).
   (b) Nature of tree - evergreen or deciduous; armed or unarmed; typical branching pattern, if any.
   (c) Bark charateristics - colour, texture, form.
   (d) Morphological features of Leaves, Inflorescence, Flowers and Fruits.
2. Distribution status :

   Very common/common - found everywhere in the area.

   Frequent/less frequent - Met with often, but at intervals.

   Occasional - Found in certain areas only and absent in other regions.

   Rare/Very rare - In the entire area, met with only 2-3 or only one specimen/s.

   Localities referring to JWLS - Plants seen at these particular localities does not indicate their absence elsewhere, but localities provided are based on observations (Figure II. 1).
3. Original home of species based on *Index Kewensis* (1895).
4. Flowering and Fruiting periods.
5. Local name(s) as ascertained to be used locally.
6. Local use, followed by any other note(s) on identity or nomenclature.

Species under cultivation have been mentioned at the end of the Family.

Each species has been critically studied and carefully identified by references to various floras. The species have been checked against the best specimens in the Blatter Herbarium, St. Xavier's College, Bombay, many of which had been previously checked against the actual types or against authentic specimens in the Kew Herbarium, U.K.

Artificial Key to the Plant Families of Forest Tree Species of 'Jambughoda Wildlife Sanctuary'

1.Plants bearing seeds .....2. **Spermatophyta**

2. Seeds or ovules enclosed in carpels .....3. **Angiosperms**

3. Root system usually with tap-root, stem with central pith and surrounded by concentric rings of woody tissue, bark separable, venation usually reticulate, flowers usually 4-5 merous, embryo with 2 cotyledons .....4. **Dicotyledons**

3. Root system usually with fibrous roots, stem without central pith, woody tissue in scattered bundles, bark firmly attached, venation usually parallel, flowers usually 3-merous, embryo with 1 cotyledon .....5. **Monocotyledons**

DICOTYLEDONS

1. Petals free, flowers dichlamydeous .....**Polypetalae**

1. Petals united .....**Gamopetalae**

1. Perianth uniseriate, generally calycine or absent .....**Monochlamydeae**

POLYPETALAE

Calyx of distinct sepals, free from the ovary. Torus small, rarely expanded into a disc, petals and stamens inserted on the torus below the ovary, stamens indefinite or definite, ovary superior .....**Thalamiflorae**

Calyx of either distinct sepals or partly united sepals, always free from the ovary. Torus generally expanded or thickened into a fleshy disc. Petals equal to sepals or fewer by abortion, stamens equal in number to petals, sometimes double or fewer by abortion, inserted around or within or upon the disc. Ovary generally superior or immersed in the disc .....**Disciflorae**

Calyx of united sepals, ovary included and adnate to calyx tube, very rarely free, disc absent. Petals equal in number to sepals, or fewer by abortion, inserted on top of the calyx

tube. Stamens definite or indefinite, inserted on the calyx tube. Ovary generally inferior .....**Calyciflorae**

THALAMIFLORAE

1. Stamens numerous..... 2.

2. Carpels numerous, free or sometimes reduced to one..... 3.

3. Leaves with parallel veins and sheathing petioles, flowers 5-merous, sepals persistent, imbricate ——— **Dilleniaceae**

3. Leaves with reticulate veins and without sheathing petioles, flowers 3-merous, sepals deciduous, valvate ——— **Annonaceae**

2. Carpels 2 or more, syncarpous, ovary unilocular or multilocular ..... 4.

4. Placentation parietal ..... 5.

5. Ovary raised on gynophore, or if sessile, leaves compound ——— **Capparaceae**

5. Ovary sessile, leaves simple, entire or lobed ..... 6.

6. Plants with yellow milky sap, flowers bright yellow or red, leaves digitate, petals present ———— **Bixaceae**

6. Plants without sap, flowers greenish yellow, leaves not digitate petals absent ——— **Flacourtiaceae**

4. Placentation axile ..... 7.

7. Stamens monadelphous, anthers 1 or 2-celled ..... 8.

8. Anthers 1-celled ..... 9.

9. Carpels 5-many, fruit a dehiscent capsule or of indehiscent cocci, leaves simple ------ **Malvaceae**

9. Carpels 2-5, fruit a capsule or woody berry, leaves compound ------ **Bombacaceae**

8. Anthers 2-celled ------- **Sterculiaceae**

7. Stamens distinct arising from a raised or contracted torus, anthers 2-celled ------ **Tiliaceae**

DISCIFLORAE

1. Placentation parietal, fruit an elongated pod like capsule, 3-valved, seeds winged — — — **Moringaceae**

1. Placentation axile or axile-pendulous, fruit and seeds not as above ..... 2.

2. Flowers zygomorphic ..... 3.

3. Leaves compound — — — **Sapindaceae**

3. Leaves simple — — — **Anacardiaceae** (in part)

2. Flowers actinomorphic, leaves simple ..... 4.

4. Plants usually armed, flowers in axillary fasicles, ovule one in each locule pendulous, stamens equal to petals and opposite to them, fruit an indehiscent drupe — — — **Rhamnaceae**

4. Plants unarmed, flowers cymose, ovules 2 or more in each locule, basal, stamens equal to petals or twice as many, alternating with them, fruit a dehiscent capsule — — — **Celastraceae**

2. Flowers actinomorphic, leaves compound ..... 5.

5. Plants armed ..... 6.

6. Leaves aromatic, gland-dotted, 3-5 foliolate — — — **Rutaceae**

6. Leaves not gland-dotted, bifoliolate — — — **Balanitaceae**

5. Plants unarmed ..... 7.

7. Leaflets oblique ..... 8.

8. Stamens monadelphous — — — **Meliaceae**

8. Stamens free — — — **Simaroubaceae**

7. Leaflets not oblique ..... 9.

9. Trees with resinous/balsaminous sap, leaves gland-dotted — — — **Burseraceae**

9. Trees with acrid resinous juice, leaves not gland-dotted — — — **Anacardiaceae** (in part)

CALYCIFLORAE

1. Leaves mostly compound, rarely simple, carpel one, superior, fruit a legume ..... 2.

2. Flowers papilionaceous, stamens 10, diadelphous or monadelphous, leaves imparipinnately compound — — — **Fabaceae** (Papilionaceae)

2. Flowers not papilionaceous, stamens 10 or less, free, leaves paripinnately compound — — — **Caesalpiniaceae**

2. Flowers regular, in dense heads or spikes, stamens numerous free or polyadelphous, leaves bipinnately or tripinnately compound — — — **Mimosaceae**

1. Leaves simple, fruit not as above ..... 3.

3. Stamens indefinite ..... 4.

4. Calyx free from ovary, i.e. ovary superior, petals crumpled in bud — — — **Lythraceae**

4. Calyx more or less adnate to the ovary making it inferior, petals not as above ..... 5.

5. Leaves opposite and alternate, glandular- punctate with intra-marginal veins — — — **Myrtaceae**

5. Leaves alternate, not glandular-punctate and without intra-marginal veins ..... 6.

6. Plants armed, ovary one-celled — — — **Alangiaceae**

6. Plants unarmed, ovary more than one-celled, fruit a fibrous drupe — — — **Lecythidaceae**

3. Stamens usually definite, not more than 10, ovary inferior or 1/2 inferior — — — **Combretaceae**

GAMOPETALAE

1. Ovary inferior, leaves simple, opposite, stipules inter-or intra-petiolar — — — **Rubiaceae**

1. Ovary superior, leaves simple or compound, stipules absent.....2.

2. Carpels more than two ..... 3.

3. Flowers usually unisexual, stamens inserted on the receptacle

— — — **Ebenaceae**

3. Flowers bisexual, stamens inserted on the corolla tube

— — — **Sapotaceae**

2. Carpels two ..... 4.

4. Plants with with milky juice — — — **Apocynaceae**

4. Plants without milky juice ..... 5.

5. Flowers actinomorphic ..... 6.

6. Inflorescence usually of one-sided cymes — — — **Boraginaceae**

6. Inflorescence not as above ..... 7.

7. Stamens 2 ..... 8.

8. Fruit a bipartite compressed capsule

— — — **Nyctanthaceae**

8. Fruit a berry or drupe — — — **Oleaceae**

7. Stamens 4-5, ovary 1-celled, 1-2 ovulate

— — — **Salvadoraceae**

5. Flowers zygomorphic ..... 9.

9. Leaves usually compound, rarely simple, fruit elongate, seeds winged — — — **Bignoniaceae**

9. Leaves usually simple, fruit and seeds not as above

— — — **Verbenaceae**

MONOCHLAMYDEAE

1.Plants erect, flowers unisexual or polygamous ..... 2.

2. Ovary 3-celled — — — **Euphorbiaceae**

2. Ovary 1-celled ..... 3.

3. Plants with milky juice, anthers inflexed in bud, multiple fruit — — — **Moraceae**

3. Plants with watery sap, anthers erect in bud, fruit a samara, nut or drupe — — — **Ulmaceae**

MONOCOTYLEDONS

1. Leaves fan-shaped or pinnate, very long or very broad, forming a terminal crown, long petiolate, fibrous, fruit a drupe — — — **Arecaceae** (Palmae)

1. Leaves simple, linear, ligulate, not forming a terminal crown, leaf sheath splitting, fruit a caryopsis — — — **Poaceae** (Graminae)

DILLENIACEAE

Dillenia Linn.

(Masc. SE. As., Indomal., N. Queensl., Fiji)

Dillenia pentagyna Roxb. Pl. Corom. 1 : 21, t.20, 1795; Hook. Fl. Br. Ind. 1:38, 1872; Cooke, Fl. Pres. Bomb. 1:6, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:10, 1909; Shah, Fl. Guj. St. 1:49, 1978; Almeida, Fl. Savant. 1:32, 1990.

A small-sized deciduous tree, 5-8m in height. Bark grey, scaly, shining on the young branches, with shallow depressions of irregular shapes due to exfoliation of leaves. Branches numerous, straggling, ascending with drooping ends. Crown rounded with large oblong-lanceolate, strongly parallel-ribbed, serrate, leaves crowded at the ends of branches. Flowers 1-2 cms in diameter, yellow, fragrant arising on leafless branches in fasicles. Fruit of 5 separate follicles, orange-yellow in colour covered with an accrescent calyx.

Distribution and Locality : Rare, in dry open patches of forest; Malbar, Jhand.

Original Home : Ind. or.

Flowers : March - April **Fruits** : May - August

Local name : Gadh saag

Local use : Fuelwood, flower buds and young fruits are eaten raw or cooked.

ANNONACEAE

Key to the Genera of the Annonaceae

Trees deciduous, flowers in stalked cymes, reddish-brown or purple within, inner petals longest -- ***Miliusa***

Trees evergreen, flowers not in cymes, creamy-yellow, inner petals minute or zero -- *Annona*

Annona Linn.

(Am.)

Annona squamosa Linn. Sp. Pl. 537, 1753; Hook. Fl. Br. Ind. 1:78, 1872; Cooke, Fl. Pres. Bomb. 1:14, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:26, t.17, 1901; Ch. & Oza, Fl. Pav. 29, 1966; Shah, Fl. Guj. St. 1:50, 1978; Almeida, Fl. Savant. 1:33, 1990.

A small evergreen tree, 5-6m in height. Bark thin, grey. Flowers creamy-yellow , scented, solitary or 2-3 together, leaf-opposed. Fruit large, globose, edible.

Distribution and Locality : Occasional, found as an escape from cultivation throughout the area.

Orignal Home : Ind. occ.

Flowers : May - July, new leaves in March **Fruits** : August - September

Local Name : Sitaphal

Local Use : Fruit edible; bruised leaves used for destroying worms bred in sores.

Miliusa Leschenault

(Indomal., Austr.)

Miliusa tomentosa (Roxb.) Sinclair in Gardens Bull. 14: 378, 1965; Shah , Fl. Guj. St. 1:51, 1978; Almeida, Fl. Savant. 1:34, 1990.

Uvaria tomentosa Roxb. Pl. Corom. 1:31, t.35, 1795.

Saccopetalum tomentosum Hook. f. & Thoms. Fl. Ind. 152, 1855; Hook. Fl. Br. Ind. 1:88, 1872; Cooke, Fl. Pres. Bomb. 1:61, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:30, t.21, 1909.

A large deciduous tree, 15-20m in height, young shoots silky-tomentose. Bark is thick, blackish-brown, cracked and longitudinally furrowed. Leaves tomentose on the lower

surface, membranous. Flowers reddish-brown or purple within, many-flowered in stalked cymes. Inner petals saccate at the base, pubescent, purplish green. Fruit succulent, purple when ripe.

Distribution and Locality : Occasional, in the foothill forests, large trees in forests around Jhand, Lambhiya and Malbar, Dhanimataji hill and Harbado hill.

Original Home : Ind. or.

Flowers : April - May, leaves shed in March **Fruits**: April - June (ripen in May)

Local Use: Fuelwood; construction; leaves used for fodder; leaves burnt to get rid of mosquitoes; fruits eaten by macaques.

Associates : *Diospyros, Anogeissus, Azadirachta.*

CAPPARACEAE

Crataeva Linn.

(trop. excl. Austr. & New Caled.)

Crataeva nurvala Buch-Ham in Trans. Linn. Soc. 15:121, 1827; Ch. & Oza, Fl. Pav. 36, 1966; Gandhi in Fl. Hassan Dist. 187,1976.

Crataeva religiosa Hook. f. *et.* Thoms. (*non* Forst. & Prodr. 35, 1786) in Fl. Br. Ind. 1:172, 1872; Cooke, Fl. Pres. Bomb. 1:42, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:64, t.43, 1909.

A medium-sized deciduous tree, upto 15m in height, having large white lenticels on the branches. Bark dark grey, with horizontal wrinkles. Leaves trifoliate and clustered at ends of branches. Young leaves appear with or sometimes before the flowers. Flowers greenish-white, turning to yellow, long-stalked with numerous stamens having purple filaments. The tree is very handsome when in full bloom. Fruit pendant, ovoid, red when ripe.

Distribution and Locality : Rare, on the edge of the forest, closer to habitation, very few in the forest near banks of streams; Dhanimataji hill.

Original Home : trop.

Flowers: April - May **Fruits**: June (ripe in August)

Local Name: Vayvarno ; Doyali

Local Use : Fruit is edible.

BIXACEAE

Cochlospermum Kunth ex DC. (*nom.cons.*)

(Trop.)

Cochlospermum religiosum (Linn.) Alston in Trimen, Hand. Fl. Ceylon 6:14, 1931; Steenis in Fl. Males. 4(2):62, f.1, 1949; Blat. *et al.* Some Beaut. Ind. Tr. (ed.2) 38, 1954; Ramamoorthy in Fl. Hassan Dist. 171, 1976; Shah, Fl. Guj. St. 1:76, 1978.

Bombax religiosum Linn. Sp. Pl. 552, 1753.

Bombax gossypium (*non* Linn.) Cav. Diss. Bot. 5:297, t.156, 1785.

Cochlospermum gossypium DC. Prodr. 1:527, 1824; Hook. Fl. Br. Ind. 1:190, 1872; Cooke, Fl. Pres. Bomb. 1:53, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:70, t.45, 1909.

A small to moderate-sized deciduous tree, 4-10m in height, with short thick spreading branches. Young branches tomentose, marked with large scars of fallen leaves. Bark is ash-coloured, smooth, fibrous and deeply fissured; inner bark red. Leaves large, 3-5 palmately lobed, grey tomentose beneath, arising at ends of branches. Flowers large, golden-yellow in terminal panicles. Fruit a capsule, dark brown, pear-shaped, seeds covered with silky wool (cochleate).

Distribution and Locality : Rare, only one tree seen in village Nathpuri and few in Lambhiya, Dhanimataji hill and Harbado hill.

Original Home : Ind. or.

Flowers : February - March; new leaves in May **Fruits** : March - April

Local Name : Ganyari

Local Use : Wood is soft so not economically useful; fuelwood; green torches; floss from seeds used for stuffing pillows; bark yields a cordage fibre; tree is fire resistant.

FLACOURTIACEAE

Key to the Genera of the Flacourtiaceae

Plants unarmed, flowers bisexual, fruit a capsule, leaves pinnately veined, seeds arillate -- ***Casearia***

Plants armed or unarmed, flowers unisexual or sometimes bisexual, fruit a berry, leaves sub-palmately veined, seeds without aril -- ***Flacourtia***

Casearia Jacq.

(trop.)

Key to the Species of Casearia

Branches, leaves and calyx hairy .....***C. elliptica***

Branches, leaves and calyx glabrous .....***C. esculenta***

Casearia elliptica Willd. Sp. Pl. 2:628, 1800; Ramamoorthy in Fl. Hassan Dist. 162, 1976; Shah, Fl. Guj. St. 1:77, 1978; Watanore, Enum. Fl. Nepal 2:48, 1978.

Casearia tomentosa Roxb. Fl. Ind. 2:421, 1839; Hook. Fl. Br. Ind. 2:593, 1872; Cooke, Fl. Pres. Bomb. 1: 554, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:71, t. 330, 1911.

A small deciduous tree, 8-10m in height. Bark thin, ash-coloured, scaly, bitter. Young parts pubescent. Leaves distichous, gland-dotted, tomentose. Flowers greenish-white, densely crowded in the leaf axil, tomentose. Fruit ellipsoidal, seeds covered with red aril.

Distribution and Locality : Occasional, on lower slopes of hills at Malbar, Narukot.

Original Home : As. trop., Australia

Flowers : January - March **Fruits**: March - May

Local Name : Dholo Umbh, Chari

Local Use : Pounded fruits used to poison fish ; wood used for carving; tree is drought resistant; leaves are unpalatable.

Casearia esculenta Roxb. Fl. Ind. 2:422, 1832; Hook. Fl. Br. Ind. 2:592, 1872; Cooke, Fl. Pres.

Bomb. 1: 520, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:70, 1911; Ramamoorthy in Fl. Hassan Dist. 162, 1976; Shah, Fl. Guj. St. 1:78, 1978.

A small deciduous tree, 3-10m in height with slender glabrous branches. Bark pale-yellow, smooth. Leaves thinly coriaceous, glabrous. Flowers greenish-white in axillary clusters, glabrous. Fruit ellipsoidal, yellow in colour.

Distribution and Locality : Occasional, on the edge of the forest ; Dhanimataji hill, Narukot hill.

Original Home : As. trop., Australia

Flowers : May - June **Fruits** : August - September

Local Name : Mori, Tandol

Local Use : Wood and leaves used in medicine.

Flacourtia Commers

(trop. & S. Afr., Masc. Is., SE. As., Malaysia, Fiji)

Key to the Species of Flacourtia

Plants 2-5 m tall, armed or unarmed, flowers bisexual, midrib glabrous beneath, berry the size of a pea ..... ***F. indica***

Plants 15-20 m tall, armed, flowers unisexual dioecious, midrib hairy beneath, berry the size of a cherry ..... ***F. montana***

Flacourtia indica (Burm. f.) Merrill, Interpr. Rumph. Herb. Amb. 377, 1917; Ch. & Oza, Fl. Pav. 37, 1966; Santapau, Fl. Khand. (ed. 3) 10, 1967; Ramamoorthy in Fl. Hassan Dist. 162, 1976; Shah, Fl. Guj. St. 1:78, 1978; Almeida, Fl. Savant. 1:47, 1990.

Gmelina indica Burm. f. Fl. Ind. 139, t.39, f.5 , 1768.

Flacourtia ramontchi L'Herit. var. *latifolia* HK. f. *et* Thoms. Fl. Br. Ind. 1:193, 1872; Talb. For. Fl. Pres. Bomb. & Sind 1:77, t.50, 1909.

Flacourtia latifolia Cooke in Fl. Pres. Bomb. 1: 56, 1903.

A small armed or unarmed deciduous tree, 3-6m in height. Bark greyish-brown, smooth, flaking off in large elongated irregular thin pieces. Leaves coriaceous, broad, glabrous, crenate-serrate. Flowers small, white in branched racemes. Berries dark purple or reddish, size of a pea, edible.

Distribution and Locality : Common, on the lower slopes of hills, Dhanimataji hill, Malbar, Poyali, Koiwav.

Original Home : Ind. or.

Flowers : January - March **Fruits** : March - May

Local Name : Tatni; Gargugal

Local Use : Leaves and roots used as an antidote for snake-bite; fuelwood; tree is drought resistant; coppices well and is readily browsed.

Flacourtia montana Grah. Cat. Bomb. Pl. 10, 1839; Hook. Fl. Br. Ind. 1:192, 1872; Cooke, Fl. Pres. Bomb. 1:55, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:76, 1909; Ch. & Oza, Fl. Pav. 37, 1966; Shah, Fl. Guj. St. 1:79, 1978; Almeida, Fl. Savant. 1:47, 1990.

A medium-sized to large armed or unarmed deciduous tree, 8-18m in height. Bark thin, grey, smooth, with or without lenticels. Leaves shiny above and hairy beneath (at least when young), 3-5 nerved from the base. Flowers unisexual, dioecious, in densely pubescent racemes. Fruit scarlet when ripe, the size of a cherry, obtusely ribbed.

Distribution and Locality : Occasional, on slopes of hills.

Original Home : Ind. or.

Flowers: February - March **Fruits** : March

Local Name : Yenkdi; Attak

Local Use : Fruits acidic in taste, edible; fuelwood.

MALVACEAE

Kydia Roxb.

(E. Himal. to SE. As.)

Kydia calycina Roxb. Pl. Corom. 3:12, t.215, 1811; Hook. Fl. Br. Ind. 1:348, 1872; Cooke, Fl. Pres. Bomb. 1:94, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:127, 1909; Shah, Fl. Guj. St. 1:109, 1978; Almeida, Fl. Savant. 1:60, 1990.

A small deciduous tree, 8-10m in height. Bark thick, viscid, mucilagenous within, brown, wrinkled and scaly outside. Leaves large, 3-7 palmately lobed, stellate-hairy above, grey-tomentose beneath. Flowers unisexual in densely pubescent panicles, white to pink in colour. Epicalyx persistent, accrescent, forming the wings in the fruit.

Distribution and Locality : Rare, Dhanimataji hill.

Original Home : Ind. or.

Flowers : July - January **Fruits** : January - February, remaining long on the tree.

Local Name : Warang

Local Use : Inner bark yields a fibre used for making ropes; fuelwood.

BOMBACACEAE

Bombax Linn. (*nom.cons.*)

(trop. Afr., As.)

Bombax ceiba Linn. Sp. Pl. 511, 1753 p.p; Robyns in Taxon 10:68 & 160, 1961; Ch. & Oza, Fl. Pav. 48, 1966; Shah, Fl. Guj. St. 1:118, 1978; Almeida, Fl. Savant. 1:63, 1990.

Bombax malabaricum DC. Prodr. 1:479, 1824; Hook. Fl. Br. Ind. 1:349, 1872 ; Cooke, Fl. Pres. Bomb. 1:120, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:130, tt. 79 & 80, 1909.

Salmalia malabarica (DC.) Schott *et* Endl. Melet. Bot. 35, 1832; Blatt. *et al.* Some Beaut. Ind. Tr. (ed.2) 126, t.26, 1954; Nicol. *et* Sald. Fl. Hassan Dist. 145, 1976.

A large deciduous tree, 15-25m in height, having a buttressed cylindrical trunk.

Branches in whorls of 5-7, spreading horizontally. The bark is covered with conical prickles when the tree is young; later the trunk is without prickles. Bark grey, silvery, smooth with widely separated longitudinal fissures and cross cracks. Leaves crowded at ends of branches, digitate with 5-7 leaflets. Flowers large, scarlet, fasicled on ends of leafless branches. Fruits black when ripe, ovoid.

Distribution and Locality : Occasionally scattered in the forest, common near habitation; Harbado hill, Jhand, Wadek.

Original Home : Am., Austr.

Flowers : January - March **Fruits** : March - June

Local Name : Shimdo

Local Use : The tree attracts plenty of birds when in bloom for nectar and for the edible fleshy petals. Wood is used in construction; gum is extracted and used in native medicines; silky floss surrounding the seeds is used for stuffing pillows; flowers and stamens are dried and cooked with the curds to make vegetable; seeds are eaten after burning the floss from dried fruits.

STERCULIACEAE

Key to the Genera of the Sterculiaceae

Flowers unisexual or polygamous, petals absent

- Flowers bright-orange, follicles membranous -- ***Firmiana***
- Flowers pale-yellow, follicles woody -- ***Sterculia***

Flowers bisexual, petals present -- ***Helicteres***

Firmiana Marsigli

(E.Afr., Indomal., SE. & E. As.)

Firmiana colorata (Roxb.) R. Br. in Bennett & Brown, Pl. Jav. Rar. 235, 1844; Ch. & Oza, Fl. Pav. 51, 1966; Shah, Fl. Guj. St. 1:121, 1978; Almeida, Fl. Savant. 1:64, 1990.

Sterculia colorata Roxb. Pl. Corom. 1:24, t.25, 1795; Hook. Fl. Br. Ind. 1:359, 1874 ; Cooke, Fl. Pres. Bomb. 1:125, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:140, tt. 85 & 86, 1909.

A large deciduous tree, 15-20m in height with spreading branches. Bark thick, grey, scaly; inner bark mottled, white. Leaves crowded at ends of branches, broader than long, cordate at base, palmately 3-lobed. Flowers in terminal panicles, bright orange in colour covered with stellate pubescence. Fruit papery, membranous follicles.

Distribution and Locality : Rare, in forests around Jhand, Kathiyari , Malbar.

Original Home : Ind. or.

Flowers : February - May; new leaves in May **Fruits** : March - June

Local Name : Kodar; Paroli

Local Use : Bark yields a fibre; twig and leaves used as fodder; paste of roots applied to broken leg of livestock.

Helicteres Linn.

(trop. As. & Am.)

Helicteres isora Linn. Sp. Pl. 963, 1753; Hook. Fl. Br. Ind. 1:365, 1874; Cooke, Fl. Pres. Bomb. 1:136, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:146, t.89, 1909; Ch. & Oza , Fl. Pav. 50, 1966; Shah, Fl. Guj. St. 1:122, 1978; Almeida, Fl. Savant. 1:65, 1990.

A shrub to small tree, 2-3m in height. Bark pale to dark brown, smooth. Leaves oblong -obovate, oblique at base, 3-5 nerved from the base, scabridly hairy. Flowers bright red in axillary fasicles of 2-6. Flowers fade to a dull lead or grey colour. Follicles woody, spirally twisted.

Distribution and Locality: Common in certain regions as undergrowth of forest, especially near Kada dam.

Original Home : As. *et* Austral. trop.

Flowers : July - October **Fruits** : August - April

Local Name : Marad sing

Local Use : Fruit is used in native medicine.

Sterculia Linn.

(trop.)

Sterculia urens Roxb. Pl. Corom. 1:25, t. 24, 1795; Hook. Fl. Br. Ind. 1:355, 1874; Cooke, Fl. Pres. Bomb. 1:123,1901; Talb. For. Fl. Pres. Bomb. & Sind 1:137, t. 83, 1909; Ch. & Oza, Fl. Pav. 51, 1966; Shah, Fl. Guj. St. 1:124, 1978; Almeida, Fl. Savant. 1:66, 1990.

A medium-sized deciduous tree, 8-18m in height, usually with a gnarled irregular trunk. Bark smooth, shining, greenish-white to pink, peeling in large papery exfoliations. Leaves crowded at ends of branches, large, palmately 5-lobed, cordate at base, villous, foul-smelling. Flowers in dense panicles, pale-yellow in colour, arising at ends of leafless branches, foul-smelling. Follicles woody, red, covered with stinging bristles.

Distribution and Locality : Occasional, found on rocky steep slopes on Masabar hill, Narukot hill, Dhanimataji hill, Poyali hill, in forests near Koiwav, Malbar, 'Ranna'.

Original Home : Ind. or.

Flowers : February - April **Fruits** : March - May

Local Name : Kadai; Kadayo

Local Use : Gum is collected as NTFP; inner bark yields a fibre; seeds are roasted and eaten; tree is fire resistant; Tree pies are fond of the seeds and pulp and are extremely efficient fruit openers.

TILIACEAE

Grewia Linn.

(Afr., As., Austr., esp. trop.)

Grewia tiliaefolia Vahl, Symb. 1:35, 1790; Hook. Fl. Br. Ind. 1:386, 1872; Cooke, Fl. Pres. Bomb. 1:141,1901; Talb. For. Fl. Pres. Bomb. & Sind 1:160, t.98, 1909; Ch. & Oza, Fl. Pav. 50 , 1966.

A small-sized deciduous tree, 5-10m in height. Bark light-brown, rough, exfoliating in irregular patches. Leaves rhomboidal, 3-lobed, obliquely cordate at the base, crenate-serrate

and stellate pubescent beneath, basal nerves 5. Flowers yellow in axillary fasicles, buds tomentose. Fruit a drupe, black when ripe, the size of a pea.

Distribution and Locality : Occasional, on the edge of forest, closer to habitation ; Chalvad, Gandhra, Keva.

Original Home: As. *et* Afr. trop.

Flowers : March - May, fresh foliage and flowers appear when the stems are bare of leaves in April **Fruits** : August - October

Local Name : Dhaman

Local Use : Ripe fruits are eaten; bark yields a fibre; wood used for making agricultural implements; fuelwood.

RUTACEAE

Key to Genera of the Rutaceae

Leaves unifoliate, fruit rind leathery -- ***Citrus***

Leaves multifoliate, fruit rind woody

Flowers bisexual, stamens 15 or more, leaves 3-foliate -- ***Aegle***

Flowers polygamous, stamens 10-12, leaves imparipinnate, leaflets 5-7 -- ***Limonia***

Aegle Corr. (*nom. cons.*)

(Indomal.)

Aegle marmelos Corr. in Trans. Linn. Soc. 5:223, 1800; Hook. Fl. Br. Ind. 1:516, 1872; Cooke, Fl. Pres. Bomb. 1:192, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:206, t.125, 1909; Ch. & Oza, Fl. Pav. 57, 1966; Shah, Fl. Guj. St. 1:144, 1978.

A small thorny deciduous tree, 3-10m in height, spines axillary, straight, about 2.5 cms long. Bark light grey, smooth with londitudinal fissures, corky. Leaves trifoliate. Flowers greenish-white, scented, in lateral panicles. Fruits woody, globose, yellow when ripe, rind smooth, pulp thick, orange, aromatic and favoured by macaques.

Distribution and Locality : Frequently met with in forests around Jabban, Lambhiya, Malbar, Katkuva, Gandhra, Dhanimataji hill.

Original Home : Ind. or.

Flowers : March - May **Fruits** : April - June; leaves shed in March -April

Local Name : Bili

Local Use : Fruits eaten by macaques, four-horned antelope (chowsingha) and birds; leaves are offered to Lord Shiva in worship; leaves used as fodder and in native medicine; pulp of ripe and unripe fruits used in medicine.

Citrus Linn.

(S. China, SE. As., Indomal.)

Citrus limon(Linn.) Burm. f. Fl. Ind. 173, 1768; Shah, Fl. Guj. St. 1:144, 1978.

Citrus medica Linn. var. *limon* Linn. Sp. Pl. 782, 1753.

Citrus medica Linn. Sp. Pl. 782, 1753; Hook. Fl. Br. Ind. 1:514, 1872; Cooke, Fl. Pres. Bomb. 1:189, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:203, 1909; Ch. & Oza, Fl. Pav. 57, 1966; Santapau, Fl. Khand. (ed. 3) 35, 1967.

An evergreen spinous shrubby tree, 2-6m in height. Bark pale greenish-yellow, rough. Leaves unifoliate, coriaceous, petioles winged. Flowers white, tinged with red, sweet-scented in axillary fasicles. Fruit a hesperidium having a leathery rind.

Distribution and Locality : Cultivated throughout the area, orchards at Katkoi, Sadada, Jambughoda.

Flowers and fruits : Throughout the year

Local Name : Limbu

Limonia Linn. (*Feronia* Correa)

(India to Java)

Limonia acidissima Linn. Sp. Pl. (ed.2) 554, 1762; Ch. & Oza, Fl. Pav. 58, 1966; Shah, Fl. Guj. St. 1:144, 1978.

Schinus limonia Linn. Sp. Pl. 389, 1753.

Feronia elephantum Correa in TLS. 5:225, 1800; Hook. Fl. Br. Ind. 1:516, 1872; Cooke, Fl. Pres. Bomb.1:191, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:204, t.123, 1909.

Feronia limonia (Linn.) Swingle in Journ. Washington Acad. Sc. 4:328, 1914.

A deciduous spinous tree, 8-10m in height. Bark dark-grey, very rough, thick, wrinkled with shallow longitudinal furrows. Leaves imparipinnate, rachis winged, flat, leaflets 5-7, opposite, smelling of aniseed. Flowers dull red in colour, in lateral or terminal panicles. Fruit a berry with a woody greyish rind and seeds embedded in an edible pulp.

Distribution and Locality: Under cultivation near habitation, especially along village paths.

Original Home : Ind. or.

Flowers : March - July **Fruits** : July - December

Local Name : Kotha

SIMAROUBACEAE

Ailanthus Desf. (*nom.cons.*)

(As., Austr.)

Ailanthus excelsa Roxb. Pl. Corom. 1:24, t.23, 1795 *et* Fl. Ind. 2:450, 1832; Hook. Fl. Br. Ind. 1:518, 1872; Cooke, Fl. Pres. Bomb. 1:193, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:208, tt. 126 & 127, 1909; Ch. & Oza, Fl. Pav. 58, 1966; Shah, Fl. Guj. St. 1:146, 1978.

A large lofty deciduous tree, 15-25 m in height. Branches with large conspicuous leaf scars. Bark light grey and smooth when young, rough and greyish brown when old, granular, giving a warty appearance, bitter. Leaves large, pinnate, crowded at ends of the branches, slightly tomentose; shed in the cold season and new leaves appear in March - April. Flowers small, yellowish in lax axillary panicles. Fruit a samara, red, spindle-shaped.

Distribution and Locality : As an escape in the wild; occasional; Kada dam, Jharva, Mota

Raska, Lambhiya.

Original Home: Ind. or.

Flowers : December - February **Fruits** : March - May

Local Name : Moto arduso

Local Use : Wood is used for local furniture and bark is used as tonic.

BALANITACEAE

Balanites Delile (*nom. cons.*)

(trop. Afr. to Burma)

Balanites aegyptiaca (Linn.) Del. I.ll. Fl. d' Eg. 263, t.28, f.1,1813; Ch. & Oza, Fl. Pav. 55, 1966; Shah, Fl. Guj. St. 1:146, 1978.

Ximenia aegyptiaca Linn. Sp. Pl. 1194, 1753.

Balanites roxburghii Planch in Ann. Sc. Nat. (ser.4) 4(2) : 258, 1854; Hook. Fl. Br. Ind. 1:522, 1872; Cooke, Fl. Pres. Bomb. 1:105, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:210, t.128, 1909.

A small deciduous tree, 3-10m in height, armed with axillary and supra-axillary spines, often bearing leaves. Bark yellow. Leaves 2-foliate, leaflets sessile, glaucous-green. Flowers small, white or greenish-white, fragrant, in axillary fasicles of 4-10 flowered cymes. Fruit is large and woody, 5-grooved, angular, having a light grey dry rind enclosing bitter pulp, with an offensive smell.

Distribution and Locality : Occasional, on steep slopes in forests around Malbar, Bhat, Koba, Rinchhbar, Mahudibor.

Flowers : March - May, new leaves and flowers together **Fruits** : Ripe in December

Local Name : Hingori

Local use : Fuelwood ; seeds, bark and leaves used in native medicine.

BURSERACEAE

Key to the Genera of the Burseraceae

Bark peeling off in flakes, fruit dehiscent, hypanthium absent -- ***Boswellia***

Bark not peeling, fruit indehiscent, hypanthium present -- ***Garuga***

Boswellia Roxb.

(Afr., Madag., trop. As.)

Boswellia serrata Roxb. ex Coleb. in Asiat. Res. 9:379, t.5, 1807; Hook. Fl. Br. Ind. 1: 528, 1872; Cooke, Fl. Pres. Bomb. 1:107, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:215, t.130, 1909; Shah, Fl. Guj. St. 1:147, 1978.

A moderate-sized deciduous tree, 10-15m in height. Bark greenish-ash coloured with distinct lenticular openings, peeling off in thin papery irregular flakes. Leaves arise at ends of branches, tomentose, pinnate. Old leaves fall in March - April and fresh foliage appears in June. Flowers white in axillary racemes when the tree is bare of leaves. Fruit trigonous, dehiscent 3-valved capsules, pyrenes separating.

Distribution and Locality : Common and scattered , almost a pure stand of more than 100 trees towards the top of the hill near Mota Raska.

Flowers : February - April **Fruits** : March - May

Local Name : Gugal

Local Use : Resinous gum is collected to burn as dhoop; resistent to forest fires.

Common Associates : *Garuga, Anogeissus, Morinda.*

Garuga Roxb.

(Himal. to S.China, Phillipp., N. Borneo, E. Java, E. Malaysia, NE. Austr., Pacific)

Garuga pinnata Roxb. Pl. Corom. 3: 5, t.208, 1811; Hook. Fl. Br. Ind. 1:528, 1872; Cooke, Fl. Pres. Bomb. 1:108, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:217, t.131, 1909; Ch. & Oza, Fl. Pav. 59, 1966; Shah, Fl. Guj. St. 1:148,1978; Almeida, Fl. Savant. 1:85, 1990.

A moderate-sized deciduous tree, 8-18m in height. Bark brown outside, exfoliating in irregular angled flakes, inner bark reddish. Leaves large, pinnate, tomentose when young, at maturity glabrous; at a later stage infected by red insect galls. Flowers yellowish in branched panicles. Fruit an indehiscent globose drupe.

Distribution and Locality: Common and scattered; on upper slopes and flats of hills throughout the area.

Original Home : Ind. or.; Malaya

Flowers : February - May; fresh leaves in April **Fruits** : ripe in rainy season

Local Name : Sota kankadio

Local Use : Fuelwood; construction; bark used for tanning; resistant to forest fires; locally the juice of fruits is given to cattle having upset stomach.

Associates : *Boswellia, Anogeissus, Morinda.*

MELIACEAE

Key to the Genera of the Meliaceae

Leaflets entire, staminal column cup-like, capsule dehiscent, valves woody, seeds winged, disc conspicuous -- ***Soymida***

Leaflets serrate or crenate, staminal column cylindric, fruit a drupe, indehiscent, seeds not winged, disc zero -- ***Azadirachta***

Azadirachta A. Juss.

(Indomal.)

Azadirachta indica A. Juss. in Memb. Mus. Par. 19: 221, 1830; Cooke, Fl. Pres. Bomb. 1:220, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:228, t.136, 1909; Ch. & Oza, Fl. Pav. 59, 1966; Shah, Fl. Guj. St. 1:149, 1978.

Melia azadirachta Linn. Sp. Pl. 385, 1753; Hook. Fl. Br. Ind. 1:554, 1872.

A moderate-sized evergreen tree, 10-15m in height. Bark dark grey outside with longitudinal and oblique wrinkled furrows, inner bark reddish brown. Leaves pinnate,

serrate, crowded at ends of branches, bitter. Flowers white in axillary panicles. Young leaves emerge at the beginning of the hot season. Flowers in cold and hot season.

Distribution and Locality : Common, especially on exposed rocky slopes and flats of hills.

Original Home : Ind. or.

Flowers : December - March **Fruits** : ripe in July

Local Name : Kadvo limbdo

Local Use : Wood used for construction and implements and furniture ; gum extracted from bark; leaves preserve paper from attack of insects.

Soymida Adr. Juss.

(Indomal.)

Soymida febrifuga (Roxb.) A. Juss. in Memb. Muss. Paris 19:251, t.22, f.26, 1830; Hook. Fl. Br. Ind. 1:567, 1872; Cooke, Fl. Pres. Bomb. 1:215, 1901; Talb, For. Fl. Pres. Bomb. & Sind 1:245, t.146, 1909; Shah, Fl. Guj. St. 1:150, 1978.

Swietenia febrifuga Roxb. Pl. Corom. 1:18, t.17, 1795.

A medium-sized to large tree, 12-18m in height. Bark dark grey to black, rough, exfoliating in large plates. Leaves crowded at ends of branches, pinnate, glabrous, pale green, conspicuously nerved. Young leaves and flowers appear in April-May before the old leaves have fallen off. Flowers greenish-white in axillary or terminal branched panicles. Fruits black when ripe, smooth.

Distribution and Locality : Occasional and scattered throughout the area; more frequently met at Poyali, Wadek, Koiwav, Kada dam, Harbado hill, Katkuva -Jhand-Lambhiya - Malbar.

Original Home : Ind. or.

Flowers : April - May **Fruits** : July - August

Local Name : Rohido

Local Use : Wood used for house construction; bark used in native medicine; to intoxicate

fish; gum is also used in medicine; inner bark yields a red fibre which is made into ropes.

CELASTRACEAE

Cassine Linn.

(S. Afr., Madag., trop., As. to Pacif.)

Cassine glauca (Rottb.) Kuntze, Rev. Gen. Pl. 1:114, 1891; Ding Hou in Steenis, Fl. Males. ser. 1, 6:286, 1962; Ramamoorthy in Fl. Hassan Dist. 318, 1976; Shah, Fl. Guj. St. 1:152, 1978.

Mangifera glauca Rottb. Nye. Saml. Kongel Norske Vidensk. Selsk. Skr. 2:534, t.4, f.1. 1783.

Elaeodendron glaucum (Rottb.) Pers. Syn. Pl. 1:241, 1805; Hook. Fl. Br. Ind. 1:609, 1878; Cooke, Fl. Pres. Bomb. 1:233, 1901; Talb. For. Fl. Pres. Bomb. & Sind 1:275, t.162, 1909.

Elaeodendron roxburghii Wight & Arn. Prodr. 157,1834.

A small to medium-sized deciduous tree, 5-10m in height. Bark usually thick (thin in large trees) grey to dark coloured, exfoliating in small 4-sided scales. Leaves opposite, glabrous, orbicular, crenate-serrate, acuminate with acumen often folded. Flowers greenish-yellow in axillary dichotomous cymes. Drupe one seeded.

Distribution and Locality : Occasional, few trees seen near the spring at Jhand, near Kada dam , Wadek.

Original Home : As. trop.

Flowers : February - June **Fruits** : May and also September - October

Local Name : Bhutri, Alan

Local Use : Bark is poisonous; leaves used as fodder.

Any critical notes on the identity or on nomenclature : Ding Hou in Fl. Malesiana ser.1, 6:284, 1962, considers *Elaeodendron* as united with *Cassine.*

RHAMNACEAE

Zizyphus Miller

(trop. Am., Afr., Medit., Indomal., Austr.)

Key to the Species of Zizyphus

Styles connate to the middle

Fruit more than 1/2 inch in diameter, leaves orbicular, tomentose beneath ..... *Z. mauritiana*

Fruit less than 1/2 inch in diameter, leaves ovate, distinctly oblique at the base, glabrous above, silky hairy beneath ..... *Z. oenoplia*

Styles distinct or nearly so

Fruit 3/4-1 inch in diameter, leaves orbicular with white or yellow tomentum beneath ..... *Z. xylopyra*

Zizyphus mauritiana Lamk. Encycl. Meth. Bot. 3:319, 1789; Ch. & Oza, Fl. Pav. 61, 1966; Santapau, Fl. Khand. (ed.3) 43,1967; Shah, Fl. Guj. St. 1:155, 1978; Almeida, Fl. Savant. 1:99, 1990.

Zizyphus jujuba Lamk. Encycl. 3:318, 1789 (*non Zizyphus jujuba* Miller, Gard. Dict. (ed.8) no.1, 1768); Hook. Fl. Br. Ind. 1:632, 1872; Cooke, Fl. Pres. Bomb. 1:240, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:294, t.175, 1909.

A small nearly evergreen tree, 4-8m in height with drooping branches. Stipular thorns, one straight, the other hooked. Bark thick, dark grey to nearly black with long, deep, irregular furrows. Leaves orbicular, buff tomentose beneath. Flowers greenish-yellow. Fruit globose, more than 1/2 inch in diameter, dark brown, orange or red when ripe, edible.

Distribution and Locality : Occasional in forest areas; common near habitation along village paths and field hedges.

Original Home : Ind. or., Malaya

Flowers : March - June **Fruits** : ripe in November - January

Local Name : Bor

Local Use : Fuelwood ; leaves used as fodder for goats and camel; charcoal made from wood; fruit adored by wild animals and children alike. A very hardy tree growing easily in open barren exposed poor soils.

Zizyphus oenoplia (Linn.) Miller, Gard. Dist. (ed.3) no.3, 1768; Hook. Fl. Br. Ind. 1:634, 1875; Cooke, Fl. Pres. Bomb. 1:242, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:296, t.176, 1909; Ch. & Oza, Fl. Pav. 62, 1966; Shah, Fl. Guj. St. 1:156, 1978; Almeida, Fl. Savant. 1:99, 1990.

Rhamnus oenoplia Linn. Sp. Pl. 194, 1753.

A straggling shrubby tree with rusty pubescent branches. Bark rough, dark grey, exfoliating into thick irregular small plates, often in distinct prominent patches close to the rings of pyramidal prickles. The plant is armed with solitary curved prickles. Leaves distichous, ovate-lanceolate, distinctly oblique at the base, silky rufous tomentose beneath. Flowers in densely tomentose axillary cymes, greenish-white. Fruit less than 1/2 inch in diameter, black when ripe and much liked by wild animals.

Distribution and Locality : Occasionally met with towards the edge of the forest, close to villages.

Original Home : As. *et* Austral. trop.

Flowers : September - October **Fruits** : February - March

Local Name : Khanteli

Local Use : Fruits eaten by children and wild animals; the dried stems make a good fence for fields.

Zizyphus xylopyra (Retz.) Willd. Sp. Pl. 1:1104, 1797; Hook. Fl. Br. Ind. 1:634, 1875; Cooke, Fl. Pres. Bomb. 1:242, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:298, 1909; Ch. & Oza, Fl. Pav. 62, 1966: Ramamoorthy in Fl. Hassan Dist. 354, 1976; Shah, Fl. Guj. St. 1:157, 1978; Almeida, Fl. Savant. 1:100, 1990.

Rhamnus xylopyrus Retz. Obs. Bot. 2:11, 1783.

An armed or unarmed tall shrub or small tree, 3-6m in height. Bark grey or brownish with thick angular, exfoliating scales. Stipular spines absent; if present, then in pairs, one straight, the other curved. Young branches tomentose. Leaves suborbicular with an oblique base, upper surface is glabrous and under surface is covered with white or yellow tomentum. Flowers creamy-white in axillary paniculate cymes. Fruit globose, covered with a grey tomentum when young, glabrous when old.

Distribution and Locality : Occasional, in the northern parts of the Sanctuary near Poyali, Dharia, Bhuriveri; also at Harbado hill and 'Ranna'.

Original Home : Ind. or.

Flowers : May **Fruits** : Ripe by end of monsoon in October

Local Name : Ghat bor

Local Use : Fruits adored by wild animals; fuelwood and construction; bark and fruits rich in tannin used to dye leather black.

SAPINDACEAE

Schleichera Willd. (*nom. cons.*)

(Indomal.)

Schleichera oleosa (Lour.) Oken, Allg. Naturg. 3(2):1341, 1841; Santapau, Fl. Khand. (ed.3) 48,1967; Shah, Fl. Guj. St. 1:165, 1978, Almeida, Fl. Savant. 1:109, 1990.

Pistacia oleosa Lour. Fl. Cochinch. 2:615, 1790.

Schleichera trijuga Willd. Sp. Pl. 4(2):1096, 1805; Hook. Fl. Br. Ind. 1:681, 1875; Cooke, Fl. Pres. Bomb. 1:266, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:335, t.198, 1909.

A medium-sized deciduous tree, 10-15m in height. Bark grey with exfoliating scales. Leaves pinnately compound, leaflets 2-4 pairs. The young foliage is very conspicuous in March being purple, then red, then pale green and turning to dark green later. Flowers pale yellow in interrupted racemes or panicles, axillary or extra-axillary, appearing along with the young leaves. Fruit ovoid with persistent style, echinate with stout blunt prickles.

Distribution and Locality : Occasional; at Dhanimataji hill quite common and frequent.

Original Home : Ind. or., Malaya

Flowers : February - April **Fruits** : March - May

Local Name : Kosimb

Local Use : Oil is extracted from seeds ; fruits eaten.

ANACARDIACEAE

Key to the Genera of the Anacardiaceae

Leaves simple

Stamens twice as many as petals, styles 5-6 -- *Buchanania*

Stamens fewer than number of petals, only one fertile, style single, lateral in position -- *Mangifera*

Leaves compound

Drupe ellipsoid-oblong or sub-reniform, red or reddish-brown when ripe -- *Lannea*

Drupe ovoid, orange yellow when ripe -- *Spondias*

Buchanania Sprengel

(Indomal., trop. Austr.)

Buchanania lanzan Sprengel in. Schrader, Journ. Bot. 2:234, 1800; Cooke, Fl. Pres. Bomb. 1:275,1902; Shah, Fl. Guj. St. 1:166,1978; Almeida, Fl. Savant. 1:110, 1990.

Buchanania latifolia Roxb. Fl. Ind. 2:385,1832; Hook. Fl. Br. Ind. 2:23, 1876; Talb. For. Fl. Pres. Bomb. & Sind 1:349, 1909.

A moderate-sized almost evergreen tree, 8-16m in height. Bark characteristic, grey-black, rough, tesselated (chequered) with deeper regular longitudinal and horizontal cracks. Leaves simple, thickly coriaceous, densely tomentose beneath. The tree is leafless for a very short time in the hot season. Flowers greenish-white in terminal panicles. Fruit black or chestnut-brown.

Distribution and Locality : Of frequent occurrence in certain localities like Jhand, Harbado hill, Dhanimataji hill, Narukot - Wadek - Bhuriakuva forests and also Poyali-Gandhra - Garumal.

Original Home : Ind. or.

Flowers : January - March **Fruits** : April - May

Local Name : Charoli

Local Use : Fruits are collected as NTFP; wood is used for construction; fuelwood.

Lannea A. Rich. (*nom.cons.*)

(trop. Afr., Indomal.)

Lannea coromandelica (Houtt.) Merrill in Journ. Arn. Arbor. 19:353, 1939; Ch. & Oza, Fl. Pav. 66, 1966; Santapau, Fl. Khand. (ed.3) 51, 1967; Shah, Fl. Guj. St. 1:167, 1978; Almeida, Fl. Savant. 1:111, 1990.

Dialium coromandelicum Houtt. Nat. Hist. 2, 2:39, t.5, f.2, 1774.

Odina wodier Roxb. Fl. Ind. 2:293, 1832; Hook. Fl. Br. Ind. 2:29, 1876; Cooke, Fl. Pres. Bomb. 1:277, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1: 353, t.207, 1909.

A moderate-sized deciduous tree, 10-15m in height. Bark ash coloured, thick with regular longitudinal fissures having cross cracks; inner bark red, mucilagenous. Leaves pinnately compound, crowded at the ends of branches. Young foliage appears just after the flowers are borne from February onwards. Leaflets 3-4 pairs, with an odd leaflet. Flowers unisexual, monoecious or dioecious, yellowish, in long pendant panicles at the ends of leafless branches. Fruits ovoid, oblique, compressed.

Distribution and Locality : Occasional, on steep slopes towards the top of the hill along with *Garuga, Boswellia, Anogeissus;* met with frequently at Harbado hill, Lambhiya, Kathiari.

Original Home : Ind. or., Burma

Flowers : February - April **Fruits** : June onwards

Local Name : Moino

Local Use : Wood used for construction; fuelwood; young twigs and leaves a favourite

fodder for cattle; fruits eaten by wild animals; gum from the bark is collected for native medicine.

Mangifera Linn.

(SE. As., Indomal.)

Mangifera indica Linn. Sp. Pl. 200, 1753; Hook. Fl. Br. Ind. 2:13,1876 ; Cooke, Fl. Pres. Bomb. 1:273, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:348, 1909; Ch. & Oza, Fl. Pav. 66, 1966; Shah, Fl. Guj. St. 1:67, 1978; Almeida, Fl. Savant. 1:112, 1990.

A large evergreen tree,15-20m in height. Bark thick, brown or blackish, rough with exfoliating scales. Leaves simple, glabrous, coriaceous, crowded at the ends of branches. Inflorescence pubescent, of terminal panicles. Flowers unisexual, monoecious, whitish. Drupe large , fleshy and edible.

Distribution and Locality : Occasional, in forest areas, more frequently seen in villages, fields or orchards; at Narukot, Jambughoda, Katkoi, Keva.

Original Home : Ind. or., Malaya

Flowers : December - May **Fruits** : February - July

Local Name : Ambo

Local Use : Wood is used for construction; leaves, seeds and gum extracted from bark are used in native medicine.

Spondias Linn.

(Indomal., SE. As., trop. Am.)

Spondias pinnata (Linn.f.) Kurz, Pegu Report, A. 44, 1875; Shah, Fl. Guj. St. 1:169, 1978; Almeida, Fl. Savant. 1:113, 1990.

Mangifera pinnata Linn.f. Suppl. 156, 1781.

Spondias mangifera Willd. Sp. Pl. 2:75, 1799; Hook. Fl. Br. Ind. 2:42, 1876; Cooke, Fl. Pres. Bomb. 1:281, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:362, 1909.

A small deciduous tree, 8-10m in height. Bark grey, smooth, thick with longitudinal shallow furrows. Leaves pinnately compound, leaflets 3-5 pairs with one odd leaflet. Flowers pinkish-green in terminal panicles which appear when the tree is bare of leaves in the hot season. Fruit ovoid, smooth, orange-yellow in colour, having smell and taste of mango, ripening during the next cold season. Adored by squirrels, monkeys and deer.

Distribution and Locality : Rare, a few trees with scattered distribution, seen in 'Ranna', Lambhiya, Narukot.

Original Home : As. trop.

Flowers : February - May **Fruits** : November

Local Name : Khatimbo, Khatumbdo

Local Use : Leaves are added to dal curry ; gum is extracted from the tree; fruits favoured by wildlife.

MORINGACEAE

Moringa Lamk.

(NE. & SW. Afr., Madag., Arabia, India)

Moringa concanensis Nimmo in Grah. Cat. Bomb. Pl. 43, 1839; Hook. Fl. Br. Ind. 2:45, 1876; Cooke, Fl. Pres. Bomb. 1:282, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:365, 1909; Shah, Fl.Guj. St. 1:169, 1978.

A small deciduous tree, 3-10m in height. Bark thick, soft, corky, greyish-brown; wood soft, white. Leaves bipinnate-tripinnate, large. Flowers yellowish-white with red or purple veins, in pubescent panicles. Fruit linear, triquetrous, bitter to taste.

Distribution and Locality : Common near villages, few trees seen near Gandhra, Dhanpuri, Targol, Keva, Nani Raski, Jabban.

Original Home : Ind. or.

Flowers : November - December **Fruits** : December onwards

Local Name : Kadvo saragvo

Local Use : The flowers and fresh leaves are cooked and eaten as a vegetable; the fruits are very bitter and used in medicine.

FABACEAE (Papilionaceae)

Key to the Genera of the Fabaceae

Leaves trifoliolate

Plants unarmed, pods flat

Flowers orange -- *Butea*

Flowers white with purple tinge -- *Ougenia*

Plants armed, pods subterate -- *Erythrina*

Leaves not trifoliolate

Leaflets opposite, calyx dark reddish-purple pods often woody -- *Pongamia*

Leaflets alternate, calyx not as above, pods not woody

Flowers creamy white, pods oblong strap-shaped, 1-4 seeded -- *Dalbergia*

Flowers yellow ,pods orbicular, one seeded -- *Pterocarpus*

Butea Roxb. ex Willd. (*nom. cons.*)

(Indomal., China)

Butea monosperma (Lamk.) Taub. in Engl. & Prantl, Pflanzenfam. 3(3): 366, 1894; Ch. & Oza, Fl. Pav. 88, 1966; Santapau, Fl. Khand. (ed. 3) 66, 1967; Shah, Fl. Guj. St. 1:185, 1978; Almeida, Fl. Savant. 1:120, 1990.

Erythrina monosperma Lamk. Encycl. 1:391, 1785.

Butea frondosa Koenig ex Roxb. Asiat. Res. 3:369, 1792; Hook. Fl. Br. Ind. 2:194, 1876; Cooke, Fl. Pres. Bomb. 1:371, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:409, t.231, 1909.

A small to moderate-sized deciduous tree, 5-16m in height. Bark ash- coloured, rough with longitudinal fissures not forming a regular pattern; inner bark fibrous and spongy. Leaves trifoliolate, coriaceous, hairy beneath, terminal leaflet is the largest. Flowers large, appear when the tree is almost bare of leaves in February-March. Flowers are orange or

salmon coloured, silvery velvety, pedicels and calyx brown velvety. Fruits are flat legumes, thickened at the sutures.

Distribution and Locality : Very common, generally found in the foothills, lower slopes and valleys along with *Madhuca*.

Flowers : February - March **Fruits** : June - July

Local Name : Khakhro, Khakhar

Local Use : Leaves collected for NTFP, dried and made into plates, cups; fresh foliage serves as fodder, fibre from inner bark is used to make rope.

Dalbergia Linn. f. (*nom. cons*)

(trop. & subtrop., S. Afr.)

Key to the Species of Dalbergia

Stamens monadelphous

Stamens 9 in one bundle, pods glabrous, 1-4 seeded

Leaflets 3-5, accuminate, flowers distinctly stalked ..... ***D. sissoo***

Leaflets 5-7, obtuse or emarginate, flowers nearly sessile.... ***D. latifolia***

Stamens 10 in one bundle, pods pubescent, 1-2 seeded ..... ***D. sympathetica***

Stamens in 2 bundles of 5 each

Leaflets with reticulate venation and stand without a callosity at base of limb ..... ***D. paniculata***

Leaflets with prominent paralled nerves, standard with a callosity at base of limb ..... ***D. lanceolaria***

Dalbergia lanceolaria Linn. f. Suppl. 316, 1781; Hook. Fl. Br. Ind. 2:235, 1876; Cooke, Fl. Pres. Bomb. 1:399, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:428, 1909; Ch. & Oza, Fl. Pav. 87, 1966; Shah, Fl. Guj. St. 1:201, 1978; Almeida, Fl. Savant. 1:126, 1990.

A moderate-sized tree with a straight trunk, 10-15m in height. Bark thick, grey,

smooth, exfoliating in thin rounded patches. Leaves with about 15 leaflets, dark green above and paler beneath, nerves numerous, parallel, prominent on upper surface. Flowers in large axillary and terminal panicles, appearing when the tree is devoid of leaves, rufous hairy. Flowers white with rufous hairy pedicels. Pods narrowed at both ends, long stalked.

Distribution and Locality : Less frequent in occurrence than *D.paniculata*, a few trees seen near Jhand, Mahudibor - Katkuva - Malbar.

Original Home : Ind. or.

Flowers : March - May

Fruits : Ripe in next cold season, remaining for a long time on the tree (upto June)

Local Name : Dindosi, Patrali

Local Use : Wood is used for construction; leaves are eaten by bats.

Dalbergia latifolia Roxb. Pl. Corom. 2:7, t.113, 1798; Hook. Fl. Br. Ind. 2:231, 1876; Cooke, Fl. Pres. Bomb. 1:396, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:423, t.239, 1909; Ch. & Oza, Fl. Pav. 86, 1966; Shah, Fl. Guj. St. 1:201, 1978; Almeida, Fl. Savant. 1:126, 1990.

A large deciduous tree, 10-18m in height, with a straight trunk and spreading crown. Bark grey or ash-coloured, cinerous, exfoliating in thin, fibrous, longitudinal flakes. Leaves imparipinnate, leaflets 5-7, nearly orbicular, obtuse or emarginate, dark green above, glaucous beneath. Flowers white, scented, in lax axillary panicles. Pods strap-shaped, glabrous, 1-4 seeded.

Distribution and Locality : Common, seen on gentle slopes towards the top of the hill (Dhanimataji hill) and even in valleys.

Original Home : Ind. or.

Flowers : April - May, along with fresh foliage **Fruits** : May - November

Local Name : Shisham

Local Use : Wood is an excellent timber; used in house construction, carts, agricultural

implements; young twigs and leaves make good cattle fodder; tree is resistant to forest fires.

Dalbergia paniculata Roxb. Pl. Corom. 2:8, t.114, 1798; Hook. Fl. Br. Ind. 2:236, 1876; Cooke, Fl. Pres. Bomb. 1: 399, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:429, 1909; Shah, Fl. Guj. St. 1:202, 1978.

A large deciduous tree, 10-18m in height, with a straight trunk and spreading crown. Bark grey, thin and flaky with longitudinal and horizontal cracks. Branches brown-silky pubescent . Leaflets 9-15, obtuse, turning black on drying, slightly hairy beneath. Flowers creamy-white or pale-yellow with a touch of bluish-pink, in crowded axillary or terminal panicles, densely brown-silky pubescent. Pods narrowed at both ends, 1-2 seeded.

Distribution and Locality : Common on hill slopes and also towards the top of hills; well represented throughout the area, especially around Kada dam.

Original Home : Ind. or.

Flowers : March - May, along with fresh foliage **Fruits** : March - October

Local Name : Passi; Parsi

Local Use : Not of much local use.

Dalbergia sissoo Roxb. Fl. Ind. 3:223, 1832; Hook. Fl. Br. Ind. 2:231, 1876; Cooke, Fl. Pres. Bomb. 1:395, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:422, t.238, 1909; Shah,Fl. Guj. St. 1:202, 1978; Almeida, Fl. Savant. 1:127, 1990.

A medium-sized deciduous tree, 12-16m in height . Bark grey, exfoliating in strips. Leaves imparipinnate, alternate, stipulate. Leaflets broadly ovate, with acuminate-cuspidate apex. Flowers yellowish in sessile axillary panicles. Pods pale brown, strap-shaped, 2-3 seeded.

Distribution and Locality : Introduced to the area by the Forest Department in their affores-

tation programme; saplings are raised in forest nurseries and mixed plantations are seen near Kada dam and Masabar. Advantageous for afforestation because they are quick growing and resistant to insect attacks.

Original Home : Ind. or., Afghan.

Flowers : March - June **Fruits** : November - February

Local Name : Sissoo

Local Use : Fuelwood and fodder ; generally increases the green cover of the area.

Dalbergia sympathetica Nimmo in Grah. Cat. Bomb. Pl. 55, 1839; Hook. Fl. Br. Ind. 2:234, 1876; Cooke, Fl. Pres. Bomb. 1:398, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:426, t.240, 1909; Santapau, Fl. Khand. (ed.3) 74, 1967; Shah, Fl. Guj. St. 1:202, 1978; Almeida, Fl. Savant. 1:127, 1990.

A large woody scandent shrub armed with hooked and twisted spines, often 3-5 together from the thickened part of the stem. Bark smooth, inner bark red, juicy. Leaflets 11-15, emarginate, covered with grey or brown silky hairs, on the lower surface . Flowers bluish or purplish in dense axillary panicles. Pods thin, strap-shaped, apiculate, 1-2 seeded, covered with thin brown tomentum.

Distribution and Locality : Rare , occur along inaccessible forest streams in 'Ranna', forests around Lambhiya - Jhand, Malbar - Mahudibor.

Original Home : Ind. or.

Flowers : January - February **Fruits** : February - April

Local Name : Gorad no Velo

Local Use : Roots and bark used to intoxicate fish.

Erythrina Linn.

(trop., subtrop.)

Erythrina suberosa Roxb. Fl. Ind. 3:253, 1832; Hook. Fl. Br. Ind. 2:189, 1876; Cooke, Fl. Pres. Bomb. 1:367, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:402, t.227, 1909; Ch. &

Oza, Fl. Pav. 90, 1966; Shah, Fl. Guj. St. 1:212, 1978; Sanjappa, Leguminosae of India 173, 1992.

A small to medium sized deciduous tree, 6-10m in height with crooked spreading branches , armed with stout conical yellowish-white prickles, which fall off after the third year. Bark light - grey, corky, with longitudinal widened furrows, exposing inner yellow wood , particularly at the base of the trunk. Leaves trifoliate, petioles sparingly covered with prickles. Leaflets densely pubescent beneath, stipels glanduliform, persistent ; terminal leaflet is rhomboid-ovate. Racemes 1-4 near the ends of branches, densely capitate. Flowers bright orange to scarlet. Pods curved, terete, narrowed at ends.

Distribution and Locality : Very rare, one tree seen at Dhanimataji hill and two trees were seen at Wadek along a field boundary - the flowering was observed on 11-4-93; the trees were severely lopped , but flowering was again observed on 13-4-94.

Original Home : Ind. or.

Flowers : April **Fruits** : April - May

Local Name : Karvinchlo

Local Use : Fruits and leaves eaten by livestock; plenty of birds visit to feed on nectar of flowers; wood is soft, can be used for carving.

Ougeinia Benth.

(India)

Ougeinia oojeinensis (Roxb.) Hochreut in Bull. Soc. Bot. Geneve 13-14 : 51, 1909; Shah, Fl. Guj. St. 1:234, 1978.

Dalbergia oojeinensis Roxb. Fl. Ind. 3:220, 1832.

Ougeinia dalbergioides Benth. Pl. Jungh. 216, 1851-1855; Hook. Fl. Br. Ind. 2:161, 1876; Cooke, Fl. Pres. Bomb. 1:350, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:390, t.221,1909.

A small to moderate-sized deciduous tree, 8-15m in height , often with irregularly

shaped gnarled trunk. Bark thin , light brown, with longitudinal and horizontal cracks, scaling off in regular-shaped patches. Leaves trifoliate, leaflets nearly glabrous, shallowly crenate, oblique at base, bluntly accuminate or obtuse. Flowers in short fasicled racemes from the old wood, white with a tinge of red or rose-coloured. Trees appear very handsome when in bloom in the hot season when leaves are absent. Pods flat, jointed, deeply indented along the dorsal suture.

Distribution and Locality : Occasional, at Dhanimataji hill and throughout the area.

Original Home : Ind. or.

Flowers : March - May **Fruits** : June

Local Name : Tanach

Local Use : Wood is a very valuable timber as it is resistant to attack of termites; bark is used to intoxicate fish ; fruits eaten by wild animals; young branches make good cattle fodder; a transparent gum is obtained from bark.

Pongamia Vent. (*nom.cons.*)

(Indomal.)

Pongamia pinnata (Linn.) Pierre, Fl. Cochinch. subtab. t.385, 1899; Thothathri in Bull. Bot. Surv. Ind. 3:418, 1962; Ch. & Oza, Fl. Pav. 87, 1966; Santapau, Fl. Khand. (ed.3) 75, 1967.

Cystisus pinnatus Linn. Sp. Pl. 741, 1753.

Pongamia glabra Vent. Jard. Malm. t.28, 1803; Hook. Fl. Br. Ind. 2:240, 1876; Cooke, Fl. Pres. Bomb. 1:402, 1902; Talb. For. Fl. Pres. Bomb. & Sind 1:432, t.243, 1909.

A moderate-sized evergreen tree, 7-15m in height. Bark soft, grey, covered with tubercles. Leaves imparipinnate, leaflets 5-9, opposite, acuminate, glabrous, bright green, shining on both the surfaces. Flowers white and purple in axillary racemes. Pod obliquely oblong , woody, beaked, one-seeded.

Distribution and Locality : Common along forest streams and Kotars passing through

villages; seen at Narukot, Bhuriveri, Laphni, Lambhiya.

Original Home : As. trop., Autral., Ins. Pacif.

Flowers : February - April **Fruits** : April - July

Local Name : Karanj, Kanaji

Local Use : Pods collected as NTFP and sold to Forest Corporation at Rs. 60/- only for 20 kgs. Locally oil is also expressed from seeds and used to light lamps and in times of scarcity even used as cooking oil.

Pterocarpus Jacquin (*nom. cons.*)

(trop.)

Pterocarpus marsupium Roxb. Pl. Corom. 2:9, t.116, 1798; Hook. Fl. Br. Ind. 2:239, 1876; Cooke, Fl. Pres. Bomb. 1:401,1902; Talb. For. Fl. Pres. Bomb. & Sind 1:431, t.242, 1909; Almeida, Fl. Savant. 1:139, 1990.

A large deciduous tree, 12-18m in height having a crooked trunk with widely spreading branches. Bark is yellowish-grey, thick, exfoliating in small irregular-sized pieces. Leaves imparipinnate, leaflets 5-7. Flowers pale yellow in short axillary panicled racemes, shorter than the leaves. Pods obliquely orbicular, usually 1-seeded, winged.

Distribution and Locality : Occasional , one large tree seen next to Dhanimataji temple at Dhanpuri.

Original Home : Ind. or.

Flowers : May - June **Fruits** : December - March

Local Name : Biyo

Local Use : Wood is very hard and durable , makes excellent timber; leaves used as fodder; young green fruits are eaten by animals and children ; a gum resin exudes from wounds and is used in native medicine.

CAESALPINIACEAE

Key to the Genera of the Caesalpiniaceae

Petals present, pods many seeded

- Leaves simple or unifoliolate, deeply cleft from the apex -- *Bauhinia*
- Leaves pinnately compound
  - Petals 6, stamens 10, all fertile or 3-5 sterile -- *Cassia*
  - Petals 3, stamens 3, fertile -- *Tamarindus*
- Leaves bipinnately compound -- *Delonix*

Petals absent, pods 1-seeded -- *Hardwickia*

Bauhinia Linn.

(warm regions)

Bauhinia racemosa Lamk. Encyl. 1:390, 1783; Hook. Fl. Br. Ind. 2:276, 1878; Cooke, Fl. Pres. Bomb. 1:431, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1: 462, tt.262 & 263, 1909; Ch. & Oza, Fl. Pav. 91, 1966; Shah , Fl. Guj. St. 1:263, 1978; Almeida, Fl. Savant. 1:157, 1990.

A small deciduous tree, 4-8m in height. Bark dark brown , very rough with deep vertical fissures. Leaves 1- foliolate divided less than half way down into two rounded lobes, cordate at base, glabrous above and pale, clothed with grey pubescence beneath, basal nerves 5-9. Flowers white in leaf-opposed racemes. Pods tapering to the base, glabrous, turgid, slightly falcate, dark brown in colour, slightly constricted between the seeds.

Distribution and Locality : Rare , sparsely distributed in forests of Narukot, Malbar, Vav, Mahudibor, 'Ranna'.

Original Home : Malaya, China

Flowers : March - June **Fruits** : November - February

Local Name : Asatri, Asitro

Local Use : Fuelwood ; leaves collected for making local bidis.

Cassia Linn.

(trop. & warm temp. (exc. Eur.))

Cassia fistula Linn. Sp. Pl. 377, 1753; Hook. Fl. Br. Ind. 2:268, 1878; Cooke, Fl. Pres. Bomb. 1:417, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:448, t. 253, 1909; Ch. & Oza, Fl. Pav. 93, 1966; Shah, Fl. Guj. St. 1:268, 1978; Almeida, Fl. Savant. 1:153, 1990.

A moderate-sized deciduous tree, 6-12m in height. Branches slender, spreading, pubescent at the extremities, seldom totally without leaves. Bark greenish-grey, compact, smooth when young, reddish-brown and rough in old trees. Leaves paripinnately compound, leaflets 4-8 pairs. Flowers yellow, fragrant, in lax pendulous racemes. Pods cylindrical, smooth, pendulous, dark brown, indehiscent.

Distribution and Locality : Occasional, occurring in plains of the forest near Malbar, Gandhra, ' Ranna'.

Original Home : As. trop.

Flowers : April - May **Fruits** : Throughout the year

Local Name : Garmalo

Local Use : Wood makes excellent charcoal, fuelwood ; used in making carts, agriculture implements; pulp and seeds eaten by bears, monkeys and birds; leaves not palatable to livestock; bark used in native medicine.

Delonix Raf.

(trop. Afr., Madag., As.)

Delonix elata (Linn.) Gamble, Fl. Pres. Madras 396, 1919; Santapau, Fl. Khand. (ed.3) 70, 1962; Blatt. and Mill. Beaut. Ind. Tr. (rep.) 58, t. Xl ,1977; Shah , Fl. Guj. St. 1:274, 1978; *Poinciana elata* Linn. Cent. Pl. 2:16, 1756; Hook. Fl. Br. Ind. 2:260, 1878; Cooke, Fl. Pres. Bomb. 1:414, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:444, 1909.

A small deciduous tree, 5-10m in height. Bark ash-coloured having lenticular opening with darker grey scales. Leaves abruptly bipinnate; pinnae opposite, 4-8 pairs.

Flowers white turning to yellow, in terminal few-flowered corymbs. Pods pale to dark brown, narrowed at both ends.

Distribution and Locality : More frequent near habitation; at Dhanpuri, Wadek, Hirapura, Nani Raski.

Original Home : Afr. trop.

Flowers : November - April **Fruits** : December - June

Local Name : Sandesro

Local Use : Wood is very soft, so used only as fuelwood; easily propagated by stump planting; bark used as an antidote to scorpion bite and also on arthritic swellings.

Hardwickia Roxb.

(India, Apet.)

Hardwickia binata Roxb. Pl. Corom. 3:6, t. 209, 1819; Hook. Fl. Br. Ind. 2:270, 1878; Cooke, Fl. Pres. Bomb. 1:456, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:456, t.258, 1909; Shah, Fl. Guj. St. 1:275, 1978; Almeida, Fl. Savant. 1:155, 1990.

A moderate-sized deciduous tree, 10-15m in height. A handsome tree with a characteristic grey, leathery foliage on slender drooping branchlets. Bark dark grey, thick and rough, peeling off in narrow flakes. Leaves 2-foliolate, stipules cordate, caducous. Leaflets pale, dull grey-green, glabrous, obliquely ovate. Flowers yellowish-green in terminal panicles. Pods strap-shaped, glabrous.

Distribution and Locality : Occasional, especially near habitation.

Original Home : Ind. or.

Flowers: In cold Season **Fruits** : April - May

Local Name : Anjaan

Local Use : Hardy wood; fuelwood; leaves eaten as fodder; bark yields a fibre.

Tamarindus Linn.

(trop. Afr.)

Tamarindus indica Linn. Sp. Pl. 34, 1753; Hook. Fl. Br. Ind. 2:273, 1878; Cooke, Fl. Pres. Bomb. 1:429, 1903; Talb. For. Fl. Pres. Bomb & Sind 1:460, t.260, 1909; Ch. & Oza, Fl. Pav. 93, 1966; Shah, Fl. Guj. St. 1:278, 1978, Almeida, Fl. Savant. 1:156, 1990.

A large evergreen tree, 10-18m in height. Bark thick, longitudinally and transversely fissured. Leaves pinnately compound, leaflets 6-12 pairs. Flowers yellow with purple streaks, in racemes at ends of short lateral branchlets. Pods thick, fleshy and pendulous.

Distribution and Locality : Found in forest area by accidentally self sown seeds, commonly found near habitation.

Original Home : As. *et* Afr. trop.

Flowers : March - July **Fruits** : April - November

Local Name : Ambli

Local Use : Wood is used in construction; fruit is edible; leaves used in curries.

CULTIVATED PLANTS

Cassia siamea Lamk. Encycl. Meth. Bot. 1:648, 1785, is cultivated along roadsides especially between Narukot - Nathpuri - Bhildungra - Jambughoda and also along the road to Chalvad and towards Bobdakuva (**Local Name**: Kasid)

Delonix regia (W.Hooker) Raf. Fl. Tel. 2:92, 1836, is a rare tree in cultivation in JWLS. (**Local Name** : Gulmohur)

Parkinsonia aculeata Linn. Sp. Pl. 375, 1753, is cultivated in forest plantations in dry arid wasteland areas close to villages. Seen at Rinchhbar. (**Local Name** : Rambaval)

Peltophorum pterocarpum (DC.) Baker ex Heyne, Nutt. Fl. Ned. Ind. (ed.2) 2:755, 1927, is commonly seen along with *Cassia siamea* as an avenue tree (**Local Name** : Tamrafali)

MIMOSACEAE

Key to the Genera of the Mimosaceae

Stamens definite, 4-10

Flowers in spikes, yellow, pods turgid, torulose -- *Prosopis*

Flowers in 2-coloured spikes, lower half flowers are rose-pink to purple, sterile; the upper half flowers are yellow and fertile, pods are twisted when mature -- *Dichrostachys*

Stamens indefinite

Armed trees, shrubs or climbers, flowers in spikes or heads forming panicles

Stamens monadelphous, flowers greenish-white in heads, pods falcate, spirally twisted, pinnae 1-paired -- *Pithecellobium*

Stamens free, flowers creamy white or yellow in heads or spikes, pods flat, pinnae more than 1-paired -- *Acacia*

Unarmed trees, flowers always in globose heads -- *Albizia*

Acacia Mill.

(trop. & subtrop.)

Key to the Species of Acacia

Climbers ..... *A. pennata*

Trees or shrubs

Flowers in heads

Heads axillary, pods torulose ..... *A. nilotica* ssp. *indica*

Heads in terminal panicles, pods flat ..... *A. leucophloea*

Flowers in spikes ..... *A. chundra*

Acacia chundra (Rottler) Willd. Sp. Pl. 4: 1078, 1806; Shah, Fl. Guj. St. 1:281, 1978; Almeida, Fl. Savant. 1:158, 1990.

Mimosa chundra Roxb. ex Rottler, Ges. Naturf. Berlin Neve Shriften 4:207, 1903; Roxb. Pl. Corom. t.255, 1811.

Acacia sundra DC. Prodr. 2:458, 1825; Hook.Fl.Br. Ind. 2:295, 1878.

Acacia catechu Willd. var. *sundra* Prain in J. As. Soc. Beng. 66:508, 1898; Cooke, Fl.Pres. Bomb. 1:448, 1903; Talb.For. Fl. Pres. Bomb & Sind 1:488, t.277, 1909.

A moderate-sized deciduous thorny tree, 6-13m in height. Bark dark grey or brown, rough, fissured, exfoliating in long narrow strips. The stipular spines are hooked or recurved from a broad base. Leaves bipinnate, leaflets 15-20 pairs. Flowers creamy-white, in long axillary spikes. Pods flat, thin, brown with a triangular beak at the apex and narrowed at the base.

Distribution and Locality : Occasional and scattered throughout the area on exposed rocky ground.

Original Home : Ind. or.

Flowers : July - September **Fruits** : Cold season

Local Name : Khair

Local Use : Wood is very durable, not attacked by termites, therefore extremely useful for construction; excellent charcoal and fuelwood; 'Kath' obtained from inner bark and heartwood.

Acacia leucophloea (Roxb.) Willd. Sp. Pl. 4 :1083, 1806; Hook. Fl. Br. Ind. 2:294, 1878; Cooke, Fl. Pres. Bomb. 1:447, 1903; Talb. For. Pres. Bomb. & Sind 1:485, t.275, 1909; Ch. & Oza, Fl. Pav. 96, 1966; Shah, Fl. Guj. St. 1:283, 1978.

Mimosa leucophloea Roxb. Pl. Corom. 2:27, t.150, 1800.

A small-sized deciduous tree, 5-7m in height. Bark thick, pale yellowish-white in young trees, dark brown in very old trees, exfoliating in patches having horizontal wrinkles. Leaves bipinnate with sessile cup-shaped glands on the rachis between each pair of pinnae on the grooved upper side, pinnae 4-10 pairs, Flowers creamy- white or pale yellow, in globose heads, in large terminal panicles. Pods flat, linear-oblong, slightly curved, tomentose, yellowish-brown.

Distribution and Locality : Found frequently in agricultural fields or boundaries of fields, at the edge of the forest.

Original Home : As. trop.

Flowers : August - September **Fruits** : Cold season

Local Name : Samadi, Pilo baval

Local Use : Fuelwood; for making agricultural implements; young fruits cooked as vegetable; bark , flowers and pods yields a black dye.

Acacia nilotica (Linn.) Willd. *ex* Delile, Fl. Aegypt. Ill. 79, 1813.

Mimosa nilotica Linn. Sp. Pl. 521, 1753.

ssp. ***indica*** (Benth.) Brenan, Kew Bull. 12:84, 1957; Santapau, Fl. Khand. (ed.3) 83, 1967; Shah, Fl. Guj. St. 1:283, 1978.

Acacia arabica auct. non. (Lam.) Willd. 1808.

var. *indica* Benth. in Hook. Lond. Journ. Bot. 1:500, 1842; Hook. Fl. Br. Ind. 2:293, 1878; Cooke, Fl. Pres. Bomb. 1:443, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:480, t.272, 1909.

A small armed deciduous tree, 4-7m in height with a spreading crown. Stipular spines straight. Bark dark brown, thick, rough with deep longitudinal fissures. Leaves with 7 pairs of pinnae on a rachis covered with grey pubescence. Flower heads yellow in axillary panicles. Pods stalked, grey pubescent, monoliform.

Distribution and Locality : Common near habitation, forest plantations and on open dry wastelands; less in forest areas.

Original Home : As. trop.

Flowers : July - October **Fruit** : August - December

Local Name : Deshi baval, Kalo baval

Local Use : Wood is hard and durable, therefore extremely useful; pods are eaten by livestock; gum exuding from wounds is collected as NTFP.

Acacia pennata (Linn.) Willd. Sp. Pl. 4:1090, 1806; Hook. Fl. Br. Ind. 2:297, 1878; Cooke, Fl. Pres. Bomb. 1:451, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:494, 1909; Ch. & Oza, Fl. Pav. 96, 1966; Shah, Fl. Guj. St. 1:284, 1978; Almeida, Fl. Savant. 1:158, 1990.

Mimosa pennata Linn. Sp. Pl. 507, 1753 (excl. syn.).

A small tree or scandent woody shrub armed with many stout hooked prickles. Bark pale to dark brown, polished, young parts with grey pubescence. Leaves bipinnate, pinnae 8-15 pairs. Flower heads creamy-white in large in long terminal panicles. Pods flat, pale yellow to brown, strap-shaped, glabrous.

Distribution and Locality : Common near habitation, climbing over other trees like, *Borassus, Ficus* ; seen at Gandhra, Rinchhbar, Sodhra, Dhanpuri, Jotvad.

Original Home : As. *et* Afr. trop.

Flowers : June - August **Fruits** : December - March

Local Name : Khairvel, Cheeyal

Albizia Durazz.

(Warm, old world)

Key to the Species of Albizia

Bark grey or brown, flowers pedicelled, pods straw coloured, upto 5 cms broad ..... *A. lebbeck*

Bark grey, flowers sessile, plants pubescent, pods brown, 2.5-3.5 cms broad ..... ***A. odoratissima***

Bark greenish-yellow, smooth, flowers sessile, plants glabrous, pods orange-brown, upto 2.2 cms broad ..... ***A. procera***

Albizia lebbeck (Linn.) Benth. in Hook. Lond. Journ. Bot. 3:87, 1844; Hook. Fl. Br. Ind. 2:298, 1878; Cooke, Fl. Pres. Bomb. 1:452, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:496, tt. 280 & 281, 1909; Shah, Fl. Guj. St. 1:287, 1978; Almeida, Fl. Savant. 1:160, 1990.

Mimosa lebbeck Linn. Sp. Pl. 516, 1753.

A large deciduous tree, 8-20m in height. Bark grey or brown, rough. Leaves bipinnate, pinnae in 2 pairs, rachis with one gland near the base of the petiole and the other below the junction of the uppermost pair of pinnae, leaflets 3-4 pairs. Flowers white, fragrant, pedicelled in large globose umbellate heads. Pods compressed, oblong, straw coloured, upto 5 cms broad.

Distribution and Locality : Common and well spread throughout the area ; in 'Panchrav' forest plantation near Masabar.

Original Home : Geront. trop.

Flowers : July - October **Fruits** : October - March

Local Name : Siris, Siras

Local Use : Wood is a source of valuable timber.

Albizia odoratissima (Linn. f.) Benth. Hook. Lond. Journ. Bot. 3:88, 1844; Hook. Fl. Br. Ind. 2:269, 1878; Cooke, Fl. Pres. Bomb. 1:452, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:497, t.283, 1909; Ch. & Oza, Fl. Pav. 97, 1966; Shah, Fl. Guj. St.1:288, 1978; Almeida, Fl. Savant. 1:161, 1990.

Mimosa odoratissima Linn. f. Suppl. 437, 1781.

Acacia odoratissima Willd. Sp. Pl. 4:1063, 1805.

A large deciduous tree, 15-20m in height. Bark thick, rough, grey with irregular fissures, exfoliating into rough flakes; inner bark purple, fibrous. Leaves bipinnate, rachis brown-pubscent with a-single sessile gland on the petiole below the lowest pairs of pinnae and another between the upper most pair. Pinnae 4 pairs, leaflets 12-18 pairs. Flowers white, fragrant, sessile in globose heads. Heads 2-4 together in terminal panicles. Pods brown, strap-shaped, glabrous, veined above the seeds, 2.5-3.5 cms broad.

Distribution and Locality : Common and well spread throughout the area.

Original Home : Ind. or.

Flowers : April - June **Fruits** : June - November

Local Name : Sarasdi, Chicholio

Local Use : Wood is a source of valuable timber ; gum is extracted from the tree.

Albizia procera (Roxb.) Benth. in Hook. Lond. Journ. Bot. 3:89, 1844; Hook. Fl. Br. Ind. 2:299, 1878; Cooke, Fl. Pres. Bomb. 1:453, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:499, 1909; Shah, Fl. Guj. St.1:288, 1978; Almeida, Fl. Savant. 1:161, 1990.

Mimosa procera Roxb. Pl. Corom. 2:12, t.121, 1798.

A large deciduous tree, 15-20m in height. Bark with greenish-yellow smooth bark, peeling off in small flakes. Leaves bipinnate, rachis glabrous with a single large sessile gland about the middle of the petiole. Pinnae 2-6 pairs, leaflets 4-10 pairs. Flowers white, sessile in many flowered heads. Pods thin, bright orange-brown, upto 2.2 cms broad.

Distribution and Locality: Common , especially near banks of forest streams, large trees seen near Jhand, Jabban.

Original Home : As. trop., Austr.

Flowers : April - June **Fruits** : September - February

Local Name : Gorad

Local Use : Wood is a source of valuable timber ; bark is used as a fish poison; in tanning leather and for dyeing.

Dichrostachys (A. DC.) Wight & Arn. (*nom. cons.*)

(trop. Afr. to Austr. esp. Madag.)

Dichrostachys cinerea (Linn.) Wight. & Arn. Prodr. Fl. Ind. Or. 271, 1834; Hook. Fl. Br. Ind. 2:288, 1878; Cooke, Fl. Pres. Bomb. 1:468, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:473-4, t.269, 1909; Ch. & Oza, Fl. Pav. 95, 1966; Shah, Fl. Guj. St. 1:288, 1978; Almeida, Fl. Savant. 1:162, 1990.

Mimosa cinerea Linn. Sp. Pl. 517, 1753.

A small tree with a gnarled trunk, 3-6m in height, spines axillary, often bearing

leaves. Bark dark brown, thin, peeling off in thin flakes with deep longitudinal fissures. Leaves bipinnate, pinnae 4-10 pairs, leaflets 12-15 pairs. Flowers crowded in dense axillary spikes, upper flowers are yellow and fertile, lower flowers are rose-pink and sterile. Pods dark brown, irregularly twisted, seeds compressed.

Distribution and Locality : Not met frequently in forest areas, occasional near habitation.
Original Home : Geront. trop.
Flowers and Fruits : July - December
Local Name : Mor dhundhiyu
Local Use : Fuelwood; wood is used to make walking sticks.

Pithecellobium Mart. (*nom. cons.*)

(trop.)

Pithecellobium dulce (Roxb.) Benth. in Hook. Lond. Journ. Bot. 3:199, 1844; Hook. Fl. Br. Ind. 2:302, 1878; Cooke, Fl. Pres. Bomb. 1:485, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:502, 1909; Ch. & Oza, Fl. Pav. 97, 1966; Shah, Fl. Guj. St.1:291, 1978; Almeida, Fl. Savant. 1:163, 1990.

Mimosa dulcis Roxb. Pl. Corom. 1:67, t.99, 1795.

An armed tree, 5-10m in height, with short, straight stipular thorns. Bark greyish, rough, longitudinally fissured. Leaves bipinnate, pinnae one pair and each with 1 pair of leaflets. Flowers whitish, in globose heads, in terminal and axillary panicles. Pods spirally twisted, edible, pulp white, sometimes red in colour; seeds black, polished, compressed.

Distribution and Locality : Very common along field hedges.
Original Home : Am. trop.
Flowers : November - April **Fruits** : December - June
Local Name : Vilayti ambli, Goras ambli
Local Use : Fruits edible, sold in local markets; monkeys and other animals enjoy the fruit.

Prosopis Linn.

(Warm Am., trop. Afr., Cauc. to W. penins. India)

Prosopis cineraria (Linn.) Druce, Bot. Exch. Club. Soc. Brit. Isles 3:422, 1914; Shah, Fl. Guj. St. 1:292, 1978.

Mimosa cineraria Linn. Sp. Pl. 517, 1753.

Prosopis spicigera Linn. Mant. 68, 1767; Hook. Fl. Br. Ind. 2:288, 1878; Cooke, Fl. Pres. Bomb. 1:439, 1903; Talb. For. Fl. Pres. Bomb. & Sind 1:472, t.267, 1909; Ch. & Oza, Fl. Pav. 95, 1966.

A small-sized thorny deciduous tree, 6-8m in height. Bark grey, rough with deep fissures and horizontal cracks. Leaves bipinnate, pinnae 1-2 pairs, leaflets 7-10 pairs. Flowers yellow, spikes arranged in axillary panicles. Pods cylindric, indehiscent, smooth, dull brown in colour.

Distribution and Locality : Occasional, near villages, fields hedges.

Original Home : Ind. or., Texas

Flowers : February - April **Fruits** : May - August

Local Name : Rinjhdo

Local Use : Fuelwood, pods used as fodder for livestock.

CULTIVATED PLANTS

Leucaena latisilicua (Linn.) Gillis in Taxon 23:190, 1974, is cultivated in forest plantations. (**Local Name** : Vilayti baval)

Prosopis juliflora (SW.) DC. Prodr. 2:447, 1825, is seen only in certain localities of the area; especially near major roads, near Bhildungra, Dhanpuri, Jambughoda, Sodhra, Jimiapura. (**Local Name** : Gando baval)

Samanea saman (Jacq.) Merrill in Journ. Wash. Acad. Sci. 6:47,1916, is commonly grown as an avenue tree. (**Local name** : Ratosarasdo)

COMBRETACEAE

Key to the Genera of the Combretaceae.

Petals absent

- Scandent shrubs, calyx persistent, enlarged in fruits -- *Calycopteris*
- Erect trees, calyx caducous
  - Flowers in spikes or racemes -- *Terminalia*
  - Flowers in globose heads -- *Anogeissus*

Petals present -- *Combretum*

Anogeissus (Wall.) Guillemin & Perrottet

(trop. Afr., Arabia, India, SE.As.)

Anogeissus latifolia (DC.) Wall. ex Bedd. Fl. Sylv. t.15, 1869; Hook. Fl. Br. Ind. 2:450, 1878; Cooke, Fl. Pres. Bomb. 1:482, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:22, t. 301, 1911; Ch. & Oza, Fl. Pav. 98, 1966; Gandhi in Fl. Hassan Dist. 292, 1976; Shah, Fl. Guj. St. 1:297, 1978.

Conocarpus latifolia Roxb. ex DC. Prodr. 3:17, 1828.

A large deciduous tree, 10-20m in height. Bark ash-coloured, smooth, scaly, exfoliating in irregular scales; inner bark purple exposing yellow wood. Leaves alternate or subopposite, coriaceous, turning red and dry before falling. Flowers yellow, in dense globose heads. Fruits crowded, winged and beaked, yellowish-brown.

Distribution and Locality : Common on steep slopes along with *Boswellia, Garuga, Azadirachta, Lannea.*

Original Home : Ind. or.

Flowers : May - June **Fruits** : November - February

Local Name : Dhaodo

Local Use : Wood is useful timber for construction; makes good charcoal; bark and gum are used in native medicine (fresh bark juice relieves cough).

Calycopteris Lamk.

(Indomal.)

Calycopteris floribunda Lamk. Encycl. 2:485, t.357, 1793; Hook. Fl. Br. Ind. 2:449, 1878; Cooke, Fl. Pres. Bomb. 1:512, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:21, t.300, 1911; Shah, Fl. Guj. St. 1:298, 1978; Almeida, Fl. Savant. 1:166, 1990.

Getonia floribunda Roxb. Pl. Corom. 1:61, t.87, 1795.

A deciduous scandent shrub, climbing on other erect trees. Bark dark brown, smooth; young branches slender, rufous-pubescent. Leaves simple, opposite, rufous-pubescent beneath. Flowers greenish-white or dirty-yellow in axillary and terminal clusters. Fruit oblong, ribbed, pubescent, crowned by persistent calyx lobes.

Distribution and Locality : Occasional, in open forests or on the edges of forest. The species is reputed as an indicator for high ground water level, which is true as one specimen was seen at Malbar, close to a well which showed level of water at 30 ft.

Original Home : Ind. or., Malaya

Flowers : February - June **Fruits** : March - June

Local Name : Ukshi

Local Use : Fuelwood

Combretum Loefl. (*nom. cons.*)

(trop. (exc. Austr.))

Combretum albidum D. Don in Trans. Linn. Soc. 15:429, 1827; Almeida, Fl. Savant. 1:167, 1990.

Combretum ovalifolium Roxb. Fl .Ind. 2:226, 1832; Hook. Fl. Br. Ind. 2:458, 1878; Cooke, Fl. Pres. Bomb. 1:515, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:26, t.303, 1911; Ch. & Oza, Fl. Pav. 100, 1966; Shah, Fl. Guj. St. 1:299, 1978.

A large woody deciduous scandent shrub. Bark light-black, peeling off into scales in older plants; in young plants pale yellowish-brown smooth. Leaves simple, opposite, narrowed at the base into petioles. Flowers yellowish-white; fragrant in axillary and

terminal panicles of spikes, often cauliflorous. Fruits ovoid with 4 membranous wings, tinged with red.

Distribution and Locality : Common in forest areas.

Original Home : Ind. or.

Flowers : January - April **Fruits** : February - May

Local Name : Madhvel

Local Use : Fuelwood; leaves serve as fodder.

Terminalia Linn. (*nom. cons.*)

(trop.)

Key to the Species of Terminalia

Leaves crowded at ends of branches, glands absent, flowers polygamous, upper flowers staminate, fruit not winged, tomentose ..... *T. bellirica*

Leaves with a stalked gland on the midrib on the undersurface, flowers bisexual, fruits winged, veins on the fruit wings straight, horizontal ..... *T. crenulata*

Terminalia bellirica (Gaertn.) Roxb. Pl. Corom. 2:54, t.198, 1798; Hook. Fl. Br. Ind. 2:445, 1878; Cooke, Fl. Pres. Bomb. 1:478, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:13, t.294, 1911; Ch. & Oza, Fl. Pav. 100, 1966; Shah, Fl. Guj. St. 1:300, 1978; Almeida, Fl. Savant. 1:168, 1990.

Myrobalanus bellirica Gaertn. Fruct. 2:90, t.97, 1791.

A large deciduous tree of rapid growth with spreading horizontal branches, 15-20m in height. Bark dark-grey, exfoliating in corky scales. Leaves crowded at ends of branches, glands absent. Flowers small, pale yellowish-green on slender axillary spikes, smaller than leaves, staminate and bisexual flowers mixed, having a strong offensive smell. Fruits ovoid covered with a grey tomentum.

Distribution and Locality : Occasional but well represented throughout the area, on slopes

and flat plains of hills; Narukot, Wadek, Dhanimataji hill, Jhand; generally occurs along with *Terminalia crenulata.*

Original Home : Ind. or., Malaya

Flowers : May **Fruits** : Throughout the year

Local Name : Behedo

Local Use : Fruits are eaten by wild animals; used in native medicine.

Terminalia crenulata Roth. Nov. Pl. Sp. 380, 1821; Ch. & Oza, Fl. Pav. 99, 1966; Shah, Fl. Guj. St. 1:301, 1978; Almeida, Fl. Savant. 1:169, 1990.

Pentaptera crenulata Roxb. Fl. Ind. 2:438, 1832.

Terminalia tomentosa Wight. & Arn. var. *crenulata* Clarke in Hook. f. Fl. Br. Ind. 2:447,1878.

Terminalia tomentosa (*non* Wight. & Arn. 1834) Cooke, Fl. Pres. Bomb. 1:479, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:18, t.297, 1911.

A large deciduous tree, 15-20m in height. Bark thick, dark coloured, deeply fissured, excorticating in characteristic rectangular flakes. Young parts covered with yellowish-brown pubescence. Leaves large with one or two stalked glands, on the under surface at the base of the midrib. Flowers bisexual, dull yellow in terminal and axillary panicles. Fruits coriaceous, brown, winged; wings 5, hard, veins straight running horizontally from the axis to the edges which are crenulate.

Distribution and Locality : Very common throughout the area; on slopes, plains, foothills and even at the top of the hill.

Original Home : Ind. or.

Flowers : February - May **Fruits** : April - December, almost throughout the year

Local Name : Sadad

Local Use : Wood makes an excellent timber, next in importance to teak; fuelwood; fruits eaten by wild animals; young branches and leaves used as green manure; gum from wounds burned as incense.

MYRTACEAE

Syzygium Gaertner (*nom. cons.*)

(paleotrop.)

Key to the Species of Syzygium

Leaves elliptic-oblong, petioles 1-3 cms long ..... *S. cumini*

Leaves narrowed-lanceolate, petioles 0.5 cms long ..... *S. heyneanum*

Syzygium cumini (Linn.) Skeels in U.S Dept. Agric. Bur. Pl. Indust. Bull. 248:2, 1912; Ch. & Oza, Fl. Pav. 101, 1966; Santapau, Fl. Khand. (ed. 3) 92, 1967; Shah, Fl. Guj. St. 1:303, 1978; Almeida, Fl. Savant. 1:171, 1990.

Myrtus cumini Linn. Sp. Pl. 471, 1753.

Eugenia jambolana Lamk. Encycl. 3:198, 1789; Hook. Fl. Br. Ind. 2:499, 1878; Cooke, Fl. Pres. Bomb. 1:523, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:41-2, t.313, 1911.

A large evergreen tree, 10-15m in height. Bark smooth ashy-brown. Leaves broadly elliptic-oblong, petioles 1-3 cms long, tapering at the base with distinct intramarginal veins. Flowers dirty-white, fragrant crowded in heads on the ends of branches in axillary cymes. Fruit oblong, dark purple, shining and glabrous, extremely juicy and edible.

Distribution and Locality : Occasional in forest areas near springs or streams - especially near Jhand and Ranjitnagar springs.

Original Home : Ind. or.

Flowers : February - April **Fruits** : March - July

Local Name : Jambu

Local Use : Fruits enjoyed by monkey, squirrels, birds and other wild animals.

Syzygium heyneanum (Duthie) Gamble, Fl. Pres. Madras 1:341, 1911; Gandhi in Fl. Hassan Dist. 281, 1976; Shah, Fl. Guj. St. 1:303, 1978; Almeida, Fl. Savant. 1:172, 1990.

Eugenia heyneana Duthie in Hook. f. Fl. Br. Ind. 2:500, 1878; Cooke, Fl. Pres. Bomb. 1:493, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:43, 1911.

A small tree, 3-5m in height, gregarious near river beds. Bark white or ash-coloured, smooth. The plant remains submerged for considerable period during the monsoons. Leaves lanceolate, gland-dotted with distinct intra-marginal vein. Flowers white in panicled cymes from an extra-axillary or lateral position, arising on leafless branches (never terminal). Inflorescence shorter than the leaves. Fruits oblong, pink, not edible.

Distribution and Locality : Common along banks of forest streams; Laphni Dam, Jhand, Vav, Keva, Gandhra, Dharia.

Original Home : Ind. or.

Flowers : January - April **Fruits** : Ripe in June

Local Name : Jar jambu

Local Use : Not much used.

CULTIVATED PLANTS

Eucalyptus globulus (Labill.) Merrill & Perry is introduced to the region in forest plantations near villages and on forest lands. (**Local Name** : Nilgiri)

LECYTHIDACEAE

Careya Roxb. *(nom. cons.)*

(Indomal.)

Careya arborea Roxb. Pl. Corom. 3:14, t.218, 1819; Hook. Fl. Br. Ind. 2:511, 1879; Cooke, Fl. Pres. Bomb. 1:497,1903; Talb. For. Fl. Pres. Bomb. & Sind 2:48, t.316,1911; Shah, Fl. Guj. St. 1:304, 1978; Almeida, Fl. Savant. 1:174, 1990.

A medium-sized deciduous tree, 10-15m in height. Bark rough, dark coloured with vertical and diagonal splits. Leaves sessile, large, obovate, turning red in the cold season. Flowers large, white and pink, having an unpleasant odour, a few crowded at ends of branches. Fruit green with persistent calyx lobes and style, having a strong unpleasant smell at maturity.

Distribution and Locality : Rare, generally on flat plains surrounded by hills around Jhand, Lambhiya, Mota Raska.

Original Home : Ind. or.

Flowers : March - April **Fruits** : April - June (in frs on 14-7-94)

Local Name : Kumbi

Local Use :Wood is used as timber and to make agricultural implements. Bark used in native medicine and yields fibres which are made into ropes for local use. Fruits are said to be poisonous and are not eaten by animals.

LYTHRACEAE

Lagerstroemia Linn.

(trop. As. to North Austr.)

Lagerstroemia parviflora Roxb. Pl. Corom. 1:66, 1795; Hook. Fl. Br. Ind. 2:575, 1879; Cooke, Fl. Pres. Bomb. 1:512,1903; Talb. For. Fl. Pres. Bomb. & Sind 2:61, t.323, 1911; Shah, Fl. Guj. St. 1:308, 1978; Almeida, Fl. Savant.1:179, 1990.

Lagerstroemia lanceolata Dalz. & Gibs. Bomb. Fl.98, 1861 (*non* Wall. 1834).

A medium-sized or small deciduous tree, 10-15m in height. Bark light brown, exfoliating in long thin scales like the teak; inner bark light red. Leaves simple, opposite; dried leaves give the tree a characteristic appearance. Flowers white, fragrant, in axillary and terminal panicles. Fruit ovoid with the calyx lobes adpressed closely to it and having a ring inside. Seeds winged.

Distribution and Locality : Very common, on lower slopes, foothills and valleys, throughout the area.

Original Home : Ind. or.

Flowers : May - August **Fruits** : June - December (persist for a long time on the tree)

Local Name : Kankadio, Bondaro

Local Use : Wood is a useful timber for construction, implements. An edible gum is extracted and bark is used in tanning.

ALANGIACEAE

Alangium Lamk. (*nom. cons.*)

(trop. Afr., Madag., Comoro. Is., China, SE.As., Indomal., E. Austr.)

Alangium salvifolium (Linn. f.) Wang in Pflanzenreich 41:9, f.2 A-E, 1910; Gamble, Fl. Pres. Madras 1:404, 1919; Ch. & Oza, Fl. Pav. 116, 1966; Shah, Fl. Guj. St. 1:347, 1978; Almeida, Fl. Savant. 1:199, 1990.

Grewia salvifolia Linn. f. Suppl. 409, 1781.

Alangium lamarkii Thw. Enum. 133, 1859; Hook. Fl. Br. Ind. 2:741, 1889; Cooke, Fl. Pres. Bomb. 1:575, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:79, t.333, 1911.

A small to medium-sized spinous deciduous tree, 4-10m in height, with long scandent branches. Bark yellowish-grey, smooth, thin, fissured, flaking into irregular scales. Leaves lanceolate, glabrous, shiny on the upper side, slightly pubescent on the lower surface. Flowers white, fragrant, densely pubescent. Fruit purple when ripe, filled with red pulp, crowned with persistent calyx lobes.

Distribution and Locality : Common, seen along banks of streams and kotars and even in moist valleys; found throughout the area.

Original Home : Geront. trop.

Flowers : February - April **Fruits** : April - June

Local Name : Ankol

Local Use : Fuelwood; wood is also used for construction, local furniture and other uses. Oil is extracted from seeds.

RUBIACEAE

Key to Genera of the Rubiaceae

Plants unarmed

Flowers in globose heads

Flowers yellow, ovules more than 2 in each cell; fruit a capsule

Calyx-tube 5-lobed, stigma clavate, leaves distinctly cordate at base -- ***Haldinia***

Calyx tube entire, truncate, stigma mitriform, leaves truncate, rounded or subacute at base -- ***Mitragyna***

Flowers white, ovule one in each cell, fruit a syncarp -- ***Morinda***

Flowers in dense paniculate pendant spikes -- ***Hymenodictyon***

Flowers not in globose heads or spikes, but in corymbose cymes -- ***Ixora***

Plants armed

Leaves petiolate, fasicled at ends of branches, ovary 2-celled, ovules on axillary placentas -- ***Xeromphis***

Leaves sessile, borne along the branches, ovary 1-celled, ovules on parietal placentas -- ***Gardenia***

Gardenia J. Ellis (*nom.cons.*)

(paleaotrop.)

Gardenia resinifera Roth. Nov. Pl. Sp. 150, 1821; Shah, Fl. Guj. St: 1:351, 1978.

Gardenia lucida Roxb. Fl. Ind. 2:553, 1824; Hook. Fl. Br. Ind. 115, 1880; Cooke, Fl. Pres. Bomb. 1:602, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:101, 1911.

A small deciduous tree, 3-6m in height. Bark grey, smooth, scaly. Stipules intrapetiolar, amplexicaule. Leaves simple, opposite and decussate, dark green, pubescent and shining above. Flowers near the ends of branches, solitary, axillary, fragrant, white turning to yellow. Fruit ellipsoidal, crowned with the calyx lobes. Plants resinous.

Distribution and Locality : Less frequent, seen at 'Ranna', Lambhiya, Katkuva.

Original Home : Ind. or., Burma

Flowers : October - January **Fruits** : December - February

Local Name : Dikamali, Jangli champo

Local Use : An opaque resin having a strong unpleasant smell is used as a veterinary medicine and in skin diseases.

Haldinia Ridsdale

(trop. & subtrop. Afr. & As.)

Haldinia cordifolia (Roxb.) Ridsdale in Blumea 24:361, 1978; Almeida, Fl. Savant. 1:205, 1990.

Nauclea cordifolia Roxb. Pl. Corom. 1:40, t.63, 1795 & Fl. Ind. 1:514, 1832.

Adina cordifolia (Roxb.) Hook. in Benth. & Hook. Gen. Pl. 2:30, 1873; Hook. Fl. Br. Ind. 3:24, 1880; Cooke, Fl. Pres. Bomb. 1:581, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:85, t.334, 1911; Shah, Fl. Guj. St. 1:349, 1978.

A large deciduous tree with horizontal spreading branches, 8-20m in height. Bark grey with silvery shine, smooth with horizontal wrinkles; exfoliating into thick scales in older trees. Leaves with long petioles, cordate at the base, orbicular or obovate. Stipules interpetiolar, closely covering the uppermost pair of buds. Flowers yellow in globose heads, axillary in 1-3 fasicles. Fruit head of many-seeded capsules with winged seeds.

Distribution and Locality : Occasional, on the lower slopes of hills, specially around Kada dam, Jhand.

Original Home : Ind. or.

Flowers : June - July **Fruits** : December - March

Local Name : Kalam, Haldarvo

Local Use : Wood is a useful timber used in house construction, agricultural implements and local furniture. Fruits are eaten by wild animals. Person having a severe migrane - juice of crushed leaves is pushed through the nose; person becomes semi-conscious and headache is relieved.

Hymenodictyon Wall. (*nom. cons.*)

(trop. Afr., Madag., Himal. to Celebes.)

Hymenodictyon orixense (Roxb.) Mabb. in Taxon 31 (1) :66, 1982; Almeida, Fl. Savant. 1:205, 1990.

Cinchona orixensis Roxb. Bot. Deser. Swietenia 21, 1793 & Med. Facts Obs. 6:152, 1795.

Cinchona excelsa Roxb. Pl. Corom. 2:3, t. 106, 1799.

Hymenodictyon excelsum (Roxb.) Wall. in Roxb. Fl. Ind. 2:149, 1824; Hook. Fl. Br. Ind. 3:35, 1880; Cooke, Fl. Pres. Bomb. 1:582, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:90, 1911; Shah, Fl. Guj. St. 1:352, 1978.

A large deciduous tree, 9-15m in height, conspicuous when in fruit. Bark thick, soft, grey, exfoliating in irregular shaped scales; inner bark very bitter. Leaves simple, opposite, decussate, membranous, narrowed into the long petiole, unequal-sided at the base. Stipules interpetiolar. Flowers white, fragrant, in terminal drooping panicles of spikes. Fruit a capsule, stout, recurved.

Distribution and Locality : Rare, seen a large tree on way to Wadek from Hirapura.

Original Home : Ind. or., Malaya

Flowers : June - July **Fruits** : October

Local Name : Dundro, Bhamarchhal

Local Use : Wood is soft, white and used for making toys and packing boxes. Bark is used in native medicine.

Ixora Linn.

(trop.)

Ixora arborea Roxb. ex Smith in Rees Cyclop. 19:5, 1811; Ch. & Oza, Fl. Pav. 119, 1966; Shah, Fl. Guj. St. 1:353, 1978; Almeida, Fl. Savant. 1:206, 1990.

Ixora parviflora Wall. Symb. 3:11, t.52, 1794 (*non* Lamk. 1791); Hook. Fl. Br. Ind. 3:142, 1880; Cooke, Fl. Pres. Bomb. 1:611, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:114, t. 350, 1911.

A small handsome evergreen tree, 3-4m in height. Bark dark coloured, covered with raised dots; inner bark brown. Leaves coriaceous, glabrous, oblong, shortly acuminate, petiole short and stout. Flowers white, sweet-scented in corymbose cymes. Fruit a globose berry.

Distribution and Locality : Occasional, especially in moist valleys, Kotars; seen at Dhanpuri, Kada dam, 'Ranna', 'Mankad kobro'- north of Narukot.

Original Home : Ind. or.

Flowers : March - April **Fruits** : May - June

Local Name : Nevri

Local Use : Wood is a useful timber. Green branches make excellent torches.

Mitragyna Korth. (*nom. cons.*)

(trop. Afr. As.)

Mitragyna parvifolia (Roxb.) Korth. Naucl. Ind. 19, 1839; Cooke, Fl. Pres. Bomb. 1:581, 1903; Ch. & Oza, Fl. Pav. 118, 1966; Shah, Fl. Guj. St. 1:335, 1978; Almeida, Fl. Savant. 1:207, 1990.

Nauclea parvifolia Roxb. Pl. Corom. 1:40, t.52, 1795.

Stephegyne parvifolia Korth. in Verh. Gesch. Nat. Bot.161, 1840; Hook. Fl. Br. Ind. 3:25, 1880; Talb. For. Fl. Pres. Bomb. & Sind 2:86, t.335, 1911.

A large deciduous tree, 9-15m in height. Bark light grey, smooth, exfoliating in irregular dark coloured scales which leave shallow depressions. Leaves variable in shape and size, rounded or acute at the base, dark green above, paler beneath. Flowers pale yellow or white, sweet-scented in globose heads, solitary, terminal. Fruit heads consist of oblong ribbed capsules.

Distribution and Locality : Occasional and found throughout the area ; a large tree seen on the Poyali hill which marks the northern boundary of the Sanctuary.

Original Home : Reg. Himal.

Flowers : May - July **Fruits** : November - December

Local Name : Karmi, Karam

Local Use : Wood is a useful timber for construction; fruits are eaten by wild animals; bark is used in native medicine; the tree has religious significance for the tribal people as young leafy branches are used in tribal rites of 'Ind' and 'Pithoro'.

Morinda Linn.

(trop.)

Morinda tomentosa Heyne ex Roth. Nov. Pl. Sp. 147, 1821; Ch. & Oza, Fl. Pav. 119, 1966; Shah, Fl. Guj. St. 1:355, 1978.

Morinda tinctoria Roxb. var. *tomentosa* Hook. f. in Hook. Fl. Br. Ind. 3:156, 1880; Cooke, Fl. Pres. Bomb. 1:614, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:122, t.356, 1911.

A small to medium-sized deciduous tree, 8-12m in height, young branchlets grooved, 4-angled and tomentose. Bark brown, corky with longitudinal fissures. Leaves large, thinly coriaceous, tomentose. Flowers white, sweet-scented in globose heads. Fruit an ellipsoidal or globose fleshy syncarpium.

Distribution and Locality : Very common throughout the area in the valleys, lower slopes, steep slopes and on top of hills.

Original Home : Ind. or., Malaya.

Flowers : April - May **Fruits** : June - July

Local Name : Aledi

Local Use : Wood is a very useful timber for local house construction and other purposes; fruit is adored by villagers, monkeys and deer alike; Too strong and difficult taste to cultivate.

Xeromphis Rafinesque

(trop.)

Key to the Species of Xeromphis

Leaves less than 8 cms long, flowers and fruits less than 3 cms in diameter, spines axillary ..... ***X. spinosa***

Leaves more than 10 cms long , flowers more than 4 cms and fruit more than 6 cms in diameter, spines terminal ..... ***X. uliginosa***

Xeromphis spinosa (Thunb.) Keay, Bull. Jard. Bot. Bruz. 28:37, 1958; Shah, Fl. Guj. St. 1:361, 1978; Almeida, Fl. Savant. 1:216, 1990.

Gardenia spinosa Thunb. Diss. Gard. no. 7, 1780.

Randia spinosa (Thunb.) Bl. Bijdr. 981, 1826; Ch. & Oza, Fl. Pav. 119, 1966.

Gardenia dumetorum Retz. Obs. 2:14, 1781.

Randia dumetorum Lamk. Encycl. Suppl. 2:227, 1793; Cooke, Fl. Pres. Bomb. 1:599, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:98, t.341, 1911.

A small deciduous tree, 3-4m in height, armed with 2-3 cm long sharp and stout axillary spines. Bark grey, scaly. Leaves fasicled on suppressed branches. Flowers white, fading to yellow, less than 3 cms in diameter, fragrant, 2-3 together on short suppressed branches. Fruit ovoid or sub-globose, yellow.

Distribution and Locality : Occasional, seen several trees on Dhanimataji hill, Poyali hill, Gandhra, Garumal, 'Ranna'.

Original Home : Geront. trop.

Flowers : March - June **Fruits** : November - January

Local Name : Mindhal

Local Use : Wood is a useful timber; bark and fruits are used in native medicine; ripe fruits are cooked and eaten ; unripe fruits use to poison fish. In Hindu marriage ceremony, the dried fruits are tied to the wrist of the bride and bridegroom.

Xeromphis uliginosa (Retz.) Maheshwari in Bull. Bot. Surv. Ind. 3:92, 1961; Shah, Fl. Guj. St. 1:361, 1978; Almeida, Fl. Savant. 1:216, 1990.

Gardenia uliginosa Retz. Obs. Bot. 2:14, 1781.

Randia uliginosa (Retz.) DC. Prodr. 4:386, 1830; Hook. Fl. Br. Ind. 3:110, 1880; Cooke, Fl. Pres. Bomb. 1:599, 1903; Talb. For. Fl. Pres. Bomb. & Sind 2:97, t.340, 1911.

A small deciduous tree, 3-5m in height, usually with 1-2 pairs of short straight spines at ends of branches. Bark reddish-brown, scaly. Leaves more than 10 cms long, fasicled at ends of suppressed branches, obovate. Flowers white, scented, more than 4 cms in diameter, dimorphic, solitary at the axils. Fruit more than 6 cms in diameter, sub-globose or ovoid, crowned by persistent calyx lobes.

Distribution and Locality : Occasional, seen at 'Ranna', Lambhiya, Jhand, Jabban-Malbar-Mahudibor, Dhanimataji hill- Harbado hill.

Original Home : Ind. or., Burma.

Flowers : April - June (new leaves in March - April) **Fruits** : December - February

Local Name : Gegadi

Local Use : Fruits are eaten after boiling or roasting.

SAPOTACEAE

Key to the Genera of the Sapotaceae

Trees deciduous, leaves crowded at ends of branches, flowers are borne at ends of leafless branches, stamens all fertile, 16 or more -- ***Madhuca***

Trees evergreen, leaves spread along branches, flowers borne along with leaves, fertile stamens 6-8 with as many staminodes -- ***Manilkara***

Madhuca J. F. Gmel.

(Indoch., Indomal. (esp. Malaysia), Austr.)

Madhuca longifolia (Koenig) Macbride, Contr. Gray Herb. Harv. Univ. NS 53:17,1918; van Royen in Blumea 10:53,1960; Ramamoorthy in Fl. Hassan Dist. 193,1976.

Bassia longifolia Koenig in Linn. Mantissa 2, App. 563, 1771; Hook. Fl. Br. Ind. 3:544, 1882; Cooke, Fl. Pres. Bomb. 2:92, 1908; Talb. For. Fl. Pres. Bomb. & Sind 2:157, 1911.

Madhuca indica J. F. Gmelin, Syst. Nat. 799,1791.

var. ***longifolia*** van Royen, l. c. 54, 1960; Oza in *Indian Forester*, Vol.97, No. 11, pp.651-653,1971.

A large deciduous tree with rounded crown, 10-15m in height, young parts densely rufous-tomentose. Bark thick, dark coloured, fissured with regular horizontal cracks, scaly; inner bark red, milky. Leaves large, elliptic, clustered at ends of branches, pubescent when young. Flowers yellow, in fasicles at ends of leafless branches, fleshy, sweet-scented, corolla caducous. Fruit ovoid, fleshy, greenish.

Distribution and Locality : Very common in the foot hills, valleys and around villages; even in open forest areas. Huge trees forming almost pure stands are met with at Narukot and most other villages of Jambughoda taluka, but is conspicuously missing in the Jimiapura, Sodhra, Bamankuva, Dolimar surroundings of the Halol taluka.

Original Home : Ind. or.

Flowers : March - April **Fruits** : June - July

Local Name : Mahudo

Local Use : Wood is a useful timber, but the flowers and fruits are of more value. Flowers are extensively collected in early mornings when the corolla has fallen during the night. The region below trees is generally burnt to clear the ground of leaves and to make collection of flowers easier. This results commonly in spread of fires in the forest - seen in the Keva-Pipia forest(' Ranna') during March 1993. The flowers are eaten by bears, chousingha and other wild animals, as well as by man, raw or cooked. Flowers are extensively used for preparation of country liqour. Dried flowers are sold to Forest Corporation collection depots at Rs.60/- per 20 Kgs (during April 1994). The fruits, called as 'Doli' are also collected for pulp and especially for seeds which yield an edible oil. Thus natural regeneration of ***Madhuca*** trees is on the

decline.

Native Medicine : Flowers are crushed with water and the juice is boiled till a coagulated white paste is formed. This is called Kokum and applied on burns and cuts on legs.

Manilkara Adans. (*nom. cons.*)

(trop.)

Manilkara hexandra (Roxb.) Dub. in Ann. Mues. Coll. Marseille 3:9, f.2, 1915; Ch. & Oza, Fl. Pav. 135, 1966; Shah, Fl. Guj. St. 1: 407, 1978.

Mimusops hexandra Roxb. Pl. Corom. 1:16, t.15, 1795; Hook. Fl. Br. Ind. 3:549, 1872; Cooke, Fl. Pres. Bomb. 2:95, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:163, 1911.

A medium-sized to large evergreen tree, 10-15m in height. Bark greyish-black, rough with deep longitudinal furrows. Leaves spread along the branches, coriaceous, dark green above, paler beneath. Flowers pale yellow, small, numerous in axillary fasicles. Fruit red when ripe, ovoid.

Distribution and Locality : Occasional, evenly dispersed throughout the area.

Original Home : Ind. or.

Flowers : November - December **Fruits** : ripe in March

Local Name : Rayan

Local Use : Wood is a useful timber.

EBENACEAE

Diospyros Linn.

(Warm)

Diospyros melanoxylon Roxb. Pl. Corom. 1:36, t.46, 1795; Hook. Fl. Br. Ind. 3: 564, 1872; Cooke, Fl. Pres. Bomb. 2:99, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:174, 1911; Ch. & Oza, Fl. Pav. 135, 1966; Shah, Fl. Guj. St. 1:409, 1978.

A medium-sized deciduous tree, 10-14m in height, young parts covered with a

yellowish tomentum. Bark thick, deeply divided into plates of hard black tissue, separated by thin whitish corky layers; inner bark reddish. Leaves simple, alternate or sub-opposite, very coriaceous, glabrous and shining above, tomentose beneath. Flowers unisexual, monoecious-male flowers in axillary or extra-axillary fasicles, smaller than the single, solitary, axillary female flowers. Fruit globose or ovoid, yellow. Pulp yellow, edible when ripe.

Distribution and Locality : Common throughout the area but almost all the trees are mutilated to various degrees.

Original Home : Ind. or., Zeylon

Flowers : April - May **Fruits** : ripe in December

Local Name : Timbru, Timbervo

Local Use : Wood is a useful timber. Fruits are edible when ripe and eaten by wild animals and man. The leaves are extensively collected for making local cigarette wrappers (bidi). In the process, branches are lopped for the leaves and hence the mutilated appearance of the tree. The flowering thus is almost suppressed thereby resulting in less regeneration of the species.

OLEACEAE

Schrebera Roxb.

(S.Am., trop. Afr., India, SE.As.,Borneo)

Schrebera swietenioides Roxb. Pl. Corom. 2:1, t.101, 1798; Hook. Fl. Br. Ind. 3:604, 1872; Cooke, Fl. Pres. Bomb. 2:116, 1904; Talb. For. Fl. Pres. Bomb & Sind 2:193, t.388, 1911; Shah, Fl. Guj. St. 1:412, 1978.

A medium-sized deciduous tree, 12-15m in height. Bark grey, thin, scaly, scabrous. Leaves imparipinnately compound, opposite, leaflets 3-4 pairs. Flowers white or brown, fragrant at night, in terminal trichotomous cymes. Fruit a pear shaped capsule, thick, woody, yellowish-brown with raised white dots, pendulous, seated on a rough, truncate, enlarged bell-shaped calyx. Seeds winged.

Distribution and Locality : Occasional and dispersed throughout the area.

Original Home : Ind. or., Burma

Flowers : April - May **Fruits** : Ripe in next cold season in December

Local Name : Mokho

Local Use : Wood is a useful timber. Fruits are eaten by wild animals.

NYCTANTHACEAE

Nyctanthes Linn.

(India, Siam, Sumatra, Java)

Nyctanthes arbor-tristis Linn. Sp. Pl. 6, 1753; Hook. Fl. Br. Ind. 3:603, 1872; Cooke, Fl. Pres. Bomb. 2:115, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:192, t.387, 1911; Shah, Fl. Guj. St. 1:410, 1978; Almeida, Fl. Savant. 1:248, 1990.

A small tree with quadrangular branches, 3-7m in height. Bark light-brown, thick, rough. Leaves scabrous, dark green above, coriaceous, paler and tomentose beneath. Flowers orange and white, sweet scented in 3-5 flowered short terminal trichotomous cymes. Fruit a capsule, orbicular, compressed.

Distribution and Locality : Common in certain localities near Kada dam; very common undergrowth on Dhanimataji hill.

Original Home : Ind. or.

Flowers : August - February **Fruits** : Almost throughout the year

Local Name : Parijat, Chhari

Local Use : Very useful fuelwood; flowers yield an orange dye.

SALVADORACEAE

Salvadora Linn.

(Warm Afr., As.)

Salvadora persica Linn. Sp. Pl. 122, 1753; Hook. Fl. Br. Ind. 3:619, 1882; Cooke, Fl. Pres. Bomb. 2:121, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:200, t.392, 1911; Shah, Fl. Guj.

St. 1:413, 1978; Almeida, Fl. Savant. 1:248, 1990.

A small evergreen tree with shining drooping branches, 3-4m in height. Bark grey, thin. Leaves glaucous-green, fleshy. Flowers greenish-yellow in axillary and terminal panicles. Fruits globose drupes, red when ripe.

Distribution and Locality : Generally found near habitation and as hedges of fields.
Original Home : Oriens, Ind. or., Afr. bor.
Flowers : November - May **Fruits** : January - June
Local Name : Piludi
Local Use : Fruit is eaten by children and wild animals and birds; young branches and leaves make good fodder for camels; native tooth-brushes are made from twigs.

APOCYNACEAE

Key to the Genera of the Apocynaceae

Corolla with corona of scales, anthers exerted,
seeds comose at the lower end -- ***Wrightia***
Corolla without corona of scales, anthers included,
seeds comose at the upper end -- ***Holarrhena***

Holarrhena R.Br.

(trop. Afr., Madag., India, SE.As., Philipp., Malay penin.)

Holarrhena antidysentrica (Roth) A.DC. in DC. Prodr. 8:413, 1844; Hook. Fl. Br. Ind. 3:644, 1882; Cooke, Fl. Pres. Bomb. 2:133, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:217, t.398,1911; Gamble, Fl. Pres. Madras 811, 1923; Ch. & Oza, Fl. Pav. 137, 1966; Shah, Fl. Guj. St. 1:417, 1978; Almeida, Fl. Savant. 1:253, 1990.

Echites antidysentrica Heyne ex Roth, Nov. Pl. Sp. 138, 1821.

Chonemorpha antidysentrica (Roth) G.Don, Gen. Syst. 4:76, 1837-38.

A large shrub or a small deciduous tree, 3-6m in height; usually slender-stemmed

with drooping branches and milky latex. Bark purplish, smooth, furrowed and scaly. Leaves large, broadly ovate or elliptic, thinly coriaceous, dark green above, paler beneath. Flowers white, scented in lax terminal corymbose or paniculate cymes, shorter than the leaves. Follicles green, studded with white spots. Seeds comose with brown deciduous hairs at the apex.

Distribution and Locality : Very common throughout the area, on steep and rocky slopes, flats at the top of hills, open forest areas. Abundant in 'Ranna'.

Original Home : As. trop.

Flowers : March - June **Fruits** : March - December

Local Name : Indrajav

Local Use : Bark, leaves, fruit and seeds used in native medicine. Leaves are not eaten by goats. Regeneration from seeds, root-suckers and coppice shoots is vigorous. Wood is useful source of fuelwood, local furniture.

Wrightia R.Br.

(trop. Afr., As., Austr.)

Key to the Species of Wrightia

Leaves tomentose, coronal scales connate, short, obtuse, follicles stout, brownish-black, rough, covered with white tubercles, united throughout their length ..... ***W. arborea***

Leaves nearly glabrous, coronal scales fimbriate, follicles slender, olivaceous-green, smooth, free except at the tips ..... ***W. tinctoria***

Wrightia arborea (Dennst.) Mabberly in Taxon 26:533, 1977; Almeida, Fl. Savant. 1:255, 1990.

Periploca arborea Dennst. Schlussel 13:23, 25, 1818 & in Forst. Allg. Teutsch. Gaertn. Mag. 3;32, 41, 83, 1818.

Wrightia tomentosa Roem & Sch. Syst. Veg. 4:414, 1819; Hook. Fl. Br. Ind. 3:653, 1882; Cooke, Fl. Pres. Bomb. 2:137, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:222-3, 1911; Ch. & Oza, Fl. Pav. 137, 1966; Shah, Fl. Guj. St. 1:420, 1978.

A small tree with milky latex, 6-8m in height; leaves and branchlets tomentose. Bark thin, dark grey, corky. Leaves thinly coriaceous, pubescent above, paler and tomentose beneath. Flowers yellowish-white, foul-smelling, in axillary corymbose cymes shorter than the leaves. Coronal scales connate, short and obtuse. Follicles stout, cylindric, brownish-black, rough, covered with white tubercles, united throughout their length. Seeds comose, with deciduous brown hairs attached at the base.

Distribution and Locality : Occasional and sparse in dense forest areas.

Original Home : Ind. or.

Flowers : April - June **Fruits** : January - February

Local Name : Dudhkadi

Local Use : A medicinal oil is extracted from the seeds. A broken twig dipped in goat's milk sets into curd within five minutes.

Wrightia tinctoria R.Br. in Memb. Wern. Soc. 1:74, 1811; Hook. Fl. Br. Ind. 3:653, 1882; Cooke, Fl. Pres. Bomb. 2:137, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:222, t.400, 1911; Ch. & Oza, Fl. Pav. 137, 1966; Shah, Fl. Guj. St. 1:420, 1978; Almeida, Fl. Savant. 1:255, 1990.

Wrightia rothii G.Don. Gen. Syst. 4:86, 1837.

A small deciduous tree with milky latex, 5-10m in height, branchlets grey-puberlous or glabrous. Bark smooth, scaly. Leaves thin, membranous, puberlous beneath when young; glabrous at maturity. Flowers white or yellowish, scented in axillary or terminal lax spreading cymes having fimbriate coronal scales. Follicles slender, cylindric, pendulous, olivaceous-green, united at the tips, smooth. Seeds comose with hairs attached at the base.

Distribution and Locality : Common throughout the area

Original Home : Ind. or.

Flowers : March - April **Fruits** : January - February

Local Name : Kado

Local Use : Wood is used locally for construction, furniture. Leaves sometimes used as bidi wrappers. Leaves yield a kind of indigo dye.

BORAGINACEAE

Key to the Genera of the Boraginaceae

Fruit a one-stoned drupe -- ***Cordia***

Fruit a drupe with 2-4 pyrenes -- ***Ehretia***

Cordia Linn.

(Warm)

Cordia dichotoma Forst. f. Prodr. 18, 1786; Ch. & Oza, Fl. Pav. 145, 1966; Shah, Fl. Guj. St. 1: 444, 1978; Almeida, Fl. Savant. 1:273, 1990.

Cordia myxa auct. plur. (*non* Linn. 1753); Cooke, Fl. Pres. Bomb. 2:199, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:270, t.422, 1911.

Cordia obliqua Willd. Phytogr. 4, t.4, 1794; Hook. Fl. Br. Ind. 4:137, 1883 (*Excl. var.*)

Cordia latifolia Roxb. Fl. Ind. 2:330, 1824.

A medium-sized deciduous tree with a short crooked trunk, 8-12m in height. Bark thick, brownish, rough and longitudinally fissured; inner bark fibrous. Leaves variable in shape, broadly obovate, nearly orbicular, rough above, more or less glabrous beneath. Flowers creamy-yellow or white in axillary and terminal cymes. Fruit one-celled, one-seeded drupe, globose or ovoid, yellow when ripe with an accrescent calyx.

Distribution and Locality : Occasional, sparsely dispersed in forest areas, more frequent near habitation.

Original Home : As. trop., Austral.

Flowers : March - April **Fruits** : March - June

Local Name : Gundi

Local Use : Unripe fruits are pickled. Ripe fruits are enjoyed by birds, wild animals and also

by humans. Fruits are cooked as vegetable and used in native medicine. Bark yields a strong fibre, made into local rope. Wood is used as a timber.

Ehretia Linn.

(Chiefly old world)

Ehretia laevis Roxb. Pl. Corom. 42, t.56, 1795; Hook. Fl. Br. Ind. 4:141, 1883; Cooke, Fl. Pres. Bomb. 2:204, 1905; Talb. For. Fl. Pres. Bomb. & Sind 2:275, tt.424-425, 1911; Shah, Fl. Guj. St. 1:447, 1978; Almeida, Fl. Savant. 1:274, 1990.

A small to medium-sized deciduous tree, 6-10m in height. Bark grey, thick, smooth and scaly; inner bark soft, white and without fibres. Leaves variable in shape, broadly ovate or elliptic, thin and glabrous. Flowers small, white, in axillary or lateral corymbose cymes. Fruits sub-globose, red, black when ripe.

Distribution and Locality : Frequently met with in forest areas only. Seen at Borkach, 'Ranna', Jabban, Malbar, Gandhra, Chalvad, Dhanimataji hill.

Original Home : As. *et* Austral. trop.

Flowers : January - July **Fruits** : ripen during March - June

Local Name : Tamburiyo

Local Use : Wood is useful timber. The fruit and soft inner bark are mixed with flour and eaten in times of scarcity.

BIGNONIACEAE

Key to the Genera of the Bignoniaceae

Leaves simple	--	***Tecomella***
Leaves 1-pinnate	--	***Dolichandrone***
Leaves 2-3 pinnate	--	***Oroxylum***

Dolichandrone (Fenzl.) Seemann (*nom. cons.*)

(trop. E.Afr., Madag., trop. As., Austr.)

Dolichandrone falcata Seem. var. ***lawii*** (Seem.) Haines in Bot. Bihar & Orissa 658, 1922 ; Santapau, Fl. Khand. (ed.3) 191, 1967; Shah, Fl. Guj. St. 1:518, 1978.

Dolichandrone lawii Seem. in Journ. Bot. 8:380, 1870; Hook. Fl. Br. Ind. 4 : 380, 1883.

Dolichandrone falcata Seem. in Journ. Bot. 8:381, 1870; Cooke, Fl. Pres. Bomb. 2:329, 1904; Talb. For. Fl. Pres. Bomb. & Sind 2:310, 1911.

A small deciduous tree with a short crooked trunk, 5-8m in height. Bark thin, grey and scaly. Leaves 1-pinnate, imparipinnate, leaflets 2-3 pairs with an odd large terminal one, all oblique at the base, coriaceous, pubescent. Flowers white, scented, in few-flowered terminal corymbose cymes. Fruit a flat, strongly falcate (sickle-shaped) capsule. Seeds flat, winged.

Distribution and Locality : Very rare ; Seen only a single tree. My field guide had come across the tree for the first time (14-5-93, Katkuva to Jabban).

Original Home : Ind. or.

Flowers : March - May **Fruits** : June - December

Local Name : Netarshindi

Local Use : Leaf paste is used to relieve headache. Wood is used for making agricultural implements.

Oroxylum Vent.

(S. China, SE. As., Indomal.)

Oroxylum indicum (Linn.) Vent. Dec. Gen. Nov. 9, 1808; Hook. Fl. Br. Ind. 4:378, 1884; Cooke, Fl. Pres. Bomb. 2:327, 1905; Talb. For. Fl. Pres. Bomb. & Sind 2:306, 1911; Shah, Fl. Guj. St. 1:520, 1978 ; Almeida, Fl. Savant. 1:311, 1990.

Bignonia indica Linn. Sp. Pl. 625, 1753.

A small deciduous tree with extremely soft wood, 5-10m in height. Bark light

brown, soft with tubercles, containing greenish juice. Leaves large, 2-3 pinnate on a stout rachis. Flowers large, purple, foetid, in unilateral racemes on an erect, terminal, hollow peduncle. Fruit a 1'-2.5' long, flat capsule, dark brown to maroon in colour, with winged seeds.

Distribution and Locality : Very rare; seen 2 trees along the roadside between Vav and Jharva (on 3-1-94, bark photograph taken).

Original Home : As. trop.

Flowers : May - July **Fruits** : ripen in January - remain for a long time on the tree

Local Name : Tetu

Local Use : Very difficult to climb this tree as branches break off very easily. Conspicuous during flowering and fruiting.

Tecomella Seem.

(SW. As., Arabia)

Tecomella undulata (Sm.) Seem. in Ann. & Mag. Nat. Hist. (Ser.3) 10:30, 1862; Cooke, Fl. Pres. Bomb. 2:328, 1905; Talb. For. Fl. Pres. Bomb. & Sind 2:307, 1911; Shah, Fl. Guj. St. 1:523, 1978.

Bignonia undulata Sm. Exot. Bot. 1:35, t.19, 1805.

Tecoma undulata G.Don, Gen. Syst. 4:223, 1837; Hook. Fl. Br. Ind. 4:378, 1884.

A small nearly evergreen tree, 5-7m in height. Bark reddish-brown or dark grey, corky. Leaves simple, opposite, oblong or linear-oblong, obtuse at the apex, grey, margins more or less undulate. Flowers when in full bloom lend a beautiful sight; large, orange-yellow, in corymbose, few-flowered racemes. Capsules linear-oblong, curved.

Distribution and Locality : Very Rare; seen only in forests behind Malbar.

Original Home : Oriens, Ind. bor. occ.

Flowers : March - April **Fruits** : March - July

Local Name : Ragat rohido

Local Use : Wood is much priced for carving and furniture. Bark is very useful in native medicine, especially in cure of Jaundice.

VERBENACEAE

Key to the Genera of the Verbenaceae

Fruits enclosed in inflated persistent calyx	--	*Tectona*
Fruits not enclosed in inflated persistent calyx	--	*Gmelina*

Gmelina Linn.

(trop. Afr., Masc.; E. As., Indomal., Austr.)

Gmelina arborea Roxb. Pl. Corom. 3:42, t.248, 1815; Hook. Fl. Br. Ind. 4:581, 1885; Cooke, Fl. Pres. Bomb. 2:424, 1905; Talb. For. Fl. Pres. Bomb. & Sind 2:348-9, t.451, 1911; Shah, Fl. Guj. St. 1:580, 1978; Almeida, Fl. Savant. 1:337, 1990.

A medium-sized deciduous tree, 8-15m in height. Bark smooth, greyish-yellow, corky; inner-bark mottled yellow, turning brown on exposure to air. Leaves long-petioled, broadly ovate, sub-cordate at base, pubescent. Flowers large, yellow on naked branches or appearing with the young leaves, in few-flowered cymes arranged in terminal yellowish-tomentose panicles. Drupe ovoid, orange-yellow when ripe.

Distribution and Locality : Occasional, seen more in forest plantations. Sparsely scattered throughout the forests.

Original Home : Ind. or., Malaya

Flowers : March - April **Fruits** : May - June

Local Name : Shivan, Sevan

Local Use : Wood is an excellent timber. Ripe fruits are eaten by natives and wild animals; Roots and bark are used in native medicine.

Tectona Linn f. (*nom. cons.*)

(Indomal.)

Tectona grandis Linn. f. Suppl. 151, 1781; Hook. Fl. Br. Ind. 4: 570, 1885; Cooke, Fl. Pres. Bomb. 2:424, 1905; Talb. For. Fl. Pres. Bomb. & Sind 2:346, t.450, 1911; Ch. & Oza, Fl. Pav. 186, 1966; Shah, Fl. Guj. St. 1:564, 1978; Almeida, Fl. Savant. 1:339,1990.

A large deciduous tree, 15-18m in height; branchlets quadrangular, chanelled, grey-stellately tomentose. Bark grey with shallow furrows, exfoliating in long thin flakes. Leaves large in young plants and coppice shoots. Upper surface of leaves is rough and under surface is stellately grey tomentose. Flowers white, in large terminal panicled cymes. Fruit enclosed in enlarged persistent accrescent calyx.

Distribution and Locality : The dominant tree of the forests, found everywhere but in a degraded condition towards the peripheral areas of the sanctuary.

Original Home : Ind. or., Burma

Flowers : June - August **Fruits** : ripen in November - January

Local Name : Saag

Local Use : Wood is an excellent timber. The first flush of leaves was heavily infected by a moth caterpillar (during July - August 1993). The leaf tissue was eaten away leaving the vein network, lending the tree a brown appearance. The infected leaves were shed by September and new leaves were again borne but of a slightly smaller size.

EUPHORBIACEAE

Key to the Genera of the Euphorbiaceae

Straggling shrubs

Distichous leaves resembling pinnate leaves	--	*Kirganelia*
Distichous leaves not resembling pinnate leaves	--	*Securinega*

Trees

Leaves very small, pinnately arranged on the branchlets, flowers in axillary fasicles, fruit fleshy indehiscent -- ***Emblica***

Leaves large, alternate, not resembling pinnate leaves, flowers in axillary clusters on leafless woody branches, fruit black when ripe -- ***Bridelia***

Leaves large, resinous-glandular beneath, stipules persistent, dioecious plants, fruits covered with red resinous powder -- ***Mallotus***

Bridelia Willd.

(Afr., As.)

Key to the Species of Bridelia

Flowers dioecious, in axillary clusters ..... ***B. squamosa***

Flowers monoecious, in axillary spikes on leafless branches ..... ***B. retusa***

Bridelia retusa (Linn.) Spreng. Syst. Veg. 3:48, 1826; Hook. Fl. Br. Ind. 5:268, 1887 (p.p.); Cooke, Fl. Pres. Bomb. 2:572-3, 1906 (p.p.); Talb. For. Fl. Pres. Bomb. & Sind 2:435, t.488, 1911 (p.p.); Ch. & Oza, Fl. Pav. 209, 1966; Shah, Fl. Guj. St. 2:614, 1978; Almeida, Fl. Savant. 1:379, 1990.

Cluytia retusa Linn. Sp. Pl. 1042, 1753.

Bridelia spinosa Willd. Sp. Pl. 4:979, 1805.

A small deciduous tree, 4-10m in height, spinous when young. Bark grey, rough, scaly; inner bark reddish, fibrous. Leaves elliptic-oblong, light green, shining above, pale with whitish pubescence or glaucous beneath, lateral nerves numerous, prominent, straight with fine reticulate network. Flowers greenish-yellow or pinkish on axillary or terminal spikes on leafless branches. Fruit fleshy with persistent enlarged calyx, purple-black.

Distribution and Locality : Occasional in forest areas.

Original Home : Ind. or., Malaya

Flowers : July - September; leaves shed in March - April. Young trees have long sharp spines

which fall off later. **Fruits** : October - December

Local Name : Dantiyo

Local Use : Wood is a durable timber. Fruit is edible, bark is used in native medicine.

Bridelia squamosa (Lamk.) Gehrm. in Engl. Bot. Jahrb. 41: Beilb, 95, 1908; Ch. & Oza, Fl. Pav. 209, 1966; Santapau, Fl. Khand. (ed.3) 243, 1967 (p.p.); Shah, Fl. Guj. St. 2:614, 1978; Almeida, Fl. Savant. 1:380, 1990.

Cluytia squamosa Lamk. Encycl. 5 (2) : 54, 1790.

A small deciduous tree, 6-8m in height. Bark yellow. Leaves elliptic-oblong, shortly acuminate at the apex, veins prominent on lower surface. Flowers in axillary clusters, sessile, creamy-white. Fruits globose with persistent calyx, turns black on drying.

Distribution and Locality : Less common, sparsely dispersed.

Original Home : Ind. or.

Flowers : August - February **Fruits** : August - February

Local Name : Akalkanto

Local Use : Wood is used as a small-time timber; fuelwood.

Emblica Gaertn.

(Madag., E.As., Indomal.)

Emblica officinalis Gaertn. Fruct. 2:122, t.108, 1791; Ch. & Oza, Fl. Pav. 211, 1966; Santapau, Fl. Khand. (ed.3) 246, 1967; Shah, Fl. Guj. St. 2:618, 1978; Almeida, Fl. Savant. 1:382, 1990.

Phyllanthus emblica Linn. Sp. Pl. 982, 1753; Hook. Fl. Br. Ind. 5:289, 1887; Cooke, Fl. Pres. Bomb. 2:585, 1906; Talb. For. Fl. Pres. Bomb. & Sind 2:442, t.491, 1911.

A small deciduous tree, 6-12m in height. Bark thick, grey, exfoliating in small irregular shaped patches. Leaves simple, sub-sessile, distichous, appearing like pinnate leaves, linear. Flowers small, yellowish, in axillary fasicles on leaf bearing branches, on

the naked portion below the leaves. Flowers unisexual, monoecious. Fruits globose, fleshy, indehiscent, pale yellow with 6 longitudinal faint lines.

Distribution and Locality : Common throughout the area.

Original Home : As. trop.

Flowers : March - April **Fruits** : October - February

Local Name : Aamri, Amala

Local Use : Unripe fruits pickled, also used in native medicine; wood used for construction, well lining and furniture; tree coppices well; ripe fruits eaten by wild animals; leaves used as a green manure.

Kirganelia A. Juss.

(trop. & Subtrop. exc. Eur. & N.As.)

Kirganelia reticulata (Poir.) Baill. Etud. Gen. Euphorb. 613, 1858; Ch. & Oza, Fl. Pav. 211, 1966; Santapau, Fl. Khand. (ed.3) 246, 1967; Shah, Fl. Guj. St. 2:629, 1978; Almeida, Fl. Savant. 1:389, 1990.

Phyllanthus reticulatus Poir. in Lamk. Encycl. 5:298, 1804; Hook. Fl. Br. Ind. 5:288, 1887; Cooke, Fl. Pres. Bomb. 2:585, 1906; Talb. For. Fl. Pres. Bomb. & Sind 2:440, t.490, 1911.

A large climbing shrub with drooping branches covered with grey-tomentum, flowering almost throughout the year. Bark brown, thin. Leaves elliptic or obovate, distichous, glabrescent, dark green above, paler beneath. Flowers unisexual, monoecious, in axillary fasicles, greenish-yellow or creamy-white. Fruit a fleshy berry, globose, purple, smooth and shining.

Distribution and Locality : Towards the edge of forests, closer to habitation.

Original Home : Geront. trop.

Flowers : August - January **Fruits** : August - January

Local Name : Kamboi

Local Use : Leaves and bark are used as diuretic by natives. Fruits edible, eaten by children and wild animals.

Mallotus Lour.

(trop. Afr., Madag. ; E. & SE. As., Indomal. to New Caled. & Fiji, N.& E. Austr.)

Mallotus phillippensis (Lamk.) Muell.- Arg. in Linnaea 34 :196, 1865; Hook. Fl. Br. Ind. 5:442, 1887; Cooke, Fl. Pres. Bomb. 2:615, 1906; Talb. For. Fl. Pres. Bomb. & Sind 2:485, t.509, 1911; Ch. & Oza , Fl. Pav. 231, 1966; Shah, Fl. Guj. St. 2:630, 1978; Almeida, Fl. Savant. 1:391, 1990.

Croton phillippense Lamk. Encycl. 2:206, 1786.

A small tree with buttressed trunk, 5-10m in height, young parts and branchlets pubescent. Bark thin, grey, irregularly cracked; inner bark red. Leaves large, ovate-lanceolate, acuminate at apex, sub-coriaceous. Petioles long with 2 sessile glands, lower surface of leaf is pubescent and covered with crimson glands. Flowers dioecious, small in sessile clusters arranged in erect, terminal, single or fasicled spikes, longer or shorter than leaves. Fruit globose, 3-lobed, covered with red resinous powder which is soluble in ether or in alcohol.

Distribution and Locality : Very Rare, only one tree was seen on edge of a field in a distorted form near Hirapura.

Original Home : As. *et* Austral. trop.

Flowers : November - January **Fruits** : February - May

Local Name : Kampilo, Kankur Oro

Local Use : Wood is used as source of fuel; bark and red resinous powder from the fruit is used in native medicine and in dyeing and tanning.

Securinega Comm. ex A. Juss. (*nom. cons.*)

(temp. & subtrop.)

Securinega virosa (Roxb. ex Willd.) Baill. Adansonia 6:334, 1866; Santapau, Fl. Khand. (ed. 3)

244, 1967; Shah, Fl. Guj. St. 2:635, 1978; Almeida, Fl. Savant. 1:394, 1990.

Phyllanthus virosus Roxb. ex Willd. Sp. Pl. 4:578, 1805.

Fluggea microcarpa Blume, Bijdr. 580, 1825; Hook. Fl. Br. Ind. 5:328, 1887; Cooke, Fl. Pres. Bomb. 2:581, 1906; Talb. For. Fl. Pres. Bomb. & Sind 2:454, t.497, 1911.

A large glabrous straggling shrub, 2-4m in height. Bark grey with small lenticular specks. Leaves large, variable, glabrous, thin, pale beneath. Flowers greenish or creamy-yellow in axillary fasicles. Fruit globose, fleshy, white, edible.

Distribution and Locality : Scattered, towards the edge of the forest, close to habitation.

Original Home : Ind. or.

Flowers : Hot season **Fruits** : Rainy season

Local Name : Thumri

Local Use : Bark is used to intoxicate fish.

ULMACEAE

Key to the Genera of the Ulmaceae

Leaves elliptic, dark green on both sides, flowers clustered on leafless branches; fruit a samara -- ***Holoptelea***

Leaves ovate-lanceolote or oblong-lanceolote, silky tomentose beneath, flowers on leafy branches; fruit a drupe -- ***Trema***

Holoptelea Planchon

(trop. Afr., Indomal.)

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat. (ser.3) 10:266,1848; Hook. Fl. Br. Ind. 5:481, 1888; Cooke, Fl. Pres. Bomb. 2:626, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:497, 1911; Shah, Fl. Guj. St. 2:636, 1978; Almeida, Fl. Savant. 1:402, 1990.

Ulmus integrifolia Roxb. Pl. Corom. 1:56, t.78, 1795.

A large deciduous tree, 8-15m in height. Bark grey, pustular, scaly with an

offensive smell when freshly cut. Leaves elliptic, dark green on both the sides, glabrous. Flowers greenish- yellow, in fasicles on leafless branches. Fruit a samara, wings orbicular with reticulate veins.

Distribution and Locality : Rare, seen at Borkach; one next to the Dhanimataji temple in Dhanpuri village.

Original Home : Ind. or.

Flowers : February - March **Fruits** : March - August

Local Name : Oro, Charal

Local Use : Wood is an excellent timber, very durable and used in construction.

Trema Lour.

(trop. & subtrop.)

Trema orientalis (Linn.) Blume, Mus. Bot. 2:58, 1856; Hook. Fl. Br. Ind. 5:484, 1888; Cooke, Fl. Pres. Bomb. 2:631, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:500, t.515, 1911; Ch. & Oza, Fl. Pav. 215, 1966; Shah, Fl. Guj. St. 2:637, 1978; Almeida, Fl. Savant. 1:402, 1990.

Celtis orientalis Linn. Sp. Pl. 1944, 1753.

A small evergreen tree of rapid growth, 5-10m in height. Bark grey, smooth, lenticellate. Leaves obliquely ovate-lanceolate, softly tomentose beneath. Flowers greenish-yellow, in axillary pubescent cymes, longer than the petioles. Drupe ovoid, black when ripe.

Distribution and Locality : Sparse, very few trees seen.

Original Home : Geront. trop.

Flowers : September **Fruits** : November - March

Local Name : Ghol, Vanjhli

Local Use : Wood makes excellent charcoal.

MORACEAE

Key to the Genera of the Moraceae

Flowers hidden inside a hollow receptacle	--	*Ficus*
Flowers crowded on the outside of large oblong receptacle	--	*Artocarpus*
Flowers in capitate or subcapitate clusters, not inside nor outside the receptacle	--	*Streblus*

Artocarpus J. & G. Forster (*nom. cons.*)

(SE. As., Indomal.)

Artocarpus gomezianus Wall. ex Trecul ssp. ***zeylanicus*** Jarret, J. Arnold Arbor. 61:90, 1960; Ramamoorthy & Gandhi in Fl. Hassan Dist. 77, 1976; Almeida, Fl. Savant. 1:403, 1990.

Artocarpus gomezianus Wall. ex Trecul. Ann. Sci. Nat. Bot. (Ser.3) 8:118, 1847 ssp. *zeylanicus* Jarret. J. Ann. Arbor. 61:90, 1960.

Artocarpus lakoocha sensu Gamble, Fl. Pres. Madras 1369, 1928, *non* Roxb. 1832.

A large deciduous tree, 10-15m in height. Bark dark-coloured, rough, without furrows. Leaves broadly ovate, finely acuminate at apex, subcordate at base, coriaceous, shining above, densely grey downy beneath. Flowers in subsessile axillary globose heads. Fruit oblong, irregularly globose, yellow when ripe, edible, minutely velvety.

Distribution and Locality : Very rare, seen one tree near Lambhiya.

Original Home : Ind. or.

Flowers : March - April **Fruits** : ripe in July - August

Local Name : Khatumbi

Local Use : Wood is an excellent timber, resistant to termites.

Ficus Linn.

(Warm, chiefly Indomal., Polynes.)

Key to the Species of Ficus

Receptacles in pairs, leaves tomentose beneath, obtuse ..... ***F. benghalensis***

Receptacles in fasicles on stem, yellowish, leaves hispid, opposite ..... ***F. hispida***

Receptacles on short, leafless warty branches, red, leaves glabrous..... ***F. racemosa***

Receptacles in sessile axillary clusters, reddish-purple, leaves cordate with caudate acuminate leaf apex ..... ***F. religiosa***

Ficus benghalensis Linn. Sp. Pl. 1059, 1753; Hook. Fl. Br. Ind. 5:499, 1888; Cooke, Fl. Pres. Bomb. 2:645, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:508, t.518, 1911; Ch. & Oza, Fl. Pav. 219, 1966; Almeida, Fl. Savant. 1:406, 1990.

A large evergreen tree, 12-18m in height, with spreading branches sending aerial roots to the ground. Bark smooth, grey, exfoliating in small irregular plates. Leaves coriaceous, obtuse at apex, shining above, pubescent beneath. Receptacles globose in pairs, sessile, red when ripe.

Distribution and Locality: Seen more often as an epiphyte or strangling another tree. Near Kada dam, *Madhuca* trees are slowly strangulated by this plant. Some *Borassus* trees also suffer from this plight (Oza & Davis, 1989).

Original Home : Ind. or., Afr. trop.

Fruits : ripe in April- June

Local Name : Vad

Local Use : Wood is durable, bark yields a coarse fibre; leaves and bark are used in native medicine; wild, self sown or planted as a shade tree.

Ficus hispida Linn. f. & Suppl. 442, 1781; Hook. Fl. Br. Ind. 5:522, 1888; Cooke, Fl. Pres. Bomb. 2:653, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:523, t.530, 1911; Ch. & Oza, Fl. Pav. 218, 1966; Shah, Fl. Guj. St. 2:645, 1978; Almeida, Fl. Savant. 1:407, 1990.

Ficus oppositifolia Roxb. Pl. Corom. t.124, 1798.

A small tree, 4-8m in height, more or less hispidly pubescent in all parts. Bark thin, grey, rough with horizontal rings encircling the branches and stems; inner bark milky. Leaves ovate-oblong, opposite, shortly acuminate at apex, hispid-pubescent on the lower surface, serrate. Receptacles obovoid, in fasicles on the stem, peduncled, yellow when ripe.

Distribution and Locality : Sparse; Seen only near villages; at Gandhra, Targol.
Original Home : As. *et* Austral. trop.
Fruits : ripe in hot and rainy season
Local Name : Dedh umardo, Jangli umardo
Local Use : Wood is used as firewood.

Ficus racemosa Linn. Sp. Pl. 1060, 1753; Santapau, Fl. Khand. (ed.3) 259, 1967; Shah, Fl. Guj. St. 2:646, 1978; Almeida, Fl. Savant. 1:408, 1990.

Ficus glomerata Roxb. Pl. Corom. 2:13, t.123, 1798; Hook. Fl. Br. Ind. 5:535, 1888; Cooke, Fl. Pres. Bomb. 2:654, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:524-5, t.531, 1911; Ch. & Oza, Fl. Pav. 220, 1966.

A large evergreen tree, 10-15m in height, without aerial roots. Bark thick, brownish grey, rather smooth, scaly. Leaves ovate-oblong to lanceolate, glabrous at length. Receptacles pedunculate, on short leafless warty branches, sub-globose or pyriform, red when ripe.

Distribution and Locality : Common in forest areas, especially near banks of streams, springs. They are good indicators of a high water table.
Original Home : Ind. or., Burma.
Fruits : March - October; throughout the year.
Local Name : Umbar, Gular

Local Use : Fruits enjoyed by wild animals and birds; wood used as a timber; sacred tree of the Hindus.

Ficus religiosa Linn. Sp. Pl. 1059, 1753; Hook. Fl. Br. Ind. 5:513, 1888; Cooke, Fl. Pres. Bomb. 2:649, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:514-5, t.523, 1911; Ch. & Oza, Fl. Pav. 219, 1966; Shah, Fl. Guj. St. 2:646, 1978; Almeida, Fl. Savant. 1:409, 1990.

A large glabrous epiphytic tree, 10-15m in height, without aerial roots. Bark grey, smooth. Leaves ovate, rotund, narrowed at the apex into a linear-lanceolate tail, glabrous, subcoriaceous, cordate at base, long petioled. Receptacles globose, sessile, axillary in pairs, reddish-purple when ripe.

Distribution and Locality : Close to habitation; religious tree of the Hindus.

Original Home : Ind. or.

Fruits : ripe in May - June

Local Name : Pipdo

Local Use : Leaf, bark and fruit used in native medicine; latex from the tree is used to make an inferior rubber.

Streblus Lour.

(Madag., SE. As., Indomal.)

Streblus asper Lour. Fl. Cochinch. 2:615, 1790; Hook. Fl. Br. Ind. 5:489, 1888; Cooke, Fl. Pres. Bomb. 2:642, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:502, t.516, 1911; Ch. & Oza, Fl. Pav. 217, 1966; Shah, Fl. Guj. St. 2:648, 1978; Almeida, Fl. Savant. 1:410, 1990.

Epicarpus orientalis Blume, Bijdr. 488, 1825.

A small rigid evergreen tree, 5-8m in height. Bark grey, soft, irregularly ribbed. Leaves elliptic or obovate, rough on both surfaces. Flowers dioecious, male flowers in axillary pedunculate globose heads. Female flowers axillary, solitary or fasicled. Fruit an

edible berry, yellow, enclosed in enlarged persistent perianth.

Distribution and Locality : Rare.

Original Home : As. trop.

Flowers : January - March **Fruits** : April - May

Local Name : Harero, Kharoti

Local Use : Leaves soaked in water are then used as sand paper.

ARECACEAE (Palmae)

Key to the Genera of the Arecaceae

Leaves simple, palmate, fan-like, fruit brownish, large -- ***Borassus***

Leaves pinnate, spiny tipped, fruit orange-yellow, small -- ***Phoenix***.

Borassus Linn.

(Palaeotrop., cultd. in Ceylon, India)

Borassus flabellifer Linn. Sp. Pl. 1187, 1753; Hook. Fl. Br. Ind. 6:482, 1893; Cooke, Fl. Pres. Bomb. 2:811, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:561, 1911; Ch. & Oza, Fl. Pav. 227, 1966; Shah, Fl. Guj. St. 2:692, 1978; Almeida, Fl. Savant. 2:50, 1990.

Trees, 10-16m in height. Stem rough, black, covered when young with persistent dry leaf bases of petioles. Leaves fan-like, palmately veined in a terminal crown. Fruits brown, large.

Distribution and Locality : Very common along field boundaries, or self-sown.

Original Home : Ind. or.

Flowers : March - April **Fruits** : April - May

Local Name : Taad

Local Use : Flower stalks used for preparing country liquor. Leaves with persistent leaf bases are a source of thatch, brooms, baskets, ropes, mats. Bamboo ladders are tied to the trunks for climbing.

Phoenix Linn.

(warm Afr., As.)

Phoenix sylvestris (Linn.) Roxb. Fl. Ind. 3:787, 1832; Hook. Fl. Br. Ind. 6:425, 1893; Cooke, Fl. Pres. Bomb. 2:801, 1907; Talb. For. Fl. Pres. Bomb. & Sind 2:548, 1911; Ch. & Oza, Fl. Pav. 228, 1966; Shah, Fl. Guj. St. 2:694, 1978; Almeida, Fl. Savant. 2:50, 1990.

Elate sylvestris Linn. Sp. Pl. 1189, 1753.

Trees, 8-13m in height. Stems densely covered with woody bases of fallen leaves. Leaves pinnate, upto 3m long. Leaflets linear-lanceolate, rigid, glabrous, spiny tipped. Spadix simple or compound. Fruit oblong, orange-yellow.

Distribution and Locality : Occasional, only near habitation.

Original Home : Ind. or.

Flowers : January - May **Fruits** : March - June

Local Name : Khajuri

Local Use : Leaves used in preparation of baskets, mats and ropes.

POACEAE (Gramineae)

Dendrocalamus Nees

(China, Indomal.)

Dendrocalamus strictus (Roxb.) Nees in Linnaea 9:476, 1835; Hook. Fl. Br. Ind. 7:404, 1896; Cooke, Fl. Pres. Bomb. 3:572, 1908; Talb. For. Fl. Pres. Bomb. & Sind 2:569,1911; Shah, Fl. Guj. St. 2:809, 1978; Almeida, Fl. Savant. 2:121, 1990.

Bambusa stricta Roxb. Fl. Ind. 2:193, 1832.

A densely tufted bamboo, 8-10m tall with solid culms, green when young, yellowish when old. Nodes swollen, lower ones with roots. Leaves linear lanceolate, glabrous.

Distribution and Locality : Rare in forest areas; Usually planted along field boundaries and in Forest Plantations. It is said to have grown wild in the forests, being abundant.

Original Home : India and Burma

Flowers and Fruits : December - March

Local Name : Vans

Local Use : Stem used in construction of houses, ladders. In early 20th Century, bamboo was supplied free of cost for marriage ceremonies for preparation of Mandap by the Maharaja of the Jambughoda State (H. H. Digvijaysinhji, *pers. comm.*)

TABLE II

CONSPICUOUS FLOWERING GENERA DURING DIFFERENT MONTHS OF THE YEAR

January	*Buchanania, Ehretia, Streblus, Ailanthes, Phoenix*
February	*Boswellia, Garuga, Firmiana, Cochlospermum, Alangium, Butea, Holoptelea, Spondias, Lannea*
March	*Erythrina, Sterculia, Bauhinia, Schleichera, Madhuca, Wrightia, Gmelina, Emblica, Bombax, Borassus, Tecomella, Artocarpus*
April	*Miliusa, Crataeva, Soymida, Aegle, Dillenia, Cassia, Syzygium, Holarrhena, Dolichandrone*
May	*Dalbergia, Albizia, Terminalia, Anogeissus, Lagerstroemia, Schrebera, Ficus, Diospyros, Pongamia, Morinda*
June	*Haldinia, Mitragyna, Pterocarpus, Zizyphus*
July	*Acacia, Albizia lebbeck, Oroxylum, Hymenodictyon, Ehretia*
August	*Tectona, Kydia, Nyctanthes, Bridelia, Kirganelia*
September	*Careya, Zizyphus oenoplia*
October	*Trema, Mallotus, Gardenia*
November	*Ougenia, Grewia, Delonix, Manilkara*
December	*Azadirachta, Mangifera*

AN ARTIFICIAL KEY BASED ON BARK CHARACTERISTICS :

People of the scientific community would understand bark to be the multilayered outer covering of a tree, which may or may not be detachable.

Botanically, bark constitutes all layers of tissue lying outside the vascular cambium. It may be further divided into outer and inner bark. The inner bark is the living secondary phloem tissue. The outer bark, called periderm develops from the cork cambium. The characteristic appearence of the tree bark is due to the visual designs formed by the periderm. This diversity of pattern, colour and texture in bark is a result of a long evolutionary history of trees (Prance & Sandved, 1993; Oza & Pandya, 1994).

In tropical forests, diversity in tree species is high. Bark characteristics may indicate species, probably along with other leaf, flower or fruit characters. In deciduous trees, leaves are shed in winter, remaining bare till almost the onset of rains. Flowering usually occurs during winter or summer when the tree is leafless. Therefore, the tree trunk is the only permanent element of deciduous tree species which could possibly aid in field identification at all times, irrespective of season. Age of the tree is an important factor, as bark appearance changes with increase in tree girth.

Keeping in mind the regularity of appearence of tree bark in some forest tree species found in JWLS, an attempt to design a key to help in field identification based on bark colour, texture and form was made. The key is substantiated with photographs and bark characteristics tally with those from Talbot's (1909-1911) *Forest Flora of the Presidency of Bombay and Sind* (Plates II . 2, 3, 4, 5 & 6).

An artificial key to the identification of some forest tree species met with in JWLS based on their bark characteristics.

Light Grey, Ash coloured or Yellow Grey Bark :

Texture smooth and shining :

Bark with longitudinal fissures :

having cross cracks, exuding red gum -***Lannea coromandelica***

not having cross cracks, not exuding red gum -***Aegle marmelos***

Bark with horizontal wrinkles in young trees and with thick scaly exfoliations in older trees -***Haldinia cordifolia*** (young & old)

Bark with flat scaly exfoliations :

Scales dark, leaving shallow depressions -***Mitragyna parvifolia***

Scales dark-grey, large, plate-like -***Soymida febrifuga***

Scales expose inner purple bark and yellow wood -***Anogeissus latifolia***

Texture rough with exfoliating flakes :

Flakes irregular :

Papery, thin, greenish, with lenticular openings -***Boswellia serrata***

Thick, small, greenish dark grey -***Emblica officinalis***

Flakes longitudinal :

Narrow, rectangular, light grey -***Acacia chundra***

Broad, irregular with horizontal lines, silvery grey -***Dalbergia paniculata***

Texture rough having corky appearence :

Scales irregular, thin, yellowish -***Alangium salvifolium***

Scales squarish, thick, whitish -***Hymenodictyon orixense***

Corky bark, furrows widely seperated exposing lines of yellow wood -***Erythrina suberosa***

Light Brown Bark :

Texture smooth with tubercles -***Oroxylum indicum***

Texture rough giving a granular warty appearence -***Ailanthus excelsa***

Grey-Brown Bark :

Bark rough :

Young trees covered with conical prickles and older trees with shallow longitudinal fissures having cross cracks and scars of fallen prickles

-*Bombax ceiba* (young & old)

Trees give a chequered appearence, having deep regular longitudinal furrows forming plates with cross cracks -*Buchanania lanzan*

Trees give a corky, crocodile skin - like appearance, having deep longitudinal fissures -*Morinda tinctoria*

Bark exfoliating into long, thin, narrow flakes :

Flakes expose inner red bark -*Lagerstroemia parviflora*

Flakes do not expose inner bark -*Tectona grandis*

Brown to Black - Brown Bark :

Texture smooth with shallow fissures :

Bark shows a regular pattern of longitudinal fissures and horizontal cracks

-*Madhuca longifolia*

Bark does not show a distinct pattern as above -*Butea monosperma*

Texture corky with deep longitudinal furrows :

Bark excorticating into thick angled rectangular plates

-*Terminalia crenulata*

Bark divided by dark corky layers, plates flat, in continuous silvery strips

-*Diospyros melanoxylon*

PLATE II . 2

Lannea coromandelica	*Aegle marmelos*
Haldinia cordifolia - young	*Haldinia cordifolia* - old
Mitragyna parvifolia	*Soymida febrifuga*






PLATE II.3

Anogeissus latifolia	*Boswellia serrata*
Emblica officinalis	*Acacia chundra*
Dalbergia paniculata	*Alangium salvifolium*






PLATE II.4

Hymenodictyon orixense	*Erythrina suberosa*
Oroxylum indicum	*Ailanthus excelsa*
Bombax ceiba - young	*Bombax ceiba* - old






PLATE II.5

Buchanania lanzan	*Morinda tomentosa*
Lagerstroemia parviflora	*Tectona grandis*

PLATE II.6

Madhuca longifolia	*Butea monosperma*
Terminalia crenulata	*Diospyros melanoxylon*




ANIMAL DIVERSITY : AVIFAUNA

Birds render incalculable service to man. Some species may cause damage to crops but the benefit from most species is overwhelming. Without the protection provided by birds our cultivated fields, orchards and our food supplies would be devoured by hordes of ravaging insects. Birds are the main agents that put a check on the multiplication of insects. If this was not controlled insects would overwhelm all life on this planet. The abundant bird life in our country is one of its valuable possessions and we should appreciate its value as being indispensible balancing force of nature and must strive for their conservation.

90 species of birds have been enumerated based on the field studies and personal communications with the natives. Birds were abundant in certain localities - Jhand, Lambhiya, Kathiari, Mota Raska, Targol (Sankheda taluka); Katkuva, Borkach, Vav, Malbar, Narukot, Dhanimataji hill, Keva, Laphni (Jambughoda taluka); Koba, Rinchhbar (Halol taluka).

The reservoirs - Kada, Laphni and Targol are transitory home for certain migratory water birds like cranes, ibises, teals, shovellers, storks and pochards. Dense forested patches provide food and shelter for other residents and resident migrants.

The enumeration of birds follows the scheme of classification proposed by Wetmore in ***Proc. U.S. Nat. Museum*** 76, Art. 24, 1930, pp 1-8, which is also adopted in ***Handbook of the Birds of India and Pakistan*** (compact edition) by Salim Ali and S.Dillon Ripley, 1983.

The sequence followed is that of Orders, families and subfamilies. The common English name is followed by the authentic zoological name and the vernacular or gujarati name. The codes used are presented below to help in the field identification of birds:

(1) Status :

R Resident, also covers local migrant

M Migrant , long distance

RM Resident with migratory populations

(2) Comparison with some common and familiar bird as a standard to give a rough indication of size, being helpful in field identification with (+), (-), (±) as indicators.

Standard	**Code**	**Size**
Sparrow	S	15 cm (6 inch)
Quail	Q	18-20 cm (7-8 inch)
Bulbul	B	20 cm (8 inch)
Myna	M	23 cm (9 inch)
Pigeon	Pi	32 cm (13 inch)
Partridge	Pa	32 cm (13 inch)
Crow	C	42 cm (17 inch)
Kite	K	60 cm (24 inch)
Duck	D	60 cm (24 inch)
Village hen	VH	45-70 cm (18-28 inch)
Vulture	V	90 cm (36 inch)

\+ Indicates bigger than standard

\- Indicates smaller than standard

± Indicates more or less same size as standard

(3) Habitat

(4) Foods habits

(5) Any special remarks/observation in JWLS.

INVENTORY OF THE AVIFAUNA OF JAMBUGHODA WILDLIFE SANCTUARY

NAME	LOCAL NAME	STATUS	SIZE	HABITAT	FOOD HABITS	LOCALITY
ORDER : PELECANIFORMES FAMILY : PHALACROCORACIDAE : CORMORANTS AND DARTER						
1. **Little Cormorant** *Phalacrocorax niger* (Vieillot)	Nano Kajiyo	RM	C+	Reservoirs, Lakes Creeks	Mainly fish eating	At Kada & Targol reservoirs during January-February
ORDER : CICONIIFORMES FAMILY : ARDEIDAE : HERONS, EGRETS, BITTERNS						
2. **Pond Heron or Paddy Bird** *Ardeola grayii* (Sykes)	Kani Bagli	R	VH+	Ponds, marshes, streams, Paddy fields	Frogs, fish, crustaceans, water beetles and other insects	At the fringes of Kada, Targol, Laphni reservoirs
3. **Cattle Egret** *Bubulcus ibis* (Boddaert)	Gai Baglo	RM	VH±	Usually with grazing cattle in forests or dry fallows or on banks of reservoirs	Chiefly insects	A favourite roosting tree is shared along with bats at the Jambughoda bus stop
4. **Little Egret** *Egretta garzetta* (Linnaeus)	Nano Dholo Baglo	R	VH+	Flooded paddy fields, marshes, jheels	Fish, frogs, crustaceans water insects.	On the southern edge of Kada on 14.1.93
FAMILY : CICONIIDAE:STORKS						
5. **Painted Stork** *Mycteria leucocephala* (Pennant)	Pilichanch Dhok	R	V±	Marshes, jheels, inundated fields	Mainly fish, reptiles, frogs, crustaceans & insects	At Kada dam in March'93
6. **Openbill Stork** *Anastomus oscitans* (Boddaert)	Phatichanch Dhok	R	D+	Inland lakes and marshes	Chiefly molluscs; also crabs, frogs.	At Kada reservoir on 24.3.93
FAMILY : THRESKIORNITHIDAE : IBISES,SPOONBILL						
7. **White Ibis** *Threskiornis aethiopica* (Latham)	Dholi Kankadsaar	R	VH±	Rivers, marshes,inundated fields	Fish, frogs, molluscus, insects,worms.	At Targol reservoir in flight
8. **Black Ibis** *Pseudibis papillosa* (Temminck)	Kala Kankadsaar	R	VH±	Rivers banks, stubble fields, jheel margins	Frogs, fish, earthworms, beetles.	A Pair seen at Kada reservoir on 14.1.93

9. Spoonbill *Platalea leucorodia* (Temminck & Schlegel)	Chamcho	RM	D±	Marshes & rivers	Fish, frogs and some vegetable matter	At Kada reservoir
ORDER : ANSERIFORMES FAMILY : ANATIDAE : DUCKS, GEESE, SWANS						
10. **Barheaded Goose** *Anser indicus* (Latham)	Raj hans	RM	D+	Large jheels and rivers	Vegetarian - grass, tubers, tender shoots of wheat, gram and other winter crops and also paddy stubbles	At Kada reservoir
11. **Common Teal** *Anas crecca* (Linnaeus)	Nani murghabi	M	Half grown D±	Jheels, marshes	Vegetarian - shoots, tubers, and seeds of aquatic plants and grains of rice	At Kada reservoir
12. **Shoveller** *Anas clypeata* (Linnaeus)	Gayno	M	D-	All types of inland waters	Crustaceans, molluscs, water insects, larvae, fish spawn, worms and also vegetable matter - shoots & corms of aquatic weeds.(Omnivorous)	At Kada reservoir
13. **White eyed Pochard** *Aythya nyroca* (Guldenstadt)	Dholiaankh Karchia	RM	D-	Jheels & reservoirs	Vegetable as well as animals (Omnivorous)	At Kada reservoir
14. **Ruddy Shelduck or Brahminy duck** *Tadorna ferruginea* (Pallas)	Bhagvi Surkhab	RM	D+	Lakes & rivers	Omnivorous - eats grains, tender shoots, tubers & animals	In a small group at Kada reservoir
ORDER : FALCONIFORMES FAMILY : ACCIPITRIDAE : HAWKS, VULTURES						
15. **Blackwinged Kite** *Elanus caeruleus* (Latham)	Kappasi	R	C-	Deciduous biotope : thin savannah forest, grassland, cultivation, plains & hills upto 1200m.	Locusts, grasshoppers, crickets & insects; lizards, mice, sickly birds & even snakes	Seen near Bhuriakuva on 26.3.93 while putting out a forest fire. It was circling above the smoke and making loud calls.
16. **Pariah Kite** *Milvus migrans* (Dukhun)	Samadi	R		Chiefly in urban localities	Omnivorous	Seen near Jambughoda, Shivrajpur, Bodeli towns.

17. **Shikra** *Accipiter badius* (Temminck)	Shikra	R	C-	Light deciduous forests, village groves	Small mammals, birds, lizards frogs, locusts, grasshoppers, & other insects.	Seen near Kada dam, Lambhiya, Jhand very often.
18. **Crested Hawk Eagle** *Spizaetus cirrhatus* (Gmelin)	Shah baaz	R	K+	Deciduous & semi-evergreen forests	Hares, young peafowl, partridges, quails, squirrels, rats & lizards.	Seen perched atop a Shirish tree between Lambhiya & Jhand on 27.2.93
19. **Indian Whitebacked Vulture** *Gyps bengalensis* (Gmelin)	Gidh	R		Open countryside	All rubbish, dead birds & animals.	Seen circling above the forest areas in summer on wind currents.
20. **Crested Serpent Eagle** *Spilornis cheela* (Latham)	Dogra cheel	R	K+	Well wooded country	Snakes, lizards, field rats, mice & sickly birds.	Seen near Jhand Hanuman temple in May 1993
ORDER : GALLIFORMES **FAMILY : PHASIANIDAE : PHEASANTS, PARTRIDGES, QUAILS**						
21. **Painted Partridge** *Francolinus pictus* (J.E.Gray)	Taliyo Tetar	R		Dry grass & scrub	Cereal grains, seeds of weeds & other green matter, Drupes & berries(*Zizyphus*), insects, larvae	Quite often flushed out while walking past through the fields or forest undergrowth.
22. **South Indian Grey Partridge** *Francolinus pondicerianus* (Gmelin)	Safed Tetar	R		Thorn scrub, dry light jungle, cultivation and village environs	Weed seeds, cereal grains, berries & drupes - *Zizyphus Lantana*, *Capparis* & insects	Mostly in village environs, fields and reservoir periphery.
23. **Indian Black Partridge** *Francolinus francolinus* (Bonaparte)	Kalo Tetar	R		Well watered tracts with tall grass, scrub, wet cultivation	Cereal grains, tender shoots of weeds & other crops, wild figs, berries, insects - Omnivorous	At Masabar in the forest plantation - 26.12.92
24. **Grey Junglefowl** *Gallus sonneratii* (Temminck)	Jangli Margho	R	VH±	Dry deciduous to moist evergreen biotope : broken country interspersed with cultivation patches.	Cereal grains, wild figs, berries, insects, lizards, snakes.	On native Gamir's authority Harishchandrasinhji says they were in plenty in early years of this century but are now no longer found in Jambughoda.
25. **Indian Peafowl** *Pavo cristatus* (Linnaeus)	Mor & Dhel	R	VH+	Moist & dry deciduous forest, cultivation and precincts of villages	Omnivorous - seeds, grain tender shoots,insects, wild fruits & berries,figs. lizards small snakes	Found in small groups - seen in Mankadkuvo near Wadek on 26.3.93

ORDER : GRUIFORMES FAMILY : GRUIDAE : CRANES						
26. Demoiselle crane *Anthropoides virgo* (Linnaeus)	Karkaro	M	V-	Affects fields of winter crops especially wheat & gram, paddy stubbles and flat open margins of jheels & tanks.	Vegetarian - gram, groundnut wheat & paddy.	Observed them flying over the area in winter & confirmed their arrival at Kada reservoir with natives.
FAMILY : RALLIDAE : RAILS, COOTS						
27. Coot *Fulica atra* (Linnaeus)	Bhagtadu	RM	Three quarter D±	Large jheels, lakes and reservoirs	Vegetable matter - shoots and seeds of aquatic plants & rice; also worms, molluscs and small fish	In flocks of 25-30 at Kada reservoir; even at Targol reservoir
ORDER : CHARADRIIFORMES FAMILY : CHARADRIIDAE : PLOVERS, SANDPIPERS, SNIPE						
28. Redwattled Lapwing *Vanellus indicus* (Boddaert)	Titori	R	Pa+	Near water in open country and cultivation - jheels, tanks, ditches & puddles	Ants, beetles, caterpillars & some amount of vegetable matter.	Seen and heard very often throughout the area.
FAMILY : LARIDAE : GULLS, TERNS						
29. Brownheaded Gull *Larus fuscus* (Linnaeus)	Ladakhi Dhomda	RM	C+	Sea coast,lagoons, back-waters, estuaries & large rivers.	Omnivorous - fish, worms, insects, grubs, shoots of various crops.	A pair seen at Kada reservoir
30. Indian River Tern *Sterna aurantia* (J.E.Gray)	Kentchipoonch Vabagli	RM	C±	Large rivers and reservoirs	Cheifly fish, crustaceans & aquatic insects.	A pair seen at Kada reservoir
ORDER : COLUMBIFORMES FAMILY : COLUMBIDAE : PIGEONS, DOVES						
31. Southern Green Pigeon *Treron phoenicoptera* (Blyth)	Harial	R	Pi±	Dry & moist deciduous biotope	Frugivorous - especially figs, drupes & berries of *Zizyphus, Syzygium, Buchanania, Terminalia bellirica.*	In flocks, seen near Borkach, Jhand, Lambhiya & Malbar.

32. **Blue Rock Pigeon** *Columba livia* (Hume)	Kabutar	R		Cliffs, gorges, cultivation & habitation	Grains of maize, jowar, moong dal & other pulses weed seeds & some amount of grit.	Seen throughout , especially in old unused wells
33. **Indian Ring Dove** *Streptopelia decaocto* (Frivaldszky)	Holo	R	Pi±	Dry deciduous plains, country with light jungle and cultivation.	Grains of paddy, jowar and weed seeds.	Seen around habitation
34. **Indian Red Turtle-Dove** *Stretopelia tranquebarica* (Hermann)	Lotund Holo	R	M±	Deciduous scrub jungle and cultivation	Granivorous - grains of cereals and weed seeds.	Seen in forest areas
35. **Indian Spotted Dove** *Streptopelia chinensis* (Gmelin)	Taliyo Holo	R	Pi-	Dry and moist deciduous biotope; prefers a better wooded, wetter habitat than Ring or Little brown dove	Granivorous - grains of cereals and weeds seeds	
36. **Indian Little Brown or Senegal Dove** *Streptopelia senegalensis* (Gmelin)	Holi	R	M+	Dry deciduous biotope	Granivorous - grains of cereals and weed seeds	Found more commonly in Euphorbia thickets.
ORDER : PSITTACIFORMES FAMILY : PSITTACIDAE : PARROTS						
37. **Alexandrine or Large Indian Parakeet** *Psittacula eupatria* (Hodgson)	Rajpipla no Popat	R	Pi+	Dry and moist deciduous biotope.	Fruits, vegetables and seeds of all kinds , wild & cultivated. Feeds on nectar of *Butea, Bombax, Erythrina.*	Seen in small groups in forests.
38. **Roseringed Parakeet** *Psittacula krameri* (Bechstein)	Popat/Sudo	R	M+	Moist & dry deciduous biotope, thin jungle, orchards, cultivation & human environments	Fruits, vegetables & seeds of all kinds. Nectar from flowers	Seen on flowering *Madhuca* trees.
39. **Southern Blossomheaded Parakeet** *Psittacula cyanocephala* (Linnaeus)	Tui	R	M-	Lowlands & hills upto 1300 m.	Grains, nectar & flower petals of *Butea, Bombax Madhuca*, fruits of *Zizyphus*, figs, destructive to orchard fruits & cereals.	Seen at Bhuriakuva while putting out a forest fire on 26.3.93, along with Black winged Kite & Roller
40. **Indian Lorikeet** *Loriculus vernalis* (Sparrman)	Latkan	R	S±	Evergreen & moist deciduous forest.	Fruits of figs, flowers of *Dendrophthoe, Bombax, Erythrina, Borassus, Tectona, Casuarina, Psidium.*	Seen in small flocks at Borkach on a *Madhuca* tree

ORDER : CUCULIFORMES FAMILY : CUCULIDAE : CUCKOOS						
41. **Pied Crested Cuckoo** *Clamator jacobinus* (Sparrman)	Chatak/Motido	RM	M±	Dry & moist deciduous lightly wooded country.	Mainly caterpillars & other insects; occasionally green leaves.	Heard near Targol Reservoir on 30.5.94
42. **Common Hawk Cuckoo or Brainfever Bird** *Cuculus varius* (Vahl)	Bapaiyo	R	Pi±	Deciduous & semi-evergreen forest, groves and gardens, near cultivation & habitation	Mainly Caterpillars & grass-hoppers; wild figs; occasionally lizards.	On authority of native Gamiro
43. **Indian Cuckoo** *Cuculus micropterus* (Gould)	Cuckoo	RM	Pi±	Deciduous & evergreen biotope.	Mainly hairy caterpillars & other insects.	During summer a distinct call of 'Indian Cuckoo' or 'Orange pekoe' is heard.
44. **Indian Koel** *Eudynamys scolopacea* (Linnaeus)	Koel	R	C±	Lightly wooded country & cultivation, gardens, mango orchards, fruit groves & towns & villages where its fosterers - the jungle & Common Crow reside.	Mainly fruits, but may also eat insects, eggs of smaller birds, nectar from flowers.	Seen especially near village environs.
45. **Common Crow-Pheasant or Coucal** *Centropus sinensis* (Stephens)	Ghunkiyo/Huko/ Ghoiro	R	C+	Deciduous scrub jungle & gardens.	Mostly small animals like mice, snakes, lizards, frogs, insects;occasionally grass & leaves.	Seen in village environs.
ORDER : STRIGIFORMES FAMILY : STRIGIDAE : OWLS						
46. **Southern Spotted Owlet** *Athene brama* (Temminck)	Chibri	R	M±	Ruins, Mango tops & village groves of old trees, in and around towns & villages near cultivation.	Beetles, moths locusts and other insects; also earthworms lizards, mice and small birds.	Seen in Dhanpuri and Jambughoda very often.
ORDER : CAPRIMULGIFORMES FAMILY : CAPRIMULGIDAE : NIGHTJARS, GOATSUCKERS						
47. **Indian little Nightjar** *Caprimulgus asiaticus* (Latham)	Deshi Chhapo	R	M±	Dry deciduous scrub jungle	Mostly dusk-flying insects.	On authority of native Gamiro

ORDER : APODIFORMES **FAMILY : APODIDAE : SWIFTS**						
48. **Indian Palm Swift** *Cypsiurus parvus* (J.E.Gray)	Tad ababeelo	R	S-	Associated with palms, especially *Borassus.*	Winged insects, bugs & beetles taken in the air.	Almost all the *Borassus* trees in the area support Swift parties.
ORDER : CORACIIFORMES **FAMILY : ALCEDINIDAE : KINGFISHERS**						
49. **Indian Pied Kingfisher** *Ceryl rudis* (Reichenbach)	Kabro KalKaliyo	R	M+	Stagnant water, jheels, reservoirs and slow-flowing streams	Mainly fish, tadpoles and aquatic insects.	Seen at Targol reservoir on 30.5.94, hunting for food.
50. **Indian Whitebreasted Kingfisher** *Halcyon smyrnensis* (Boddaert)	Kalkaliyo	R	M+	Canals, streams, reservoirs, cultivation, gardens & edges of forests often away from water.	Small animals; fish a secondary choice. Insects, lizards, mice small birds.	Seen and heard very often near villages and even in forests.
FAMILY : MEROPIDAE : BEE-EATERS						
51. **Bluetailed Bee-eater** *Merops philippinus* (Linnaeus)	Nilpunchh Patrango	RM	B+	Open country near streams, jheels and reservoirs.	Winged insects, mainly dragon-flies, wasps & bees.	During summer, near Gandhra, Chalvad, Keva.
52. **Indian small Green bee-eater** *Merops orientalis* (Latham)	Nano Patrango	R	S+	Open country interspersed with light forest & cultivation.	Mainly ants, wasps, & bees; also moths, butterflies, dragonflies, other winged insects & beetles.	Very common throughout the region.
FAMILY : CORACIIDAE : ROLLERS OR BLUE JAYS						
53. **Nothern Roller or BlueJay** *Coracias benghalensis* (Linnaeus)	Chash/Deshi Nilkanth	R	P±±	Open country, cultivation, gardens and light deciduous forests.	Mainly insects, occasionally small animals like frogs, mice, snakes.	Seen very often near villages.
FAMILY : UPUPIDAE : HOOPOES						
54. **Hoopoe** *Upupa epops* (Linnaeus)	Ghantitankdo	RM	M+	Open hillsides, cultivation, light forests and near villages.	Entirely insectivorous.	Very commonly seen in fields after harvest and near forest fires - for the flushed out insects.

ORDER : PICIFORMES **FAMILY : CAPITONIDAE : BARBETS**						
55. **Northern Green Barbet** *Megalaima zeylanica* (Franklin)	Moto Kansaro	R	M+	Well wooded moist and dry deciduous country, often entering city gardens.	Mainly figs (*Ficus*) and large varieties of berries & drupes flowers petals & nectar; also insects.	Heard many a times in the area.
56. **Crimsonbreasted Barbet or Coppersmith** *Megalaima haemacephala* (Latham)	Kansaro\Tuktuk	R	S+	Lightly wooded countryside, roadside avenues and groves of trees near villages & cultivation.	Banyan, peepal and other figs, berries & drupes; occasionally moths & flying termites.	Present within village periphery.
FAMILY : PICIDAE : WOODPECKERS						
57. **Northern Goldenbacked Woodpecker** *Dinopium benghalense* (Linnaeus)	Moto Lakkadkhod	R	M+	In dry & moist deciduous biotope.	Insects & larvae, mainly ants picked up from tree trunks or from the ground.	Seen many a times during the breeding season in May - Chalvad, Keva, Dhanpuri.
58. **Yellowfronted Pied or Mahratta Woodpecker** *Picoides mahrattensis* (Latham)	Nano Lakkadkhod	R	B-	All types of lightly wooded areas from arid semi-desert to moist deciduous biotope.	Mainly insects.	Very common in area.
ORDER : PASSERIFORMES **FAMILY : ALAUDIDAE : LARKS**						
59. **Indian Small Skylark** *Alauda gulgula* (Franklin)	Dolavri	RM	S±	In damp open grassland on edge of tanks and jheels, young wheat fields or cultivated crop fields.	Weed seeds, plant bulbs, & also insects.	Seen near Kada village making display for its mate.
FAMILY : LANIIDAE : SHRIKES OR 'BUTCHER-BIRDS'						
60. **Indian Grey Shrike** *Lanius excubitor* (Sykes)	Dudhio Latoro	RM	M+	Open semi-desert country, sparse scrub jungle, thorn & dry deciduous forest.	Carnivorous - Insects, also lizards, young mice, sickly birds.	In open areas of the forest or edges of forest perched on small bushy plants.
61. **Indian Baybacked Shrike** *Lanius vittatus* (Valenciennes)	Panchnak Latoro	RM	B±	Dry open scrub and near cultivation.	Caterpillars, beetles, ants; also grasshoppers & locusts; occasionally young mice & nesting birds.	Seen near cultivated fields on a *Zizyphus* bush or *Euphorbia* thorn.

62. Rufousbacked Shrike *Lanius schach* (Vigors)	Maatiyo Latoro	R	B+	Openly wooded, well watered cultivated tracts, gardens, roadside hedges, groves of date or toddy palm.	Carnivorous - any small living creature that can be overpowered.	
FAMILY : ORIOLIDAE : ORIOLES						
63. **Indian Golden Oriole** *Oriolus oriolus* (Sykes)	Peeluk	RM	M+	Well wooded country, secondary deciduous forests, groves & orchards in cultivation & around villages.	Mainly insects.	A winter visitor to Gujarat. More visible in February-March.
FAMILY : DICRURIDAE : DRONGOS						
64. **South Indian Black drongo or King Crow** *Dicrurus adsimilis* (Hodgson)	Kalio koshi	R	B+	Open deciduous forests, often near cultivation and outskirts of habitation.	Mainly insects.	More common along roads, open village areas; during forest fire seen along with Roller, Blackwinged kite, circling the area.
65. **Indian Whitebellied drongo** *Dicrurus caerulescens* (Linnaeus)	Safed peto koshi	R	B+	Edges of thin tree jungle & bamboo forests.	Grasshoppers, Crickets, moths & other winged insects; flower nectar from *Bombax, Erythrina*	Seen near habitation.
FAMILY : STURNIDAE : STARLINGS, MYNAS						
66. **Blackheaded or Brahminy Myna** *Sturnus pagodarum* (Gmelin)	Brahminy kabar	R	M-	Open deciduous forest & scrub jungle, near cultivation and habitation.	Fruits of *Zizyphus, Ficus* figs, *Salvadora, Bridelia,* fleshy flowers of *Madhuca,* nectar from flowers of *Erythrina, Bombax, Butea, Capparis* & also insects.	More common in village environs.
67. **Rosy Starling or Rosy Pastor** *Sturnus roseus* (Linnaeus)	Vahyu	M	M±	Open cultivation, grassland & low thorn jungle.	Frugivorous, flower nectar, cereal grains & insects.	In large swarms during January-February. A winter visitor & abundant in Gujarat.
68. **Indian Myna** *Acridotheres tristis* (Linnaeus)	Kabar	R	Pi-	In neighbourhood of home-steads, villages and cities.	Fruit, grains, insects and everything else that can be eaten.	The most common and ubiquitous bird.
69. **Bank Myna** *Acridotheres ginginianus* (Latham)	Dhola kabar	R	M±	Near habitation - often associated with cattle.	Fruit grain & insects; very destructive to ripening crops.	Almost accompanies Indian Myna.

FAMILY : CORVIDAE : CROWS, MAGPIES, JAYS						
70. **Western Tree pie** *Dendrocitta vagabunda* (Blyth)	Khairkhatto	R	M+ with long tail	Well wooded country around villages and cultivation, mango orchards, open deciduous forests & scrub jungle.	Practically everything - neem seeds, favours figs, cereal crops, destructive to fruit orchards, flower nectar, insects & small animals.	Dhanimataji hill forest.
71. **Indian Jungle Crow** *Corvus macrorhynchos culminatus* (Sykes)	Girnari Kagdo	R	C+	Outskirts of forest villages as well as in cities.	Practically everything from animals to vegetable matter.	Seen throughout the area, especially near towns of Jambughoda & Shivrajpur.
FAMILY : IRENIDAE : FAIRY BLUEBIRDS, IORAS & LEAF BIRDS						
72. **Common Iora** *Aegithina liphia* (Linnaeus)	Shaubheegi	R	S±	Open forests, forest edges, cultivation, village outskirts	Insects & larvae, spiders.	Outskirts of forests & near villages.
FAMILY : PYCNONOTIDAE : BULBULS						
73. **Redvented Bulbul** *Pycnonotus cafer* (Linnaeus)	Bulbul/Hadiyo	R	M-	Light scrub, secondary deciduous forest, gardens.	Fruits, flower nectar, also insects and may be lizards also.	Throughout the forest areas.
FAMILY : MUSCICAPIDAE : BABBLERS, FLYCATCHERS, WARBLERS THRUSHES AND CHATS SUBFAMILY : TIMALIINAE, BABBLERS						
74. **Common Babbler** *Turdoides caudatus* (Dumont)	Thoriyu Lailu	R	B+	Thorn scrub jungle, in dry plains dotted with *Tamarisk* & *Zizyphus* bushes.	Mainly insects, also flower nectar & fruits.	In groups of 7-9, in under-growth of forests.
SUBFAMILY : MUSCICAPINAE : FLYCATCHERS						
75. **Whitespotted Fantail Flycatcher** *Rhipidura albicollis albogularis* (Lesson)	Tapkili Nayand	R	B-	Well wooded areas-secondary jungle, groves & gardens.	Winged insects.	Outskirts of forests.
76. **Peninsular Indian Paradise Flycatcher** *Terpsiphone paradisi* (Linnaeus)	Dudhraaj	RM	B±, with long tail streamers	Well watered and shady forests.	Mainly winged insects.	A pair seen at Jhand Hanuman temple forest area, Dhanimataji hill forest.

SUBFAMILY : SYLVIINAE : WARBLERS.						
77. **Southern Ashy Wren-Warbler** *Prinia socialis* (Sykes)	Phatakphutki	R	S-	Grassland & scrub, banks of streams in deciduous forests.	Insects & larvae, spider & flower nectar.	Close to habitation.
78. **Indian Tailor bird** *Orthotomus sutorius* (Latham)	Darjido	R	S-	Herbaceous gardens, scrub country, deciduous jungle and village environs.	Small insects and their larvae also flower nectar.	Common in dense wooded hedges of cultivated fields.
79. **Plain Leaf Warbler** *Phylloscopus neglectus* (Hume)		M	S-	Scrub country near cultivation, gardens, deciduous jungle.	Insects	Forages in low undergrowth bushes, flitting in & out seen near Kada reservoir
SUBFAMILY : TURDINAE : THRUSHES & CHATS						
80. **Indian Magpie - Robin** *Copsychus saularis* (Linnaeus)	Daiyad	R	B±	In neighbourhood of human habitation; also dry deciduous jungle & open secondary jungle	A wide variety of insects & also flower nectar.	Near villages only.
81. **Indian Robin** *Saxicoloides fulicata* (Linnaeus)	Devchakli/kalidev	R	S±	Thin scrub jungle, dry deciduous forest, sparse bushes and termite mounds, fallow paddy fields with *Lantana* bushes.	Chiefly insects, partial to termites.	Seen in village precincts.
82. **Pied Bush Chat** *Saxicola caprata bicolor* (Sykes)	Pidda	RM	S-	Cultivated fields near villages; coarse grass and reeds near canals, tanks, reservoirs.	Ants, beetles, larvae, grasshoppers & some vegetable matter.	Seen throughout the area.
FAMILY : MOTACILLIDAE : PIPITS AND WAGTAILS						
83. **Grey Wagtail** *Motacilla cinerea* (Gmelin)	Van Pilakiyo	M	S± with long tail.	In dry river beds.		Seen near Kada reservoir
84. **Greyheaded Yellow Wagtail** *Motacilla flava thunbergi* (Billberg)	Rakhodishir Pilakiyo	RM	S± with long tail.	Moist grassy ground especially along jheel margins.	Mainly insects.	On margin of Kada reservoir, Jhand spring, Targol & Laphni reservoirs.

FAMILY : DICAEIDAE : FLOWERPECKERS						
85. **Indian Thickbilled Flower pecker** *Dicaeum agile* (Tickell)	Phul sunghani	R	S-	Especially on large flowering trees & those infested with *Dendrophthoe* & *Viscum* in dry to moist deciduous or semi-evergreen forests.		In the Malabar, Jhand - Lambhiya & Dhanimataji hill forests.
86. **Tickell's Flowerpecker** *Dicaeum erythrorhyncos* (Latham)	Phul Sunghani	R	S-	In deciduous forests, orchards, fig trees, forest plantations.	Predominantly berries of *Dendrophthoe* & *Viscum*; also small insects.	Seen in Keva, Malbar and Jhand.
FAMILY : NECTARINIIDAE : SUNBIRDS						
87. **Purple Sunbird** *Nectarinia asiatica* (Latham)	Phul chakli/shakkar khoro	R	S-	Light deciduous or dry thorn forests, cultivation, gardens.	Nectar from flowers; very fond of *Madhuca* flowers & toddy juice of Borassus; also insects.	
FAMILY : PLOCEIDAE : WEAVER BIRDS **SUBFAMILY : PASSERINAE : HOUSE AND ROCK SPARROW**						
88. **Indian House Sparrow** Passer domesticus (Jardine & Selby)	Chakli	R	B-	An ubiquitous commensal of man, wherever he may reside.	Mainly grass & weed seeds flower buds & fruits.	
SUBFAMILY : PLOCEINAE : WEAVER BIRDS, BAYA						
89. **Indian Baya** *Ploceus philippinus* (Linnaeus)	Sughari	R	S±	Open cultivations, near paddy fields, secondary scrub dotted with Babul & toddy trees.	Grass and weed seeds, insects, caterpillars, spiders.	Nesting colonies seen in Bhildungra, Rinchhbar, Chalvad, Dhanpuri, Pipia.
SUBFAMILY : ESTRILDINAE : AVADAVAT, MUNIAS						
90. **Whitebacked Munia** *Lonchura striata* (Hodgson)	Shakari Munia	R	S-	Open country, light scrub jungle.	Seeds & insects.	In flocks, flitting from electric wires to the ground especially fallow fields.

Besides the avifauna and mammals, JWLS shows abundant other fauna like reptiles - poisonous and non-poisonous snakes, few monitor lizards, forest lizards and chameleons; insects - cicadas, butterflies and dragonflies.

MAMMALS :

The Mammals form a large Class in the Animal Kingdom, comprising of animals which nourish their young by milk. There are more than 500 different species of mammals found within the Indian Region. The wide range of larger mammals, such as Elephant, Tiger, Lion, Gaur, Rhino, Sambhar, Nilgai, Four-horned Antelope, Foxes, Wolves, Giant Squirrels, Lemurs, Bats, Langurs, Ant-eaters are all remarkable in their symmetry of form, large size, beauty of colouring and strange habits. There is always an attraction and charm that their presence in our forests and plains create for all mankind. The presence of mammals in JWLS has been noted based on field observations. Dialogue with the natives have confirmed their availability in the region. Prater's (1980) ***Book on Indian Animals*** and Ayyar and Ananthakrishnan's (1981) ***A manual of Zoology Part-II (Chordata)*** have been used for the Zoological names and distributional range of the animal.

INVENTORY OF MAMMALS IN JAMBUGHODA WILDLIFE SANCTUARY

All mammals are placed in Class Mammalia and Subclass Eutheria

Order : Primates

Family: Cynomorpha

Rhesus Macaque - *Macaca mulatta* (Zimmermann)

Local name : Mankado

Distribution : Himalayas, Assam, north and central India as far south as river Tapi in the west and river Godavari in the east.

Localities in JWLS : In forests near Vav, Koiwav, Jhand, Kathiari, Malbar.

Food : They eat and destroy a lot of crop plants like Tuver, groundnuts and other cereal crops. They also feed on insects and spiders, young flush of foliage leaves.

Present Status : They form an important prey for the panther; and are also exploited for shows on streets in towns by Madaris.Very small troops exist in the area and the number is still declining, due to pressure from man and predator.

The Common Langur or Hanuman Monkey - ***Presbytis entellus*** (Dufresne)

Local name : Langur, Vandro

Distribution : Whole of India , from the Himalayas to Kanya Kumari, except the western desert and Sri Lanka.

Localities in JWLS : Found nearer to villages, Dhanimataji hill, Jabban, Mahudibor, Katkuva, Jhand, Rinchhbar, Targol, Keva.

Food : They are pure vegetarians, feeding on wild fruits, flowers, buds, young shoots and occasionally raid fruit orchards and cultivated fields.

Present status : They freely move into village areas and cause harm to crops and may get killed in an encounter. They are prey for panthers.

Order : Carnivora

Family : Felidae

The Leopard or Panther - ***Panthera pardus fusca*** (Linnaeus)

Local name : Tapka Valo Vagh, Dipdo, Chito

Distribution : Found in whole of India extending into Burma and Sri Lanka.

Localities in JWLS : First indirect evidence of Panther with cubs was on 25th December 1992, at the base of Masabar hill (Plate II. 7. 1). Second encounter was at Kada reservoir on 15th January 1993. After that at several places scats (droppings) were found along the forest paths near Jhand, Kathiari, Lambhiya, Malbar, Narukot, Gandhra, Dhanimataji hill, 'Ranna'. During the `Panther census week' conducted by the Forest Department, during 9th to 15th May 1993, pug-marks were found near Kathiari, Shivjipura, Kolva, Mahudibor, Chalvad, Dandiapura, Jharva, Vav, Rinchhbar, Dharia, Wadek. A rough estimate not biased by Forest Department's census, the number of Panthers within the JWLS could be between 15-20 including sub-adults and cubs.

Food : The normal prey for the panther, the wild boar, is extinct from the area, the number of four-horned antelope is much less to support the large population of panthers; therefore, goat and dog lifting from villages is of common occurrance. In the scats of the panther, hairs of goats, langurs, dogs, hares and four-horned antelope have been identified.

Present status : Due to the protection accorded to the forests since 1990, the number of panthers is on the increase. But comparatively the prey species have not increased in number, leading to conflict between man and panther.

The Jungle Cat - *Felis chaus* (Guldenstaedt)

Local name : Jungli Biladi

Distribution : Found in practically all parts of the country. They inhabit open grasslands, scrub jungle, reedy banks of rivers and reservoirs.

Localities in JWLS : Pug marks found in wet soil near base of Dhanimataji hill towards Kada reservoir on 15th January 1993. At several occassions, pug marks were seen near Laphni reservoir and Ranjitnagar spring.

Food : They prey on small mammals such as mice, rodents, birds and poultry picked up from village vicinity.

Present status : No census has been done for the jungle cat; but my field experience confirms the presence of cats.

Family : Herpestidae

The Common Mongoose - *Herpestes edwardsi* (Geoffroy)

Local name : Noliyo

Distribution : Throughout India. Abundant in open country where low hills and ravines offer convenient holes and caves for shelter.

Localities in JWLS : Considering the amount of food and sheltering place available the Mongoose is a well established entity in the Sanctuary. The rocky hill slopes and thickets around fields provide adequate shelter and plentiful food of rodents, snakes, lizards and frogs.

Food : Some locals train and keep Mongooses to battle against snakes. It sometimes attack poultry, even nests of birds, fruits and roots.

Present status : A well established animal in the area , common everywhere around villages.

Family : Hyaenidae

The Striped Hyena - *Hyaena hyaena* (Linnaeus)

Local name : Zarakh

Distribution : Throughout peninsular India. Found in open country, where low hills and ravines offer convenient sheltering places.

Localities in JWLS : Have encountered pug marks at Kada reservoir and near Malbar and Narukot quite often.

Food : Feed upon remains of panther kills or dead animals having died of disease.

Present status : Only a few pairs may be inhabiting the area.

Family : Canidae

The Jackal - *Canis aureus* (Linnaeus)

Local name : Lombdi, Shiyal

Distribution : Throughout India. They can live in almost any kind of environment. They prefer lowlands near towns, villages and cultivation.

Localities in JWLS : Seen very often at dusk in villages, hunting out for prey. Encountered in Dhanpuri, Narukot, Jotwad.

Food : They are good scavengers, sometimes hunt poultry, sickly goats or babies, or even feed on fallen bor (*Zizyphus*) fruits.

Present status : Satisfactory numbers are found in the area because shelter for them is easily available among the reeds, termite mounds, hollows of *Madhuca* trees.

Family : Ursidae

The Sloth Bear - *Melursus ursinus* (Shaw)

Local name : Rinchh, Bhalu

Distribution : Throughout the forested tracts of India. They prefer forests that provide adequate shelter and suffecient food.

Localities in JWLS : On authority of the Sarpanch Bhavsing of Poyali village, the Bear moves to the forests of Poyali and Gandhra at certain times of the year from Ratanmahal forests in the north-east. Maharaj Harishchandrasinhji has also con firmed this probability. They are not present anywhere else in the sanctuary.

Food : During summer, plenty of fruits such as mangoes, jamun, figs, bael, timru and also honey are available. During monsoons, it feeds on insects especially termites. During winter, bor and *Madhuca* form the main diet along with maize cobs from fields.

Present Status : Totally absent excepting one or two in the north-eastern region.

Order : Chiroptera

Flying Fox - *Pteropus giganteus* (Brunnich)

Local name : Vagod, Vad vagod

Distribution : The largest of Indian bats, throughout India, living in large, noisy, squabbling colonies on the trees in midst of towns and villages.

Localities in JWLS : A large colony lives on the main market road of Jambughoda town. On several occasions seen them flying over the Kada dam to the water level, sipping water and flying back in search of food at dusk.

Food : They eat only the juice of fruits.

Present status : Several colonies seen at Jambughoda, Shivrajpur, Jabban, Pipia, Targol.

Order : Rodentia

The Indian Porcupine - *Hystrix indica* (Kerr)

Local name : Shahudi

Distribution : Throughout India, favouring rocky hillsides. Can inhabit open lands and forest regions.

Localities in JWLS : A porcupine spine was met with near Kada reservoir and also foot prints were seen. Porcupine burrows were shown at several places by natives.

Food : Vegetables, fruits, roots and grains constitute their main diet.

Present status : Only a few may be present in the area, due to over exploitation and destruction of forests, thereby reducing sheltering sites of the animal.

Order : Lapomorpha

The Indian Hare - *Lepus nigricollis* (F. Cuvier)

Local name : Sasalu

Distribution: Southern India. Common in large tracts of forests alternating with cultivated plains. Even found in vicinity of villages and fields.

Localities in JWLS : Found throughout the area, seen on several occasions, in Dhanpuri, Keva, Targol, Kathiari, Wadek, Vav, Chalvad, Malbar, Narukot and Jabban.

Food : Feed on fruits, grains, *Madhuca* flowers and grass.

Order : Artiodactyla

Family : Bovidae

Subfamily : Boselaphinae

The Four Horned Antelope or Chowsingha - *Tetracerus quadricornis* (Blainville)

Local name : Ghutari, Bakra haran

Distribution: Peninsula India in woody hilly terrain, not densely forested. They live close to a supply of water. They defecate in the same place.

Localities in JWLS : By observing the' dung heaps', the regions frequented by Chowsingha can be estimated; in Malbar, 'Ranna', Jhand, Lambhiya, north of Narukot, Katkuva. Encountered the animal twice, at Koiwav and in 'Ranna'.

Food : Fruits, *Madhuca* flowers, grains, grass.

Present status : About 10-12 animals may be found in the Sanctuary.

The Nilgai or Blue Bull - *Boselaphis tragocamelus* (Pallas)

Local name : Nilgai

Distribution: Indian peninsula especially in undulating plains. They avoid dense forests. They can survive without water for long periods and also defecate in same place.

PLATE II . 7

INDIRECT EVIDENCES OF ANIMAL DIVERSITY

II. 2. 1 - Panther pug - marks

II. 2. 2 - `Dung - heap' of Nilgai

Localities in JWLS : 'Dung heaps' have been regularly encountered in forests around Malbar, Narukot, Jabban, Mahudibor, Jhand, Lambhiya, Kathiari, Mota Raska, and in 'Ranna'(Plate II. 7. 2). A group regularly visits fields in Malbar and Mahudibor to feed on Tuver pods.

Food : Leafy shoots, fleshy *Madhuca* flowers, fruits of bor and others; cause a lot of damage to cultivated crops.

Present status : 3-4 groups are well distributed in the area, each probably consisting of 10-15 animals.

DISCUSSION

Natural diversity is now restricted to only protected areas of the world. It is an irreplaceable resource on which human survival depends (Dasmann, 1994). Protected areas preserve a reservoir of continuously evolving genetic material which enables various species to adapt to changing environments (Harmon, 1994).

The existence of a protected area may help maintain a more natural balance of the ecosystem over a much wider area. It affords sanctuary to breeding populations of birds which control insect and mammal pests in agricultural areas. Bats, birds and bees which nest, roost and breed in such areas may range far outside the sanctuary boundaries and pollinate fruit trees in the surrounding areas. Integrated and co-ordinated forest and agricultural ecosystems help maintain optimum environmental conditions (Harmon, 1994)

Jambughoda was a Princely State in the pre-independence era. The Jambughoda State was a forest economy. It was the only State to have its forests surveyed and settled way back in 1916-17 (Maharana Digvijaysinhji, *pers. comm.*). The revenue areas were divided into villages, agricultural fields, gauchers and wastelands. The forests were divided into blocks and coups. It was the only state to have a 4 inch topomap for its forests (Gazetteer,1972).

Each coup was worked for mature timber at an interval of 25-30 years. Teak was the main timber yielding species and until the late fifties, Jambughoda was famed for its teak (Maharaj Harishchandrasinhji, *pers. comm.*). According to the Forest Depertment survey in 1969, teak comprised about 39% of all trees in the area. The systematically worked out coup was then declared closed for 5 years to grazing, collection of firewood. The cut stumps were properly dressed for good coppicing and 40 trees were retained as mother trees for regeneration. During that period, a cartload of teak was sold for Rs. 5/- only. At wedding ceremonies the bamboo mandap (stage) was a gift from the Head of State.

At the time of merger of the princely states with the Government of Bombay in 1948, there were about 36,000 *Madhuca* trees in the Narukot region only (Yuvraj Vikramsinhji, *pers. comm.*). *Madhuca* still predominates the Narukot area as a poor representation of its past glory.

Trees of outstanding size with 5' to 20' girth are almost non-existent. A single Teak tree was seen in Rampura village at the boundary of a field. Such trees should be accorded adequate protection.

The forests of Jambughoda were home to abundant wildlife. Hunting for game was practised by the ruler and his family and guests. A hunting season began in mid November and lasted till the month of May. Only 2 leopards were killed per season and only 4 animals were shot per day. The meat of a day's kill was shared with the beaters' , and served with alcohol (Maharana Digvijaysinhji, *pers. comm.*).

Wild boar were abundant in the pre-independence era and are now totally extinct from the region. Sambhar and Cheetal were also found during that period but do not exist there now. Uptil 1953, the tiger was a regular visitor and wild boar numbers had begun to decline. The Bengal fox and the Indian Pangolin are also extinct from the region. The Sloth Bear probably migrates during some months of the year from the region linking

Ratanmahal Sloth Bear Sanctuary to JWLS. Both the regions were once contiguous forests and now lie fragmented.

Amongst the avifauna, the Grey Jungle fowl and Common Hornbill are no longer seen in JWLS. The green pigeon are restricted to certain regions only.

The presence of these above mentioned diverse plants and animals were found in the JWLS forests. Their status may now have become rare, threatened, vulnerable or may be totally extinct from the region.