

ENVIS CENTRE ON FLORAL DIVERSITY



FROM DIRECTOR'S DESK

I take this opportunity to say my departing note to the ENVIS readership as I shall be retiring by 31 December 2010 on superannuation. I always felt it as a great privilege to write foreword to this Newsletter that was established to spread the message of significance and the efforts put in by various institutions on floral diversity, documentation and conservation. These are Survey's main focus of research and this has made me, being the Director, all the more involved in the contents that have been chosen for print over the years. Not being limited to activities taken up by BSI, the Newsletter, more desirably, has given ample space for the efforts taken up by university departments and other research institutions in the defined theme of this ENVIS centre to update one and all on current efforts on the concerned subject. In this issue, there have been articles on conservation of the highland betel nut palm of New Guinea, the epiphytic flora on red oil palm in Little Andaman Island, the plants used for treating various ailments by Sikari tribe, the medicinal significance of *Didymocarpus pedicellatus* and *Hedychium coronarium* and, also a note on plants that hold up birds for a variety of needs in a wetland of national significance. ENVIS has gone a long way generating 15 volumes in its existence of about one and half decades and I am sure that it carries on to serve the purpose for which it was recognized in the coming years.



M. Sanjappa
Director
Botanical Survey of India



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The 'Highland Betel Nut Palm' of New Guinea in Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah

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The genus *Areca* L. belonging to family Aracaceae (= Palmae) comprising c. 47 species is distributed from India and south China through Malesia to New Guinea and the Solomon Islands (Dransfield *et al.*, 2008). There are three species found in India in the wild (Karthikeyan *et al.*, 1989).

Three species of this economically important genus, viz., *Areca catechu* L., *A. macrocalyx* Zipp. ex Blume and *A. triandra* Roxb. ex Buch.-Ham. are conserved in Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah (AJCBIBG).

A. macrocalyx, popularly known as 'Highland Betel Nut Palm' is one of the most elegant ornamental palms of the world. This beautiful solitary stemmed palm was originally known only from Bismarck Archipelago, New Guinea and subsequently from Solomon Islands, Seram and Aru. It was first introduced in this garden in 1973 through seeds received from Papua New Guinea.



Areca macrocalyx Zipp. ex Blume

There is only one palm tree existing in Division no. 17 of AJCBIBG adjacent to the Large Palm House. The plant began to bloom when it was 7–8 years old. Profuse flowering was observed on several occasions but fruit setting is rare in AJCBIBG.

Areca macrocalyx Zipp. ex Blume, Rumphia 2:75.1839; S.K. Basu & Chakraverty, Man. Cult. Palms India 126. 2002; Govaerts & J.Dransf., World Checkl. Palms 9. 2005.

Fl. & Fr.: February–November.

Uses: This species is often used as a house plant or ornamental avenue palm (http://palm-trees.org/palm_trees_detail.php?ID=14). The leaves are used for thatching; pith is edible and the nut contains a mild narcotic like chemical similar to that of *Betel* nut and hence used as a substitute of *A. catechu* (<http://davesgarden.com/guides/pf/go/60809/>; <http://www.fao.org/docrep/012/i1590e/i1590e.pdf>).

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- Karthikeyan, S., S.K. Jain, M.P. Nayar & M. Sanjappa. 1989. *Florae Indicae Enumeratio: Monocotyledonae*, p. 16. Botanical Survey of India, Calcutta.

The Little Andaman is the fourth largest island of Andaman group, covering an area of 733 sq km, located between 10°30' to 10°54' N latitude and at 92°30' E longitude. The island is separated from Great Andaman group by Duncan Passage and Nicobars by 10° channel. Geographically it is more or less flat with few undulations in the north-eastern parts. The central and western portions are hilly and the highest elevation is c. 210 m. This island is gaining fame as a tourist spot amongst Andaman group of islands because of its white surfy waterfall, colourful sandy beaches and *Oil Palm* plantations. Floristically, it is very rich and most of the areas are still covered by inaccessible moist dense evergreen forest.

Elaeis guineensis Jacq. – the *Oil Palm*, popularly known as *Red Oil Palm* in India, is native of West Africa and cultivated in many countries of south-east Asia (Kumar, 2004). In 1979, the Andaman & Nicobar Islands Forest Plantation Development Corporation Limited (ANIFPDCL) started the *Oil Palm* plantation in the Little Andaman Island with an aim to provide

Epiphytic flora on *Red Oil Palm*, in Little Andaman Island

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employment and improve economy. At present, the plantation is spread over an area of 1593 ha. A factory for extraction of palm oil is also run by the ANIFPDCL at Nethaji Nagar.

The trunks of *Oil Palm* trees are good substrata for epiphytic plants. Under natural conditions, the palms retain their leaf-bases when the leaves die or fall. In plantations, old leaves are pruned and the leaf-bases are trimmed. The trunk then resembles an enormous pineapple. The plant debris deposited among the leaf-bases gradually rot to form pockets of humus which retain water and the humus is therefore an ideal substratum for the growth of epiphytes. Besides the epiphytes, a good number of terrestrial species also grow there as pseudo-epiphytes.

An effort was made to inventorize the epiphytic plants growing on *Elaeis guineensis*. A total of 36 plant species belonging to 27 genera under 22 families were collected from the trunks of *Oil Palm* trees, of which 16 species are pteridophytes and 20 species are angiosperms. Most of the angiosperms are natural terrestrials but found growing as epiphytes. *Ficus* and *Asplenium* are the dominant genera having 7 and 3 species, respectively. *Davallia* ranks next with 2 species and the rest of the 24 genera are represented by a single species. These species are listed below:

PTERIDOPHYTES

1. <i>Asplenium falcatum</i> Lam.	Aspleniaceae
2. <i>Asplenium nidus</i> L.	Aspleniaceae
3. <i>Asplenium phyllitidis</i> D. Don	Aspleniaceae
4. <i>Blechnum finlaysonianum</i> Hook. & Grev.	Blechnaceae
5. <i>Davallia denticulata</i> (Burm.f.) Mett. ex Kuhn	Davalliaceae
6. <i>Davallia solida</i> (G.Forst.) Sw.	Davalliaceae
7. <i>Drymoglossum piloselloides</i> (L.) C. Presl	Polypodiaceae
8. <i>Drynaria quercifolia</i> (L.) J.Sm.	Polypodiaceae
9. <i>Lindsaea ensifolia</i> Sw.	Dennstaedtiaceae
10. <i>Mecodium exsertum</i> (Wall. ex Hook.) Copel.	Hymenophyllaceae
11. <i>Microsorium punctatum</i> (L.) Copel.	Polypodiaceae
12. <i>Nephrolepis biserrata</i> (Sw.) Schott	Oleandraceae
13. <i>Pyrrosia adnacens</i> (Sw.) Ching	Polypodiaceae
14. <i>Stenochlaena palustris</i> (Burm.f.) Bedd.	Blechnaceae
15. <i>Tectaria melanorachis</i> (Baker) Copel.	Dryopteridaceae
16. <i>Vittaria elongata</i> Sw.	Vittariaceae

ANGIOSPERMS

1. <i>Ageratum conyzoides</i> L.	Asteraceae
2. <i>Alocasia decipiens</i> Schott	Araceae
3. <i>Cymbidium aloifolium</i> (L.) Sw.	Orchidaceae
4. <i>Delonix regia</i> (Bojer) Raf.	Leguminosae: Caesalpinioideae
5. <i>Ficus benghalensis</i> L.	Moraceae
6. <i>Ficus benjamina</i> L.	Moraceae
7. <i>Ficus hispida</i> L.f.	Moraceae
8. <i>Ficus microcarpa</i> L.f.	Moraceae
9. <i>Ficus religiosa</i> L.	Moraceae
10. <i>Ficus tinctoria</i> Forst.f. var. <i>gibbosa</i> (Blume) Corner	Moraceae
11. <i>Ficus virens</i> Dryand. var. <i>glabella</i> (Blume) Corner	Moraceae
12. <i>Geodorium densiflorum</i> (Lam.) Schltr.	Orchidaceae
13. <i>Hoya parasitica</i> (Roxb.) Wall. ex Wight	Apocynaceae: Asclepiadoideae
14. <i>Hyptis capitata</i> Jacq.	Lamiaceae
15. <i>Leea indica</i> (Burm.f.) Merr.	Leeaceae
16. <i>Mussaenda macrophylla</i> Wall.	Rubiaceae
17. <i>Peperomia pellucida</i> (L.) Kunth	Piperaceae
18. <i>Rhapidophora laciniata</i> (Burm.f.) Merr.	Araceae
19. <i>Tetrameles nudiflora</i> R.Br.	Tetramelaceae
20. <i>Trema tomentosa</i> (Roxb.) H.Hara	Ulmaceae

Reference

Kumar, Shashi. 2004. Oil Palm in Andaman and Nicobar Islands. *Indian Forester* 130: 977.



Plantation of Red oil palm



Oil palm factory in Little Andaman

Plants sustaining birds in Ujani Wetland, Maharashtra

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According to the Annual Report (2008-2009) of Ministry of Environment & Forests, Government of India, a total number of 115 wetlands have been identified under National Wetland Conservation programme and Ujani wetland in Maharashtra is one of them. It was formed because of the construction of Ujani dam across the river Bhima which is a tributary of the river Krishna and has come into existence in June, 1980.

The Ujani dam was named after the Ujani village and is situated 150 km away from Pune on Pune-Solapur road. It lies on the border of Solapur, Ahmednagar and Pune districts in Maharashtra.

The Ujani wetland is situated at 18°4'24" N latitude and 75°7'15" E longitude at an altitude of 900 m above sea level. The total submerged area is 29,000 ha and gross catchment area is 14,856 sq km. The total area of the reservoir is 357 Mm². The depth of the water in the reservoir varies from 1–20 m depending on the seasons. There are two small islands and the backwater covers a large portion of the adjacent crop fields.

The wetland harbours 293 species and 16 infraspecific taxa belonging to 186 genera under 60 families of Angiosperms. Besides, two species of Pteridophytes have also been recorded.

The wetland is famous for its waterfowl and large flock of Greater flamingos (*Phoenicopterus roseus*). They enjoy living in this wetland for a greater part of the year and during winter a large number of migratory birds

such as duck, wader, coot, tern and many others visit this wetland. Pradhan (2002) recorded 102 species of resident and migratory birds belonging to 60 genera under 18 families. About 59 species of migratory birds from East Asia and beyond have been recorded here. Most of the migratory birds visit this area in winter.

While working on the Ujani wetland from 1999 to 2003, information was collected regarding the plant species on which the birds build their nests or use for preparing nests and the plant species eaten by various species of birds. They are given below:

The nests are built on clumps of *Ipomoea carnea* subsp. *fistulosa* by Spotbill or Grey ducks (*Anas poecilorhyncha*) and on *Typha angustifolia* by Indian weaver bird (*Ploceus philippinus*). *Paspalum* and *Paspalidium* spp. are used by Spotbill duck and Purple moorhen (*Porphyrio porphyrio*) for nesting. *Cyperus alopecuroides* is also used by Purple moorhen for nesting.

The grasses and the ripened grains of bajra, jowar and maize are eaten by the Indian weaver bird, Munia (*Lonchura malacca*) and Rosy pastor (*Sturnus roseus*). The rhizomes of



Flocking of aquatic birds - coot, flamingos, etc.

Typha angustifolia are eaten by Purple moorhen. The tender leaves and stems of *Ipomoea aquatica* are eaten by coot (*Fulica atra*). *Potamogeton nodosus*, *P. crispus* and *P. pectinatus* are eaten by coot, pochard (*Aythya ferina*), Indian moorhen (*Gallinula chloropus*), Eurasian wigeon (*Anas penelope*), Northern shoveller (*Anas clypeata*) and Cotton teal (*Nettapus coromandelianus*). The seeds of *Digitaria ciliaris*, *Panicum* spp. and *Bidens biternata*; plants of *Spirodela polyrhiza*, *Lemna perpusilla*, *Wolffia arrhiza*, *Azolla pinnata*; achenes of *Ceratophyllum demersum* and sporocarps of *Marsilea minuta* var. *indica* are eaten by ducks. *Hydrilla verticillata* and *Najas* spp. are eaten by coot and pochard.

Reference

Pradhan, M.S. 2002. Higher Chordates. In: Director, Zoological Survey of India (Ed.), *Fauna of Ujani (Maharashtra)*, pp.161-196. Kolkata.



Migratory birds in Ujani wetland

The flowers of *Oxystelma esculentum* (L.f.) Schult. (Apocynaceae: Asclepiadoideae), known as 'Tuni phool' (Bengali), are used for worshipping Goddess Lakshmi during 'Kojagari Lakshmi Purnima' in West Bengal.

The flowering branches are sold in main flower markets of West Bengal only during this particular occasion. A bundle of 8–10 flowering branches costs ₹ 5–10.

Oxystelma esculentum (L.f.) Schult. ▶

Courtesy: K.L. Maity, Central National Herbarium, BSI, Howrah



Hedychium coronarium J.König (Zingiberaceae) in Achanakmar-Amarkantak Biosphere Reserve, Central India

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Hedychium coronarium J.König

A World Health Organization report claims approximately 80% of the people in developing countries depend on traditional system of medicine for primary health care that involves the usage of plants.

India is rich in traditional knowledge related to plants. Around 8000 plant species are used in the different systems of medicine.

Achanakmar-Amarkantak Biosphere Reserve (Madhya Pradesh, Chhattisgarh) established in 2005 is rich in plant diversity. The flowers of *Hedychium coronarium* J.König (Zingiberaceae) found here in plenty, and known as 'Gulbakawali' are used in curing various eye ailments by the local people. It has a great potential for developing a drug molecule by the pharmaceutical industries.

Hedychium coronarium
J.König

Butterfly Ginger Lily, White Ginger Lily (English); *Dolan champa* (Hindi); *Suruli Sugandhi* (Kannada); *Takhellei angouba* (Manipuri); *Sontaka* (Marathi).

Fl. & Fr.: August – February.

Habitat: Grows in moist tropical evergreen forest.

Distribution: Common throughout India and Malesia; widely grown as ornamental and naturalized in tropical countries. It is seen frequently growing in wild in four localities of A m a r k a n t a k B i o s p h e r e Reserve—Sonemuda, Mai ki Bagia, Antaria and Sambhudhara.

The 'Gulbakawali Ark' of Amarkantak is world famous. The traditional healers and natives of this region are well aware of its medicinal uses and use it as eye- tonic to prevent cataract and eye infections including inflammations. 'Gulbakawali Ark' is available at all local markets and stores in Amarkantak area.



'Gulbakawali Ark' used as eye drop by herbal practitioners

'Ark' is prepared using fresh flowers that are collected and dried in open air. These dried flowers are soaked in water over night. The soaked flowers are boiled in earthen pots



'Gulbakawali Ark' stored in bottles

having an outlet of tube ending into another glass container where the extract (Ark) is collected through distillation process.

The rhizomes are the source of essential oil used in perfumery and pharmaceutical preparations. Decoction of the rhizomes has an anti-rheumatic property. It is also used in curing tonsillitis through gargling. 'Gulbakawali' growers in Amarkantak area earn additional revenue because of its valuable uses.

'Gulbakawali' is suitable for cultivation on slopes under subhumid and subtemperate condition at altitudes above 1100 m. The location may be sunny or partially shady. It prefers clay loam soils rich in organic matter (humus) with adequate moisture. The pH of the soil may be slightly acidic to neutral and crop can be raised from rhizomes during December and January. Rhizomes of 3 – 4 cm in length with 2 or 3 eyes and c. 30 g weight (vegetative buds) are suitable. Larger rhizomes should be cut to ideal size before planting. For one hectare of land, 12-13 q of rhizomes are required. Under recommended agro-climatic conditions, the crop does not require irrigation. However, where soil is not moist, light watering of the field soon after planting is recommended. In areas which receive high rainfall, care should be taken to ensure subsurface drainage, as the crop does not endure water-logging. It can also be grown under partial natural shade and hence can be integrated with agro-forestry and social forestry.

Plants in 'Sikari' medicine from Ajodhya hills, Purulia district, West Bengal

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Survey of some selected forest areas and tribal villages in Ajodhya hills, Purulia district, West Bengal was undertaken during 2007-2009 with the help of experienced and knowledgeable local medicinal healers of different tribal communities for collection of information on the medicinal uses of plants known to them. Information on the preventive and curative properties of some plant species used for treating various ailments by the 'Sikari' tribe, the monkey-eating community of Birhor, are given below along with 'Sikari' names.

Abrus precatorius L. (Leguminosae: Papilionoideae) 'Runz'

The fresh young leaves are pounded into paste and mixed with mustard oil in the ratio of 2:1. The mixture is then boiled for 15–20 minutes and after cooling, it is used for massaging to cure chest pain. About 5 gm of the root powder is mixed with one glass of cow's milk and taken once a day in empty stomach for 15 days to cure allergy.

Alstonia scholaris (L.) R.Br. (Apocynaceae: Rauvolfioideae) 'Chatimdaru'

About 15 gm of the fresh stem bark is pounded into paste and heated gently with 10 grains of *Piper longum* L. It is then applied on the affected joints twice a day to get relief from rheumatic swellings. The latex is said to be used for curing veterinary dysentery.

Argemone mexicana L. (Papaveraceae) 'Seal-baha'

About 10 drops of the latex which is yellow in colour is heated gently for a few seconds and then applied to cure fungal infection of feet or any other kind of skin irritation.

Boswellia serrata Roxb. ex Colebr. (Burseraceae) 'Salai, Salgaw'.

About 10 gm of oleo-resin gum is boiled in mustard oil in the ratio of 2:1 and the paste is then applied to cure rheumatic swelling. The fresh leaf-



Boswellia serrata Roxb. ex Colebr.

decoction is used for washing septic wounds for quick healing. The resin is smoked to get relief from asthma.

Buchanania lanzan Spreng. (Anacardiaceae) 'Piyal'

Half a teaspoon of dried stem bark is mixed with 100 ml of cow milk and taken in empty stomach for 5–7 days for treating cough and cold. The dried seed powder with the paste of black pepper in the ratio of 2:1 is taken for urinary infection in women.

Capparis zeylanica L. (Capparaceae) 'Asaro'.



Capparis zeylanica L.

The fresh leaves, stems and roots are ground into a paste and applied to cure rheumatic pain. One or two teaspoons of dried fruit powder are taken for 5–7 days for treating snake bite cases.

Ficus hispida L.f. (Moraceae) 'Kak dumbri'

The fresh leaves are fed to the cattle for safe and smooth delivery.

Ficus racemosa L. (Moraceae) 'Jagya dumbri'

Young figs are eaten as a vegetable to cure urinary infection.

Garcinia pictoria Buch.-Ham. (Clusiaceae) 'Tamal'

The decoction of the unripe fruits is mixed with the paste of ginger in the ratio of 3:2 and taken for curing dysentery.

Helicteres isora L. (Sterculiaceae) 'Atmora, Gamochra'

The decoction of the fruit is mixed with salt in the ratio of 3:2 and half a teaspoon of the mixture is given to the children to cure stomach pain. The fresh leaf-juice is used for washing cuts and wounds.

Holarrhena pubescens (Buch.-Ham.) Wall. ex DC. (Apocynaceae: Apocynoideae) 'Kuruchi'

The infusion of stem bark with honey in the ratio of 3:2 is taken for curing dysentery. The dried seed powder is inhaled for curing asthma and the same is taken with cow's milk for treating malarial fever.

Mallotus philippensis (Lam.) Müll.Arg. (Euphorbiaceae) 'Kamala'

The fresh roots are made into a paste and applied on the swollen joints for treating arthritis. One teaspoon of the red powdery coatings of the fruits is boiled with cow's milk and taken to get rid of intestinal parasites.

Sterculia urens Roxb. (Sterculiaceae) 'Banar Pichal'

Gum obtained from this species is popularly known as 'Kothila' in traditional medicine.

A few seeds are boiled in 50 ml of mustard oil and the oil is then smeared on the skin to cure itching. The gum obtained from the stem-bark is soaked in water and mixed with sugar. The water is then taken as a soft drink for

treating diarrhoea and dysentery.

Terminalia bellirica (Gaertn.) Roxb. (Combretaceae)



Woodfordia fruticosa (L.) Kurz

Didymocarpus pedicellatus R.Br. (Gesneriaceae) from West Bengal

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Didymocarpus pedicellatus R.Br. (Gesneriaceae), commonly known as 'Stone flower' is endemic to the Himalayan range across India, Nepal and Bhutan. In India it is reported from Himachal Pradesh, Uttarakhand, Sikkim, Assam and Arunachal Pradesh at altitudes ranging from 500 – 2500 m. Traditionally this species is used in the treatment of renal diseases particularly kidney stone (Kapoor & Kapoor, 1976) and is also referred to in the Ayurveda.

While exploring Buxa Duar (Jalpaiguri district) of West Bengal for medicinal plants, the authors collected *D. pedicellatus* (7.9.2009, A. Sarkar & T.K. Paul 109–CAL) where it was abundantly growing in moist places on stones. During the literature survey, it was found that this species was first reported from Buxa Duar by Hilliard (2001). However, Mukherjee *et al.* (2008) overlooked this report in their work.

Didymocarpus pedicellatus R.Br., *Cyrtandreae* 118. 1839; C.B. Clarke in Hook.f., *Fl. Brit. India* 4: 345. 1884; H. Hara in H. Hara *et al.*, *Enum. Fl. Pl. Nepal* 3: 134. 1982; Hilliard in Grierson & D.G. Long, *Fl. Bhutan* 2(3): 1311. 2001. *D. macrophyllus* sensu Royle, *Ill. Bot. Himal. Mts.* 1: 294, t. 70, f. 1. 1835, non Wall. ex D. Don 1825.

In Ayurveda it is known as 'Shilapuspha', 'Shantapuspi' and sometimes 'Pasanbheda'. In Hindi it is commonly known as 'Charela' or 'Pathar Phori'.

Fl. & Fr.: June – September.

Chemistry: The plant contains polyterpenes (didymocarpol and didymacarpinol), flavonoid (didymocarpin, isodidmyocarpin, pedicin, isopedicin, pedicellin, pediflavone) and dicarboxylic acid (pedicellic acid). Pedicellic acid is the active principle and is valued for anti-cancer activity (Singh, 2007). It has an essential oil didymocarpene which exhibits antimicrobial activity (Singh *et al.*, 1978).

Uses: The Magar community of Buxa Duar who have migrated from eastern Nepal, collect this plant from the forest and after sun drying burn it at home as incense for its sweet odour. The aerial parts are used as a home remedy for anal and blood cancer. About 50 grams of aerial parts are made into a fine paste and then boiled in 250 ml of water for 30 minutes. 15 ml of this extract after straining is given twice daily for six months and a significant improvement in the prognosis of cancer was seen. It is rare in West Bengal and

may be cultivated for its valuable medicinal uses.

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Didymocarpus pedicellatus R.Br.



Dr. K.N. Gandhi, The Harvard University Herbaria, U.S.A. delivering a lecture on Botanical Nomenclature in the Committee Room of Central National Herbarium, BSI, Howrah

Dr. G.S. Rawat, Director General, Indian Council of Forestry Research and Education (ICFRE), Dehradun in the Type Herbarium I of Central National Herbarium, BSI, Howrah



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Website	http://www.bsienvis.nic.in
Activities of the Centre	The centre has enormous data on many areas and wants to create database / publish the following information: State wise / phytogeographical distribution of Threatened and Endemic taxa of India; Documentation of traditional / ethnobotanical knowledge of plants of India; Mangroves of India; Carnivorous plants of India; State wise Bibliography and Abstracts of papers pertaining to plants of India. User service will continue.
Future plan	Thrust area of the ENVIS Centre, BSI is the task of disseminating information on Floral Diversity from different eco-regions of India. Economic and medicinal plants included in red list categories will be given special emphasis. Assessment of plants included in the CITES list will be continued. Incorporation of new data in Database of Phyto-geographical distribution of Rare, Endangered and Threatened species will also be continued. Incorporation of new data on plants of Ethnobotanical importance is continued. An initiative to make database on Mangroves of India and Insectivorous plants of India has been taken.
List of publications brought out so far	Books: 1. Mangroves, Associates and Salt Marshes of the Godavari and Krishna Delta, Andhra Pradesh – India 2. Diversity of Coastal Plant Communities in India. (Priced publication) ₹ 804.00 * 3. Red List of Threatened Vascular Plant Species in India 4. Bibliography and abstract of papers on flora of West Bengal 5. Bibliography and abstract of papers on flora of North East India – I 6. Bibliography and abstract of papers on flora of West Bengal – II Newsletters: Up to Vol.15(2).

*DD is to be drawn in favour of ACCOUNTS OFFICER, P.A.O. (BSI/ZSI) and to be sent to the address of the ENVIS Centre given above