



Plant diversity in the coastal region of Odisha with special reference to the medicinal plants

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ABSTRACT

India is a country of great diversity in its tradition, culture, language, geography, climate and vegetation. The peninsular India is having a coast line of 5690 Km of which 482 Km long Odisha coast experiences the sub-humid climate showing strand and estuary vegetation due to the major rivers like; the Subarnarekha, the Budhabalanga, the Baitarani, the Brahmani, the Mahanadi, the Devi and the Rushikulya contributing to the coastal plain of Odisha and making it the "Rice Bowl" of the State. The floristic account in the deltaic region of the coast line comprising of four erstwhile major districts of the state like Baleswar, Cuttack, Puri and Ganjam have revealed 332 species belonging to 200 genera and 82 families. Plants belonging to different habit and habitat and plant parts like stem, root, leaf, flower, bud, fruit and twig etc. were also recorded. The role of the local healers, ayurvedic practitioners, experienced men and women making traditional healthcare were also noted. The importance of the medicinal plants used by the rural and tribal people have also been highlighted during the present investigation.

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1. Introduction

India is the second largest populous country in the world. It is a country of great diversity not only because of its vegetation and floristic variation but also because of diversity, both, in anthropogenic and physiographical aspects. So far as the geography is concerned, India is surrounded by the Great Himalayan mountain range in the North, Arabian Sea in the West, Bay of Bengal in the East and Indian ocean in the South, which influence the climatic condition of this great country. According to the geographical location and climatic conditions, the Indian landmass is divided into five different types like the Northern plains, the North East hilly regions, the peninsular plateau, coastal plains and the Thar Desert. However, in this diversified physical scenario, the country is having a coast line of nearly 5690 Km long from East to West (Rao and Sastry, 1974). It is of great concern that the floristic vegetation of the coastline has not yet been properly studied,

which needs a thorough investigation emphasizing on the coastal flora of India in general and the State of Odisha, in particular. Since the coastal regions comprise a diverse ecosystem and possess many interesting aspects for ecological, physiological and phyto-geographical features, it is necessary to study these aspects in detail. During the present work, concentrating on Odisha, some physiologically specialized and ecologically adapted evolved plant species were found to survive in the saline water as well as in sensitive eco-system. The East coast runs in wide curve, changing direction from North to North East at 16° latitude and covers the states of Tamil Nadu, Andhra Pradesh, Odisha and West Bengal (Rao, 1971). The climate along the coastline is relatively uniform throughout and it has been classified into the five climatic groups of which the Odisha coast experiences, mostly, the sub humid climate (Thorntwaite, 1948). Out of the entire length of the coastline of India, Odisha covers 482 km only (Pattnaik *et al.*, 2008) which is nearly 8.4% of the total coastline of India. The vegetation of Odisha coast appears to be peculiar due to wide range of diverse demography and climatic changes. The vegetation

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of the coastal Odisha seems to be quite mosaic because of the deltaic regions formed at the mouth end of some important rivers like Subarnarekha, Mahanadi, Devi and Rushikulya. Rao and Sastry (1974) were of the opinion that the mixture of coastal sand dunes and inland vegetation divide the coastal vegetation into two subtypes like Strand Vegetation and Estuarine borderland vegetation.

2. Materials and methods

Intensive exploration to collect information from the people of different villages of erstwhile coastal districts of Baleswar, Cuttack, Puri and Ganjam was made. Before the collection of information and data, liaison and survey was made in different areas of the coastal region. The interactions with the people were done, which were on different aspects such as their lifestyle, food habit, socio-economic standard, education and health care practices. Observations on the people residing in the village were also taken concerning their traditional system of herbal healthcare practices based on the plants and plant products. It was also observed at the time of interaction and discussion that they go for this folklore herbal treatment with medicinal plants available in nature.

List of locally available plants used for the treatment and health care, were identified. Photographs of the plants were neatly taken and kept for documentation. The herbaria of the plants were prepared for reference. The botany of the plants was enumerated to ensure the co-relation between the morphology and its medicinal use. The information like name of the plants, their local name, places of availability, plant parts used and name of the diseases etc. were also prepared for furtherance of the work.

3. Result and discussion

During the present investigation it was observed that the deltaic region at the mouth end of the river Subarnarekha, Budhabalanga and the Dhamara exhibited the flora of an estuarine complex (Behuria, 1992b) and the important species in the floristic component are *Avicennia marina*, *A. officinalis*, *A. alba*, *Sonneratia apetala*, *Premna corymbosa*, *Aegiceras majus*, *Rhizophora mucronata*, *Bruguiera gymnorrhiza*, *Caesalpinia nuga*, *Excoecaria agallocha*, *Hibiscus tiliaceus*, *Clerodendrum inerme* and *Acanthus illicifolius*. The floristic view across the coastline in the deltaic region of the Mahanadi is very rich and varied comprising of 750 genera belonging to 120 families (Behuria, 1992c) and widely distributed families are Verbenaceae, Caesalpiniaceae, Fabaceae, Mimosaceae, Poaceae, Euphorbiaceae, Rubiaceae, Asteraceae, Lamiaceae, Moraceae, Arecaceae and Cyperaceae. Among other important families are Dipterocarpaceae, Malvaceae,

Meliaceae, Anacardiaceae, Rhizophoraceae, Cucurbitaceae, Combretaceae, Ebenaceae and Apocyanaceae. The important taxa are *Mimosa pudica*, *Jatropha gossypifolia*, *Annona squamosa*, *A. reticulata*, *Argemone mexicana*, *Aegle marmelos*, *Parkinsonia aculaeta*, *Tridax procumbens*, *Martynia diandra*, *Alocasia macrorrhiza*, *Hyptis suaveolens*, *Datura metel*, *Scoparia dulcis*, *Adhatoda vasica*, etc. Some very common orchard species *Mangifera indica*, *Artocarpus heterophyllus*, *Psidium guajava*, etc. and the less common species are *Anacardium occidentale*, *Dillenia indica*, *Citrus sinensis* and *C. aurantifolia*. The palms grown here are *Borassus flabellifer*, *Cocos nucifera*, *Phoenix sylvestris*, etc. Hedges like *Duranta repens*, *Lawsonia inermis*, *Ipomoea carnea*, *Vitex negundo* and *Bambusa tulda* are widely planted on fence. The common shade trees are *Ficus religiosa* and *Ficus benghalensis*. The common pond species are *Nelumbo nucifera* and *Nymphaea nauchali*. The other wetland and aquatic species like *Myriophyllum indicum*, *Ludwigia adscendens*, *Pistia stratiotes*, *Trapa bispinosa*, *Nymphoides indica*, *Hydrilla verticillata*, *Ottelia alismoides*, *Ceratophyllum demersum*, *Vallisneria natans* and, *Eichhornia crassipes* widely grow on ponds, canals and water bodies. However the western hilly region and adjoining forest plains are having a lot of forest trees like; *Shorea robusta*, *Pterocarpus marsupium*, *Ougenia oojenensis*, *Adina cordifolia*, *Xylia xylocarpa*, *Terminalia tomentosa*, *Anogeissus latifolia*, *Bombax ceiba*, *Chloroxylon swietiana*, *Diospyros melanoxylon* etc found naturally occurring in the forest. Besides the other large number of species like *Dillenia pentagyna*, *Lannea coromandelica*, *Garuga pinnata*, *Protium cerratatum*, *Fagara budrunga*, *Alstonia scholaris*, *Anogeissus acuminata*, *Pongamia pinnata*, *Albizia lebbek*, *Pterospermum heyneanum*, *Miliusa velutina*, *M. tomentosa*, *Lepisanthes tetraphylla*, *Putranjiva roxburghii*, *Polyalthia cerasoides*, *Mallotus philippensis*, *Streblus taxoides* etc. the herbs, *Rouvolfia serpentina*, *Hemidesmus indicus*, *Gymnema sylvestre*, *Asparagus racemosus* etc. are very common. The region has got sporadic population of different types of Bamboo species and *Bambusa arundinacea* and *Dendrocalamus strictus* are very prominent. The vegetation across the Puri district coastal region is featured with deltaic types of vegetation having beautiful groves of coconut palms, mangoes and raised gardens. Most part of the deltaic region of the district are sandy ridges covered with thorny plants and some places are covered with creepers belonging to the genus *Convolvulus* of the family Convolvulaceae (Senapati and Kuanr, 1977). The deltaic region of the river Devi exhibits the vegetation of mangrove forest. The cultivated plains in between hill region and sea-coast are met with the weeds of rice fields, while the wet lands and the water bodies are filled with the hydrophytes including dangerous water

hyacinth in and around the villages which is a characteristic feature in the flora of the coastal Orissa. The hill region is dominated with dry ever green forest and comprise the forest tree species like *Shorea robusta*, *Pterocarpus marsupium*, *Diospyros chloroxylon*, *Crateva magna*, *Terminalia alata* etc. Other common plants are bamboos, canes, *Bauhinia vahlii*, *Milletia auriculata*. The forest vegetation of the Western region of this coastal segment chiefly comprises the *Terminalia tomentosa*, *T. alata*, *Eugenia jambos*, *Diospyros chloroxylon*, *Bridelia stipularis*, *Lagerstroemia reginae*, *Dalbergia sissoo*, *Careya arborea*, *Adina cordifolia*, *Schleichera oleosa* and *Cassia siamea*. Common shrubs species are *Flemingia bracteata*, *Indigofera tinctoria*, *Oldenlandia corymbosa*, *Woodfordia fruticosa*, *Ixora coccinea*, *Butea monosperma*, etc. and common climber is *Combretum decandrum*. It is interesting to note that most of the medicinal plants, under report, belong to the families as mentioned earlier. The floristic feature of the southern coast is quite rich in view of the forest coverage in the larger part of the erstwhile Ganjam district (Behuria, 1992a). The plants in the vegetation are mostly represented by forest plants which are distributed in three forest divisions such as i) Paralakhemundi, ii) Ghumusar North, and iii) Ghumusar south. The sea coast vegetation is inundated by the sea are covered with the xeric psamophytes like *Casuarina equisetifolia*, *Pandanus fascicularis* and some gigantic grasses like *Vetiveria zizanioides*, *Eragrostis coarctata* and *Desmostachya bipinnata* etc. The vegetation pattern in this region changes under variable environmental factors such as the periodic input of forest water which changes according to tidal level.

Out of all the plants collected during this investigation, it is observed that 332 species are having medicinal importance. Of all these plants, about 58 species were found to be common in all coastal districts. Those are *Azadirachta indica*, *Acanthus illicifolius*, *Derris trifoliata*, *Ficus hispida*, *Hygrophila auriculata*, *Premna corymbosa*, *Salvadora persica*, *Tamarix gallica* and fifty others. The medicinal plant species with their plant parts are important due to their use for healthcare treatment like common cold, fever, dysentery, stomach disorders and some skin diseases. People used to take these traditional plant medicine for their treatment unless otherwise they are forced, under circumstances, to go for any alternative. On the other hand, these types of treatment are not only viable economically, but also, easily available at hand in their surroundings. These plants were also reported earlier by several workers like Subudhi *et al.* (1992), Satpathy and Brahmam (1999), Das *et al.* (2003), Baske and Sur (2010), the Vaidyas and other ethno botanical practitioners. Plants collected during this work were thoroughly scrutinized in the field and through

the literature from where some interesting information could be revealed. The leaves of eighty species amounting 24% of the total number of 332 are very useful for different diseases. Similarly the stem, bark, root, flower, fruit, buds, seeds and other plant parts were studied in detailed (Fig.1).

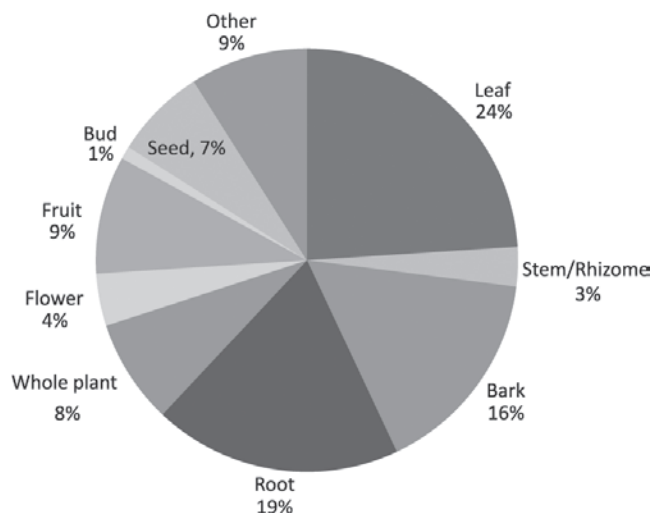


Fig.1 Proportion of the various plant parts used for herbal cure of various diseases in coastal regions of Odisha.

It is revealed from the observation that the leaves, roots and barks of the plants used, appear to be quite high as compared to the other parts. This particular observation substantiates the age old practices of traditional healers and the Vaidyas upholding the views given by several scientists as to why leaves, stem and bark of the plants need to be taken care of. The other plant parts like flower, bud, seed, etc. have also been noticed of their use, which is indisposed due to their significant role for curing some of the important diseases. During the present investigation, an account of diseases cured by these said plants and plant parts were prepared and it was found that nearly 122 of different diseases could be cured. However, in order to signify the diseases and the plant parts used, ten (10) number of plants have been selected which have got maximum use of the plants as a whole or the plant parts to cure those diseases (Fig. 2).

Incidentally, those ten diseases like diarrhea, dysentery, blood dysentery, cough and cold, dental care, and skin diseases etc. were found to be treated by the medicinal plants. On studying the diseases, it could be observed that those diseases are of very common type. It is heartening to note that, the serious diseases like Cancer, Blood Pressure, Diabetes and Cardiovascular disorders etc. have not been significantly treated by medicinal plants, despite the facts, people of ethno medicines, Vaidyas and Ayurvedic practitioners have claimed that those diseases can be cured

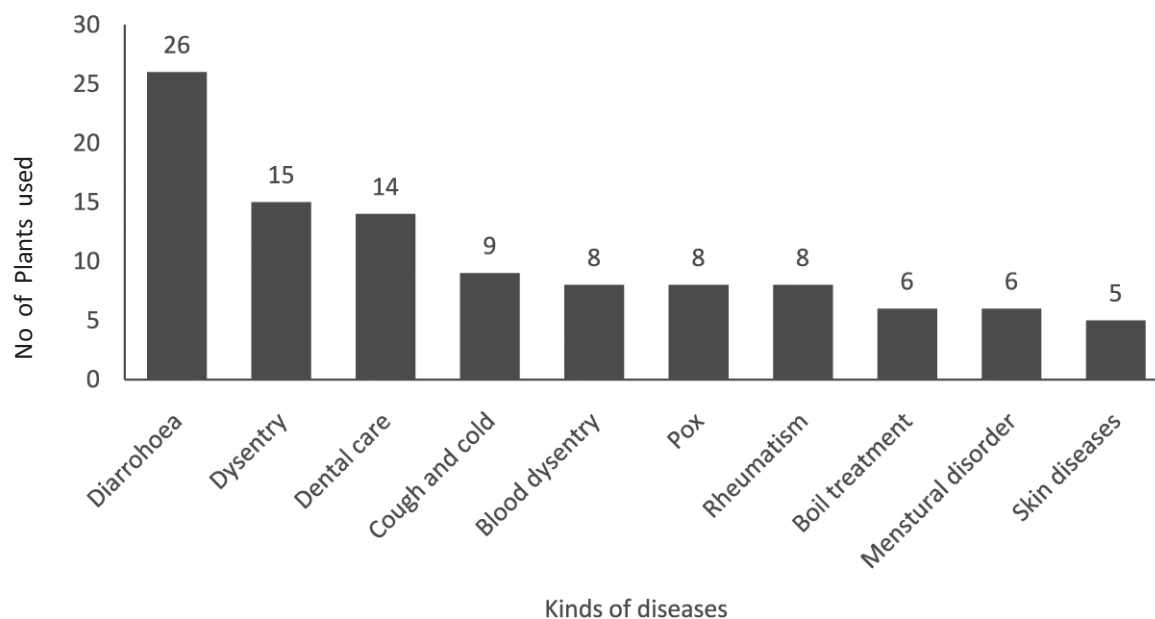


Fig. 2 Number of plants and plant parts used for herbal cure of ten important diseases in coastal regions of Odisha.

by the use of medicinal plants. Now it is an open challenge, faced by the people working on medicinal plants, as to how they can enhance the confidence of common people as regards the use of medicinal plants for those dreaded diseases.

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