

STUDENT PROJECT PROPOSAL

FOR CONSIDERATION UNDER

(Quality and Excellence Enhancing Activities)

RUSA SCHEME

PROJECT TITLE

**MANGROVE VEGETATION IN VASISTA GODAVARI EUSTUARY AND ITS
IMPACT ON ENVIRONMENT**

SUBMITTED BY

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(Project Advisor)

Lecturer

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SRI Y N COLLEGE (AUTONOMOUS)

Thrice Accredited by NAAC at 'A' Grade

Narsapur-534275

Detailed Project Proposal

Project Description:

Mangroves are a diverse group of salt tolerant plants growing in the inter-tidal estuarine zones above the mean sea level of sheltered coastal environments. The habitat of mangroves is often referred to as mangrove forest or 'tidal forest'. These plants are constantly subjected to tidal flushing with the ability to live in salt water. Pneumatophores, supporting stilt roots and buttresses, salt excreting glands in the leaves and viviparous propagules are some of the several highly specialized and collectively well known adaptations of this group. The advantage of the mangroves growing in a saline environment is the lack of other competing plant elements. A limited number of plants alone have evolved adapting to such inter tidal conditions.

The richest mangrove communities occur in tropical and subtropical areas where the water temperature is greater than 24°C in the warmest month, where the annual rainfall exceeds 1250mm. The mangroves need protection from high – energy waves, which can erode the shore and prevent seedlings establishment. In the Godavari mangroves, 18Km length of the sand spit protect the mangroves from the high – energy sea waves. The area of the mangrove wetlands in India has been estimated. Various estimates range from 6,81,000ha. By Sidhu (1963) to 5,00,000ha. By the Forest Survey of India (1998).

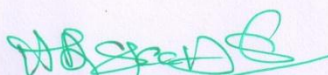
Justification:

1. To study the Mangrove vegetation in Vasista Godavari estuary region.
2. To analyse the water quality with respect to Mangrove Vegetation.
3. To assess the impact of Mangrove Vegetation on Environment.

4. To make suitable suggestions for improving mangrove vegetation in VGE region.
5. Possible Water analysis will be done along with Mangrove vegetation monthly wise.
6. Abiotic factors are measured by self or collaborating with external agencies basing on the funds sanctioned.
7. List out the Mangrove species.

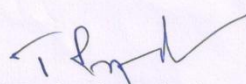
Budget Estimation:

S.No	Requirement	Budget Estimation
1	Field work & travel	6000/-
2	Reference books	4000/-
3	Contingency	4000/-
Total		14,000/-


(Dr A R S Kumar)

Principal
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Sri Y.N.College (Autonomous)
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MANGROVES

The District Wise distribution of mangrove forests are as below:

DISTRICT AREA IN HECTARES

East Godavari 33.266

Krishna 16.463

Guntur 8.490

Total 58.219

Importance of Mangroves to Mankind

Mangroves forest act as a barrier against the coastal storms, high velocity winds, and the high tidal waves thus protecting the villages and the agricultural land.

Mangroves are a highly productive ecosystem, and supply nutrients to the marine living resources and thus increasing the Fish, Prawn, Crab etc., production.

Mangroves provide shelter to the wildlife particularly as nesting ground for migratory birds.

They protect the coast-line from erosion and also it reclaims land from the sea.

They build up and extend coastal soil by accumulation and stabilisation of sediments.

They provide highly valued products like timber for boat building, Bark for tanning, Seedlings for food etc.

Flora

Thirty Five Plant Species are present in this Godavari region belonging to twenty four families. The Plants species commonly found here are

Species	Telugu Names	species	
Telugu Names	Species	Telugu Names	
Avicennia officinalis	Nalla Mada	Avicennia marina	Tella
Mada	Avicennia alba	Vilva Mada	

Excoecaria agallocha	Tilla	Rhizophora mucronata	Uppu Ponna
Ceriops decandra	Calhasu		
Bruguiera gymnorrhiza	Oorudu	Lumnitzera recemosa	
Thanduga	Sonneratia apetala	Kalinga	
Aegiceras corniculatum	Guggilam	Thespesia populneoides	
Attakanarai	Hibiscus tiliaceous	Gangaravi	
Rhizophora conjugata	Ponna		

Avicennia marina. A officinalis and A.alba representing the family Avicenniaceae and Excoecaria agallocha belonging to Euphorobiaceae are dominant. The Mangrove plants exhibit interesting adaptations such as stilt roots as in Rhizophora, Pneumatophores (respiratory roots) in Avicennia and Sonneratia, viviparous seedlings in Rhizophora, Bruguiera and Ceriops. A part from the above tree species shrubs like Dalbergia spinosa (Chillangi), Derris trifoliata (Nallatheega). Acanthus ilicifolius (Alchi) and Clerodendrum inerme (Pisingi) and herbs like Sesuvium portulacastrum, Suaeda maritima (Iiakura), Suaeda monoica (Iiakura) and Salicornia brachiata and grasses like Aeluropus lagopoides. Porteresia coarctate (Yelugaddi) and Myriostachya wightiana (Dabbagaddi) are also found in the sanctuary.

Fauna of Mangroves

The fauna found in mangroves is unique and cannot survive in any other ecological situation. Mangroves provide different varieties of conditions for the habitation of variety of animal population. The crowns of trees including trunk, branches, leaves, flowers and fruits provide niches essentially, to terrestrial fauna like birds, mammals and insects. The soil surface of mangroves provide niche for mudskippers, crabs and molluses. The water in the forest supports a variety of animals like the smooth Indian Otters (Mud skipper, Crab) Jackal Monkeys and Fishing cat. The Sanctuary has an unique distinction of having a 18 Km. long sand spit in the North Eastern side, where the

species of Olive Ridley sea turtle (endangered species) nests during January – March every year.

Apart from these animals, mangroves invariably attract large populations of birds which feed on various organisms occurring in the mangrove forest and in the back water. During the low tide some of the areas are exposed (elevated mud flats having small fishes, shrimps, molluses) attracting avafauna for its feed. Over 120 species of birds are reported and among them the following are the common birds found in the Sanctuary.

godavari districtkrishna godavarikrishna rivervegetationkakinadamapindiamada forestmangrove swampseast godavarimolluscanmangrove treesanimalmangrove ecosystemmangrove forests

Image result for mangroves in andhra pradesh

Little Egret Cattle Egret Pied Kingfisher Small Blue KingFisher Black Capped KingFisher
Pond Heron Reef Heron Grey Heron Night Heron Little Stint
Sand Piper Red Shrank Red Wattle-Lapwing Crow Pheasant Flamingos
Sea Gulls Purple Heron Brahmini Kite Open Bill Stork Little Cormorant

Conservation Strategies

For purpose of conserving, improving and developing the existing mangroves the following conservation strategies are adopted. Bring mangroves under the network of protected areas. Demarcation of MANGROVES, and Mangrove sanctuaries including the core areas to avoid encroachments.

Taking up various protection measures by intensified watch and ward. Taking up of large scale afforestation of blanks by digging channels at 12.5 mts. apart. The seedlings of 60 cms height. The seedlings grown in the nursery are planted on sloped

edges of the channels at 2.0 mts apart staggered through the funds from the World bank Assistance and the Ministry of Environment and Forests, Government of India.

Forming Eco – Development Committees for the Conservation of mangroves through participatory approach towards conservation by providing welfare measures/alternatives to the villagers living around the sanctuary to reduce the dependency on the mangroves and at the same time enhancing the livelihood of the coastal community. Setting up of Nature Study center to educate the local people regarding the importance of fragile ecosystem and the necessity for its protection and its role in the environment.

Accessibility godavari district krishna godavari krishna river vegetation
kakinada map india mada forest mangrove swamps east godavari molluscan mangrove
trees animal mangrove ecosystem mangrove forests
Avicennia officinalis

The young tree forms a low, dense bushy crown. When it matures, it forms a columnar tree up to 15 m and may grow up to 30 m. The shiny green leaves, 10 cm long by 5 cm wide, have rounded apexes and golden-brown under leaf and grow in opposites. The flower, the largest among the *Avicennia* species has a diameter of 6 to 10 mm when expanded. It is orange yellow to lemon yellow in color. The bark is smooth, dirty green to dark gray in color. It is slightly fissured and does not flake. The fruit is green or brown, heart-shaped abruptly narrowed to a short beak, is 2.5 cm long or more.

Avicennia officinalis is found sporadically on the banks of rivers and rarely found near the sea. It prefers clay soil and usually found inland. The plant can be found in Bangladesh, Brunei, Cambodia, India, Indonesia, Malaysia, Myanmar, Papua New Guinea, the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam . The fruit is heart-shaped, with two thick cotyledons. The aboriginals of Cleveland Bay dig a hole in the ground, where they light a good fire; when well ignited, they throw stones over it,

which when sufficiently heated, they arrange horizontally at the bottom, and lay on the top the egaie fruit, sprinkling a little water over it ; they cover it with bark, and over the whole, earth is placed to prevent the steam from evaporating too freely. During the time required for baking (about two hours), they dig another hole in the sand ; the softened egaie is put into it, they pour water twice over it, and the midamio is now fit for eating. They resort to that sort of food during the wet season when precluded from searching for any other." (Murrell's testimony,* quoted by Mens. Thozet.) In Salt-water estuaries all round the coast. * Murrell was a shipwrecked sailor, who lived for 17 years with the aboriginals of Cleveland Bay, Queensland."

Taxonomy references

Linnaei, Caroli; Salvii, Laurentii (1753). "Tetrandria Monogynia". *Species plantarum: exhibentes plantas rite cognitatas, ad genera relatas, cum differentiis specificis, nominibus trivialibus, synonymis selectis, locis natalibus, secundum systema sexuale digestas*. Tomus I. Stockholm: Impensis Laurentii Salvii. p. 110. Retrieved 2009-03-31.

Linnaeus, Carl (1775-11-05). "Avicennia officinalis L." *Linnean herbarium*. Stockholm: Department of Phanerogamic Botany, Swedish Museum of Natural History. Retrieved 2009-03-31.

"Index Nominum Genericorum -- Avicennia". *International Code of Botanical Nomenclature*. Washington, D.C.: Smithsonian Museum of Natural History. Retrieved 2009-03-31.

References Avicennia officinalis

Avicennia officinalis Blanco1.73-cropped.jpg

Indian mangrove

Scientific classificationedit

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Asterids

Order: Lamiales

Family: Acanthaceae

Genus: Avicennia

Species: A. officinalis

Binomial name

Avicennia officinalis

L.

Excoecaria agallocha

Excoecaria agallocha

Scientific classification

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Order: Malpighiales

Family: Euphorbiaceae

Genus: Excoecaria

Species: E. agallocha

Binomial name

Excoecaria agallocha

L.

Growth habit of *Excoecaria agallocha*

Excoecaria agallocha in flower

Excoecaria agallocha, a mangrove species, belongs to the genus *Excoecaria* of the family Euphorbiaceae. The species has many common names, including blind-your-eye mangrove, blinding tree, buta buta tree, milky mangrove, poisonfish tree, and river poison tree. Most of the names refer to its toxic properties or its propensity to cause blindness when its latex comes into contact with the eyes.

This plant grows in saline or brackish water in tropical mangrove forests, in a distribution bounded to the west by India, to the north by Bangladesh, to the south by Australia. Within Australia, it thrives from northern New South Wales along the northern coastline around to Western Australia.

Contents

Description

Mangrove swamps form a type of coastal wetland found in the tropics and subtropics. Within a mangrove forest, the most salt-tolerant species occur near the ocean. *Excoecaria agallocha*, known as a back mangrove, is found at higher elevations back away from the ocean where salinity is lower. Mangroves of this plant surround the ancient Thillai Chidambaram Temple in Tamil Nadu.

This small tree species may grow up to 15 m high. Trees are either male or female. Male flowers form drooping tassels, while female flowers appear as shorter spikes. Pollinators such as bees commonly visit the flowers. The fruit is a small dark capsule

The plant is well-protected by chemical defenses; these include diterpenoids, triterpenoids and flavonoids. The milky latex of *Excoecaria agallocha* is very poisonous and powerfully irritant, which is not unusual in milky species of plant in the family Euphorbiaceae. Contact with skin causes irritation and rapid blistering; slight contact with eyes can cause temporary blindness, hence the common names that refer to blindness. Even the generic name is from the Latin for "blinder".

William Bligh in his book *Voyage to the South Sea* mentioned that he was already aware of this hazard when he embarked on the voyage that ended in the notorious mutiny on the *Bounty*, having learned of it in 1777 from Captain James Cook during the time that he served as Cook's sailing master. Several of the men that Cook had sent ashore to cut wood had been blinded for a time. He accordingly instructed his men not to cut that type of tree when he sent them ashore in Tahiti to gather wood and water in 1789. It was just as well that he did so, because even the smoke from the burning wood is poisonous and can harm the eyes, so it would not have been useful as fuel.

Taxonomy

Main article: List of Euphorbiaceae genera

Excoecaria agallocha, a mangrove species, belongs to the genus *Excoecaria* of the family Euphorbiaceae.

Ecology

The latex produced by *E. agallocha* contains a variety of phytotoxins, including the excoecariatoxins, which are powerful irritants to the skin, eyes and mucous membranes.

Despite the powerful chemical defense mechanisms of this plant, *E. agallocha* is the sole food source for the larvae of the mangrove jewel bug (*Calliphara nobilis*), a phytophagous species of jewel bug found in tropical mangrove forests in some parts of Asia. Like many other species of aposematic scutellerids, *C. nobilis* is able to sequester chemical compounds from its host plants that are toxic to their predators, and use them towards its own defenses. These chemical compounds are concentrated and stored in a pair of scent glands located on the metathorax of the adults and nymphs. When these

insects are threatened or handled, they can secrete an irritating and toxic fluid from these glands as a deterrent to potential predators.

Uses

Even dried and powdered leaves retain the poison and can kill fish very quickly or be used on a poison dart.

Excoecaria agallocha has been found to have various medicinal and pharmacological benefits, including the treatment for epilepsy, ulcers, leprosy, rheumatism, and paralysis.[17] Owing to its complex chemistry, the plant may have many new medicinal uses.*Excoecaria agallocha*.

Scientific classification

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Order: Malpighiales

Family: Euphorbiaceae

Genus: *Excoecaria*

Species: *E. agallocha*

Binomial name

Excoecaria agallocha

L.

Bruguiera gymnorhiza

Scientific classification

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Order: Malpighiales

Family: Rhizophoraceae

Genus: Bruguiera

Species: *B. gymnorhiza*

Binomial name

Bruguiera gymnorhiza

(L.) Lam.,

Synonyms

Bruguiera capensis Blume[2]

B. conjugata (L.) Merr.

B. gymnorhiza (L.) Savigny, *Encycl. [J. Lamarck & al.]* 4: 696 (1798) (Isonym)[1]

B. rheedei Blume

B. rumphii Blume

B. wightii Blume

B. zippelii Blume

Rhizophora conjugata L.

R. gymnorhiza L.

R. palun DC.

R. rheedei Steud.

R. tinctoria Blanco

Bruguiera gymnorrhiza00.jpg

Bruguiera gymnorrhiza is a mangrove tree that grows usually to 7-20m high, but sometimes up to 35m, that belongs to the family Rhizophoraceae. It is found on the seaward side of mangrove swamps, often in the company of *Rhizophora*. It grows from the Western Pacific across Indian Ocean coasts to Cape Province, South Africa.

Contents

Description

A tree that can grow up to 35m, though usually smaller, around 7-20m, it has a glabrous, smoothish, trunk with reddish brown bark (the bark is sometimes fibrous, sometimes lightish brown or grey). The tree develops short prop-roots rather than long stilt-roots. The green elliptic leaves are 5–15 cm long. Flowers are solitary, with white or cream petals, that soon turn brown up to 1.5 cm long, pinkish-green to reddish brown calyx. The fruit are turbinate (spinning-top shaped), 2 cm long, when mature, the spindle-shaped fruits drop and become embedded in the mud in an upright position, where they rapidly develop roots. The seeds, when still on tree, have a hypocotyl up to 11 cm long.

Bruguiera gymnorrhiza

Distribution

The tree is found as a native on the coasts of places bordering the Indian Ocean, the South China Sea, and parts of the western Pacific Ocean Regions that it is native to include: Caroline Island, Samoa, Tonga, Wallis and Futuna, Fiji, Marshall Islands, Gilbert Islands, Nauru, Vanuatu, Solomon Islands, Queensland, New Guinea, Northern Territory, Lesser Sunda Islands, Sulawesi, Nansei-shoto, Borneo, Jawa, Hainan, Christmas Island, Southeast China, Cambodia, Vietnam, Sumatra, Peninsular Malaysia, Thailand, Myanmar, Bangladesh, Nicobar Islands, Andaman Islands, India (including Andhra Pradesh), Sri Lanka, Maldives, Mauritius, Madagascar, Aldabra, Seychelles, Somalia, Djibouti, Kenya, Mozambique Channel Islands, Tanzania, Mozambique, KwaZulu-Natal, Cape Provinces.

It has become extinct in Taiwan, and is naturalized in Florida

Habitat

The tree grows on intertidal mud-flats and estuaries, 0-2m (the elevation range between mean sea level and highest tide), on the less exposed parts of the coast, with a rainfall of 1000-8000mm. Common associates on Pacific Island include other mangrove species. The species grows on a wide range of soils, but does best in river estuaries, Salt water habitats on an alluvial sediment allows the tree to spread with its adventitious roots. The black mangrove is a protected tree in South Africa.

Names

As well as its botanical name, the tree is known by many common, or vernacular names. These include: Tongan: tongo; Marshall Islands jon; [3] Kosrae sraol; Pohnpei sohmw; Chuuk ong; Yap yangach; northern Australia orange mangrove; Wanigela, Northern (Oro) Province, Papua New Guinea kavela, mangrove bean.;

Uses

A major use of the tree is for wood products. Its uses in agroforestry include a woodlot, mulch/organic matter production, soil stabilization, coastal protection, windbreak, wildlife/marine food and habitat and bee forage. [3] The wood is widely used, including for firewood, building construction (including structural components such as poles, beams and rafters), canoe parts, fishingstakes, spears, copra-huskers, chips for pulp production, tool handles and digging sticks. In the Andaman Islands the trunks have been used for telephone and transmission poles, it seems rot-resistant (i.e. durable in direct contact with the ground). The wood has a high calorific values, and is used as fuel on some Pacific Islands (e.g. Kosrae), and for charcoal production in Indonesia, and Cambodia. In the Marshall Islands, it has been used for keel-pieces (maal), outrigger (kie'), and outrigger struts (kein-eon erre). Paddles are also made from the wood on some islands.

The fruit (propagule/hypocotyl) is reported as being eaten after scraping/grating, washing, drying and cooking to remove tannins, and sometimes mixed with coconut in Melanesia and Nauru. [3] The fruit is sold as a vegetable at Honiara Market, Solomon Islands. For the Soweik people, living on Supiori Island, Papua Province, Indonesia, the fruit is a staple, or primary food, of their diet, due to its high carbohydrate content. [9]

The bark is used as an abortifacient and for treating burns in the Solomon Islands The bark is reported to be used for diarrhoea and fever in Indonesia. The astringent (and mildly toxic) bark has also been used to treat malaria in Cambodia. The fruits has antiviral properties, and bark extracts of the closely related *Bruguiera sexangula* are reportedly active against at least two types of cancerous tumors (Sarcoma 180 and Lewis

lung carcinoma). The bark is used for dyeing, with colours ranging from red-brown to black (requires repeated dyeing). For working with leather, the bark has a high tannin content, but tends to colour excessively unless collected "at the end of each growing season".

The green propagules/hypocotyl are also eaten by many Indigenous groups in northern Australia. For example, on northwestern Cape York Peninsula, in the Weipa region, Thaynakwithi people (also referred to as Thyanhngayth dialect, Awngthim language people) call the species *nhomb* and explain that the propagules could be baked, then mashed or pounded and the flesh placed into a sieve-like woven bag before being soaked in water

Amongst the people of Wanigela, Northern (Oro) Province, in southeastern Papua New Guinea, the cooked hypocotyls are eaten, providing one of their staples, and used in the ethnomedicine as antimicrobial and insecticidal.

The Batjamal and Emi speaker of the Wadjiginy language, who live near Anson Bay in the Northern Territory, Australia, use the durable and hard wood to make spear tips (batjagada [Batjama], ijinde [Emi], with a *Bambusa arnhemica* shaft.

The reddish fine-textured wood used for local building in Cambodia, such constructions as huts, wharfs, fences, and fishery structures. Charcoal from the wood is excellent. The bark is used to dye fishing nets, and to tan animal skins. A decoction of the bark is taken in to combat diarrhoea.

There is evidence of the hypocotyls being eaten in India, Bangladesh, and other parts of Southeast Asia

In the Maldives the propagules or green pods are eaten as a *coBruguiera gymnorhiza*

Bruguiera gymnorhiza.jpg

Scientific classificationedit

Kingdom: Plantae

Clade: Tracheophytes

Clade: Angiosperms

Clade: Eudicots

Clade: Rosids

Order: Malpighiales

Family: Rhizophoraceae

Genus: Bruguiera

Species: *B. gymnorhiza*

Binomial name

Bruguiera gymnorhiza