

# A REPORT ON THE EXISTENCE OF *HERITIERA LITTORALIS* DRYAND. ON THE COAST OF MAHARASHTRA

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## ABSTRACT

*Heritiera littoralis* Dryand is a new addition to the mangrove flora of Maharashtra. This is a rare-most and narrowly distributed species along the coastline of this state. Very few individuals are located and the species demands immediate conservation measures. As a part of its conservation biology, the present work throws the light on its morpho-taxonomy, phenology, seedling morphology, habitat and regeneration.

## INTRODUCTION

On the central west coast of India, the Maharashtra coast extending about 720 km is indented with about 55 creeks and estuaries along which there occur a luxuriant as well as fringing mangrove pockets. These are threatened because of several anthropogenic pressures. The present condition of mangrove community shows an impact of human interference, as a result of which it is shrinking. The species diversity is also dwindling very fast (Kulkarni, 2009). Actually, the coastline of Maharashtra represents relatively better extent and composition compared to other locations along the west coast of India (Bhosale *et al.*, 2002). The mangrove vegetation of India is well known and well documented (Cook, 1996). Especially, on the coast of Maharashtra, number of mangrove species including *Heritiera littoralis* Dryand. (Sterculiaceae) have been reported from the Bombay Presidency of British India way back, almost a century ago (Cooke, 1901). Since then this species has not been collected from the coast during last several decades. Mangroves of Maharashtra are also been evaluated for their IUCN status (Bhosale, 2002) in which *H. littoralis* could not find the place. During the present work, a few number of threatened individuals of *H. littoralis* are recorded from the endangered habitats along the creeks in Sindhudurg district of Maharashtra during January, 2009. The individuals were monitored for last two years to observe the phenophases and regeneration. The autecology of *H. littoralis* has been presented in this paper.

## MATERIALS AND METHODS

With the aim of species documentation and diversity assessment, an extensive field survey was made along the

coast of Maharashtra. *H. littoralis* is located in January 2009 along the two different blanks of creeks in Sindhudurg district of Maharashtra. The identification is confirmed by using standard literature (Cooke, 1901; Tomlinson, 1986). The population was monitored for documentation of phenophases and regeneration. Detailed seedling morphology was described by using the typical taxonomic and morphological terms according to the standard literature (Hickey and King, 2000; Simpson, 2006).

## RESULTS AND DISCUSSION

*Heritiera littoralis* Dryand. is one of the typical mangrove species mostly inhabiting fringing habitats along the creeks and estuaries. Though its occurrence on the coast of the Bombay Presidency was recorded earlier, it was reported to be found on the banks of Kala River (North Canara) which falls in the Karnataka state presently. Later on Blatter (1905) reported the mangroves and their biology from the Bombay Presidency, which comprises 14 species excluding *H. littoralis*. After these reports, some recent literature on district and state level flora were published and only few of them have included *H. littoralis* on the authority of Cooke (1901). But, the species has not been collected so far from the coast of Maharashtra.

The authors have been exploring the coastal Maharashtra from last 12 years. Few mangrove species (Bhosale *et al.*, 2002), several mangrove associates (Gokhale and Chavan, 2003; Gokhale *et al.*, 2009 and Gokhale *et al.*, 2011) as well as grasses and sedges (Gokhale *et al.*, 2010) have been reported from coastal Maharashtra. During this survey, nineteen individuals of *H. littoralis* are recorded along the eroding banks which are privately owned land stretches. Only three individuals are growing in encroached area where seedlings



**Figure 1: Occurrence of *Heritiera littoralis* Dryand. on the coast of Maharashtra** A: Habitat; B: Large buttress root; C: Folds of buttress; D: Fruits; E: Regeneration in field; F: Seedling morphology

of *Excoecaria agallocha*, *Aegiceras corniculatum* and *Acanthus ilicifolius* are commonly seen. One plant is growing as glycophyte in wet place away from the bank. Unfortunately, there is no sapling. All the individuals are either small or medium sized trees. In fact, most of them are the sprouts generated after the natural fall of mother tree with large buttresses, caused by heavy erosional force on the banks. Root system facing the water front is completely exposed. Most of the individuals are more than 100 years old producing flowers and fruits in large number. The details about morpho-taxonomy, phenology, seedling morphology, habitat and regeneration are given below-

### Morpho-taxonomy

On the coast of Maharashtra, *H. littoralis* is a tree attaining a height up to 30 feet. The bark is longitudinally furrowed, young parts covered with stellate hairs. Large buttresses are seen on soil at the base of the bole. Leaves 10 to 23 cm x 4 to 10 cm, broadly elliptic to elliptic oblong with acute apex and base usually cuneate, sometimes rounded; glabrous above; entirely covered beneath with minute silvery hairs, petioles 1.1 to 2.5 cm long, double pulvinous, stipules small, scaly, brown coloured, caducous.

Flowers small, unisexual in tomentose, much branched, draping, axillary panicles in the upper axils. Female flowers slightly larger than male flowers. Calyx campanulate, 4 to 6 toothed, clothed on both the surfaces with orange yellow

pubescence, teeth short, ovate, acute. Stamens 4 to 5, present on androphore. Anthers minute, forming a wing around a central column, extrose, pollens few. Female flowers usually terminating distal panicles of branches; staminods minute below the carpels, carpels 4 sometimes 5, sessile, united loosely, each laterally compressed with one basal ovule, style as a short extension of the carpels, stigmas minute and recurved.

Fruits maturing in pendulous clusters; 1 to 4 in each flower; one seeded; 6 to 9 cm long; 5 to 6 cm wide; ellipsoid with woody fruit wall. Embryo represented by fused cotyledons.

### Phenology

The species flowers in the month of June to August, lingering flowers can be observed up to October. Fruits mature during January to April.

### Seedling morphology

The seedling is cryptocotylar, geal or hypogeal with well developed and profusely branched tap root system; roots are creamy-white in colour. The cotyledons two, fused but can be demark, unequal, flesh coloured, thick and fleshy, hidden inside the fruit. Hypocotyl 1 to 1.5 cm in length, stout, terete, creamy-white in colour, covered with lenticels. Plumular axis long, creamy-white, tomentose and lenticellate; the spirally arranged scale leaves, which are the stipule pairs of aborted leaves are sparsely distributed on the plumular axis. The first internode is 1.5 to 2.5 cm in length, creamy-white, terete, tomentose. Metaphylls alternate, directed downward; stipulate; stipules 2, brown, scale like; petiolate; petioles distinct, creamy-white, tomentose, swollen. Blades narrowly elliptic, glossy-green above, silvery below, dorsally covered with stellate hairs, coriaceous, base cuneate, apex acute, margin entire, wavy. Primary vein one, venation anastomosing. Subsequent leaves are similar except size. The leaves of seedlings are narrower than the leaves in mature tree.

### Habitat

It occupies the forest fringe and rocky shores along the creeks. It requires, as it seems, moderately saline habitats with well drained soils. It is associated with other mangrove species viz. *Rhizophora mucronata*, *Sonneratia caseolaris*, *Aegiceras corniculatum* and *Dolichandrone spathacea*.

### Regeneration

The species is hardly regenerating on the coast though the seeds are viable and produced in large number. A few seedlings are recorded but unfortunately, there is no evidence of a single sapling. Loss of habitat is the only obstacle for regeneration.

This data will prove beneficial in future for collection of dessiminule, reintroduction of the species to suitable habitats, resultantly for conservation of this species. Further, the work on the same line is in progress.

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