

# Mimosa diplotricha

Giant sensitive plant

The Asia-Pacific Forest Invasive Species Network (APFISN) has been established as a response to the immense costs and dangers posed by invasive species to the sustainable management of forests in the Asia-Pacific region. APFISN is a cooperative alliance of the 33 member countries in the Asia-Pacific Forestry Commission (APFC) - a statutory body of the Food and Agricultural Organization of the United Nations (FAO). The network focuses on inter-country cooperation that helps to detect, prevent, monitor, eradicate and/or control forest invasive species in the Asia-Pacific region. Specific objectives of the network are: 1) raise awareness of invasive species throughout the Asia-Pacific region; 2) define and develop organizational structures; 3) build capacity within member countries and 4) develop and share databases and information.



**Scientific name:** *Mimosa diplotricha* C.Wright

**Synonym:** *Mimosa invisa*

**Common name:** Giant sensitive plant, creeping sensitive plant, nila grass.

**Local name:** Anathottawadi, padaincha (Kerala, India), banla saet (Cambodia), duri semalu (Malaysia), makahiyang lalaki (Philippines), maiyaraap thao (Thailand), Cogadrogadro (Fiji).

**Taxonomic position:**

Division: Magnoliophyta

Class: Magnoliopsida, Order: Fabales

**Distribution:** South and South-East Asia, the Pacific Islands, northern Australia, South and Central America, the Hawaiian Islands, parts of Africa, Nigeria and France. In India, it currently occurs throughout Kerala state and in certain parts of the northeast, especially the state of Assam. Its occurrence in other states is unknown and needs to be ascertained. *M. diplotricha* has not attained weed status in the Americas, Western Asia, East Africa and Europe.



Mimosa stem with prickles

**Habit:** *M. diplotricha* is a fast-growing, erect shrub and a scrambling climber, which can form dense thickets in a short span of time. It is an annual, although behaves as a perennial. Leaves are bright green, feathery, alternate, each leaf with about 20 pairs of small leaflets, bipinnate, sessile, opposite, lanceolate, acute, 6 - 12 mm long and 1.5 mm wide, sensitive to disturbance. The stem is four-angled, woody at the decumbent base, with re-curved thorns (3 - 6 mm long), up to 3 m in height. The inflorescence is a clustered fluffy ball, about 12 mm across, pale pink, occurs on short stalks (1 cm long) in leaf joints; the corolla is gamopetalous; there are twice as many stamens as petals. The flowering period is from August to February, but can vary from region to region; it flowers throughout the year in some tropical countries. The pods are clustered, 10 - 35 mm long and 6 mm wide, linear, flat, clothed with small prickles, splitting transversely into one-seeded sections at the grooves. The seeds are flat, ovate, spiny, 2 - 2.5 mm long and 0.6 - 1.4 mm thick, glossy and light brown. Seed production is in the range of 8,000 - 12,000 per m<sup>2</sup>. The weight of 1,000 seeds is around 6 gm. Seed setting is from September to February. Roots are profusely branched and with root nodules.

This fact sheet is compiled and edited by Dr. K.V. Sankaran, APFISN Coordinator (sankaran@kfri.org), Kerala Forest Research Institute, Peechi, Kerala, India, on behalf of the Asia-Pacific Forest Invasive Species Network. For more information on APFISN and its activities, please contact your national focal point or the APFISN Coordinator or Mr. Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok. E-mail: patrick.durst@fao.org. The fact sheet is supported by the Food and Agriculture Organization of the United Nations (FAO) and USDA Forest Service.



Flowers



Pods of Mimosa



Seeds



**Seed dispersal:** Seed dispersal is through running water, carried in animal fur, clothing, vehicles, agricultural implements and machinery and as a contaminant of soil or the seeds of crop plants. Dry heat promotes the germination of seeds. Seeds are known to lie dormant up to 50 years.



Mimosa overgrowing Mikania

**Threat and damage :** *M. diplotricha* is a big threat to forest ecosystems, agricultural land and pastures. It causes heavy damage in crops like sugar cane, coconut, rubber, cassava, tea, pineapple and upland rice. Thick growth of Mimosa prevents the regeneration, reproduction and growth of indigenous species in all infested areas. All parts of the plant are toxic to herbivores if ingested. It produces a toxin (mimosin - a non-protein amino acid), which can cause vascular endothelial damage, necroses of the heart and liver and anemia in cattle.

The tangled and thorny growth of Mimosa hampers movement and access to food and other resources for wild animals like the one-horned rhinoceros (*Rhinoceros unicornis*) an endangered species, Asian elephant (*Elephas maximus*), swamp deer (*Cervus duvauceli*) and tiger (*Panthera tigris*) in Kaziranga National Park in north-east India. In Australia, the weed chokes out cane and other crops and grassland, causing crop and pasture loss. Crops infested with mimosa are difficult to harvest because of the thorns. Increased cultivation costs, reduced crop yield, loss of crops, reduced land value and soil degradation are the main economic impacts of Mimosa.

**Habitat:** The weed can tolerate a wide range of soil conditions. It grows best in tropical regions in habitats such as wastelands, pastures, disturbed forests, plantations, agricultural systems and along roadsides and railway tracks at an altitude of 0 - 2,000 m above sea level. In evergreen and semi-evergreen forests, infestation is limited to the fringes of the forest wherever the canopy is open due to disturbance. The weed is heliophytic in adaptation and cannot grow under a closed canopy. It is drought-resistant but senesce leaves during dry conditions. The spiny variety of the weed is apparently evolved from the spineless variety.

**Mode of infestation:** *M. diplotricha* scrambles vigorously over other plants, forming dense tangled thickets up to 2 m in height. It smothers and kills indigenous flora. Sharp and recurved thorns of the weed make animals reluctant to graze on it and difficult for them to penetrate the thickets. In India, Mimosa smothers other invasive weeds such as *Chromolaena odorata* and *Mikania micrantha* and establishes itself over them.

**Uses:** It is used as nitrogen fixing cover crop and green manure in several countries in the Asia-Pacific region. The spineless variety is an excellent soil improver and soil binder. In Indonesia, the plant is used as a fodder to buffaloes.



Mimosa smothering coconut palm, Kerala, India

#### **Control :**

**Mechanical:** Uprooting and burning, grubbing and slashing are the most common methods. Uprooting is the most efficient method to control the weed. This should be done at least twice a year to achieve a satisfactory level of control. The first uprooting may be done before flowering and seed setting and the second soon after the first showers when seedlings emerge from seeds arriving from other sources. Slashing is not advisable since the weed can easily re-generate from the cut stumps. Grazing by animals prevents the dominance of Mimosa in Queensland, Australia.

**Chemical:** Use of glyphosate (0.75 kg), paraquat (0.5 kg), diuron (2-4 kg), acetochlor plus atrazine (0.92 + 0.63 kg), starane (1.3-1.5 l), atrazine plus metolachlor (0.82 + 1.68 kg) and atrazine-500 g a.i. (4 - 6 l) per ha would give good control of Mimosa. For best results, the applications are to be done before the onset of flowering and fruiting. However, the efficacy of herbicides is short-lived and applications may have to be done periodically, depending on the re-growth of the weed.

**Biological:** Several natural enemies of the weed have been reported from its natural range. A sap-feeding bug from Brazil, *Heteropsylla spinulosa* (Homoptera: Psyllidae), that causes growing tip distortion and reduces seed production in Mimosa was introduced in Queensland (Australia), Fiji and Papua New Guinea with some success. *Corynespora cassiicola*, a cosmopolitan fungus, causes stem spot, defoliation and dieback of Mimosa in Queensland and Papua New Guinea. The fungus can be very damaging under hot humid weather conditions. A coreid bug, *Scamurius* sp., that feeds on the Mimosa shoots inhibiting vegetative growth and flowering was introduced from Brazil to Queensland and Western Samoa but did not establish. Host specificity of a moth viz., *Psygida walkeri*, which feeds on the leaves, flower buds, tender seedpods and tender stems of Mimosa in Brazil and Colombia was tested on 110 plant species from 29 families including Mimosaceae. Twenty-nine of these plant species supported some degree of larval feeding. Further studies are in progress. Pathogenic fungi isolated from the weed including *Cercospora canescens*, *Fusarium* sp. and *Uredo mimosae-invisae* are yet to be tested for host specificity. *Fusarium pallidoroseum*, a fungus isolated from diseased *M. diplotricha* in the Philippines, provided excellent control of Mimosa seedlings when sprayed with crude culture filtrate or cell free filtrate. Further studies are warranted before recommending use of the fungus to control Mimosa.

In natural forest ecosystems, the use of manual or mechanical control methods is comparatively safer than chemical methods. Long term control of the weed in other ecosystems requires the use of mechanical, chemical and biological methods in an integrated manner. Any integrated management program should contain a strong extension and education component to ensure the adoption of methods suitable to different ecosystems.

**Strategies to avoid further spread :** To avoid further spread of Mimosa, non-infested countries should refrain from introducing the plant as a cover crop. Also, strict observation of quarantine regulations, especially during the import of seeds, will help to keep the plant out of countries/ regions wherever it has not yet spread.



Mimosa infestation along roadside



Sickle weeding of Mimosa thicket