



## The Giant Sensitive Weed, *Mimosa pigra* (L.) Current knowledge and control

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may assist invasion.

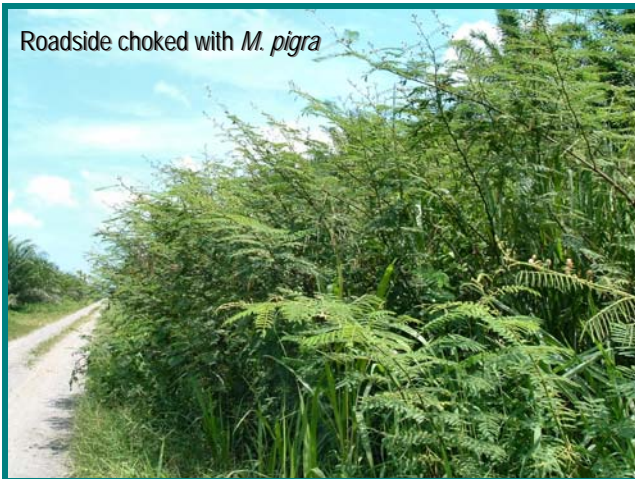
### BIOLOGY AND ECOLOGY

*M. pigra* has a maximum life span of 5-years. First inflorescences are produced 4-12 months after germination. One inflorescence is produced daily on each main branch and each lasts one day. Flowering occurs all year round in open and permanently moist sites. On average <5% of flower buds produce seeds, the flowers are pollinated by bees. A typical large plant can produce up to 220,000 seeds per year. The pods ripen over about three months and, when mature, the seeds drop off in their bristle-covered segments. These float and are principally dispersed by rainfall and flooding. The bristles also stick onto the fur of animals and clothing. Because the seeds are very hard, they can be picked up by muddy tyres of vehicles and spread along roads, hence the reason why the weed is found so regularly along roadsides. It is thought that birds may disperse the seeds. It has been suggested that scarification of the seeds is needed to give high germination rates. Some seeds are able to germinate as soon as conditions permit, while others can remain viable for many years, 2-years being commonly found, but up to 15-years has been recorded. Because of this, large numbers of viable seeds can build up on and in the ground (*up to 12,000/m<sup>2</sup> have been found in seed banks*).

### BIOLOGICAL CONTROL

Over the last 20-years, more than 45 biocontrol agents of *M. pigra* have been assessed in their native countries and 32 have been tested under quarantine conditions in Australia. Twenty insect and fungal species have been released in Australia.

Roadside choked with *M. pigra*



*Mimosa pigra* can sometimes be confused with other *Mimosa* species and shrubs, but has two features which will separate it from the others: (i) 6-14 pinnae per leaf more than other species (ii) sensitive leaves, separating it from other shrubs.

### HABITAT

*M. pigra* principally invades wetlands and floodplains but can be found on the banks of rivers, lake shores, marsh edges and roadsides. It can regenerate under

some degree of shade. It is found in tropical regions with >750 mm annual rainfall and not normally found in tropical rain forest areas with >2250 mm rainfall. In areas of < 750 mm annual rainfall *M. pigra* may grow on edges of dams and watercourses. Water run-off from roads can encourage growth. There does not appear to be any preference for particular soil types. Germinating seeds may grow more easily in the absence of competition, so newly cleared land and burning

### THE PROBLEM

The giant sensitive weed can readily form dense, impenetrable thickets. Dense growth eliminates most other species of plants and can alter the habitat within an area. Once seedlings are established, growth is rapid and can be as much as 2.4 cm per day at 8-12 weeks old. With one-year-old plants stems can be 2.5 cm in diameter and grow to 7 cm in the second year. The weed can double its invasion area every one to one-and-a-half years.

### DESCRIPTION

The giant sensitive weed, *Mimosa pigra* (L.), originated from Mexico, Central and Southern America. It was introduced into several countries as a good cover crop which fixes nitrogen and increases soil fertility. It has also been used as green manure, animal feed and fuel.

*M. pigra* is a spreading, multi-stemmed, thorny shrub which normally grows up to 2 m high although occasionally up to 6 m. The plant is ever-green, has sensitive leaves which are up to 18 cm long. There are curved spines on the undersides of the petioles, petiolets and stems. The inflorescences are round, fluffy, pink or mauve balls 1-2 cm across. Each inflorescence can produce 7-24 hairy seed pods which can be 3-15 cm long and contain 8-24 seeds each. Each pod turns brown when mature and splits into segments which fall away from the pod leaving a skeletal outline. Each segment contains an oblong shaped seed that is 4-6 mm long and about 2 mm wide.

Table 1. *M. pigra* biological controls established in Australia

Biocontrol agent	Part of weed attacked	Notes
<b>Bruchidae (seed beetles)</b>		
<i>Acanthoscelides puniceus</i>	Mature seed	
<b>Chrysomelidae (leaf beetles)</b>		
<i>Chlamisus mimosae</i>	Leaves & stems	
<i>Malacorhinus irregularis</i>	Leaves & roots	
<b>Curculionidae (weevils)</b>		
<i>Coelocephalopion pigrae</i>	Leaves & flower buds	
<i>Chalcoderms serripes</i>	Mature green seed	Establishment not confirmed
<i>Sibinia fastigiata</i>	Young green seed	Establishment not confirmed
<b>Lepidoptera (moths)</b>		
<i>Neurostrotta gunniella</i>	Tunnels in pinnae & small stems	
<i>Carmeta mimosa</i>	Tunnels in large stems	
<i>Marcaria pallidata</i>	Leaves	Establishment not confirmed

lia and elsewhere. Those listed in Table 1 have become established.

So far, no individual biocontrol agent has produced good control of the weed but *Coelocephalopion pigrae*, *Neurostrotia gunniella* and *Carmenita mimosa* have shown considerable promise in suppressing the spread of *M. pigra* (Table 1).

weed management (*IWM*) is used which combines various techniques. In the long run, biocontrol agents might be expected to provide sustainable suppression of *M. pigra*. This has to be investigated through a long-term project with guidance from *M. pigra* experts at CSIRO, Australia.



#### PHYSICAL & CULTURAL CONTROL

Clearing by cutting stems or burning is not effective and should be avoided because vigorous re-growth can occur. Widespread clearing of the ground by hand or herbicide can encourage seeds to germinate because of lack of competition. Hand-pulling can be practised on isolated plants which may be threatening particular small, economically important, areas (e.g. *smallholder gardens*). Susceptible areas can be managed by maintaining a dense ground cover that will provide competition against *M. pigra* development and will also help to prevent invasion and the development of isolated infestations.

#### CHEMICAL CONTROL

Foliar applications of herbicides can be made on small infestations using hand-held sprayers. Where plants are found in new localities targeted treatment with residual, soil applied, selective herbicide that kills mature *M. pigra* and its germinating seed, but does not kill ground cover, should be considered. Cutting stems can be combined with treatment of the freshly cut stumps with herbicide. Because of the presence of a seed bank, repeat herbicide applications every six-months are more effective than single applications.

Herbicides tested and found to be affective for control of *M. pigra* include: dicamba, glyphosate, hexazinone, linuron, picloram, sulfometuron, tebutiuron, and triclopyr.

#### THE FUTURE

Because mechanical control rarely kills plants, healthy mimosa is difficult to burn, plants often re-grow vigorously and buried seeds survive and can germinate; follow-up control is always necessary. It is therefore important that integrated



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