Catclaw Mimosa (*Mimosa pigra*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, June 2015
Revised, April 2018
Web Version, 11/9/2020

Organism Type: Plant
Overall Risk Assessment Category: High

Photo: ovilla82/iNaturalist. Licensed under Creative Commons BY-NC. Available: https://www.inaturalist.org/photos/2589221. (April 16, 2018).

1 Native Range and Status in the United States

Native Range

GISD (2018) lists *Mimosa pigra* as native to Central and South America.

CABI (2018) lists *Mimosa pigra* as native to Mexico, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama, Trinidad and Tobago, Argentina, Bolivia, Brazil, Chile,

Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela.

Status in the United States

GISD (2018) lists *Mimosa pigra* as alien, established, and invasive in southern Florida.

CABI (2018) lists *Mimosa pigra* as introduced and invasive in Florida and Puerto Rico, introduced in Texas, and present in Hawaii.

From CABI (2018):

"*M. pigra* has been declared a noxious weed in Florida and Hawaii, USA, […]. The plant must either be eradicated or its spread controlled in these areas."

Mimosa pigra is a Federal Noxious Weed (USDA 2016).

No records of *M. pigra* for sale within the United States were found.

Means of Introductions in the United States

No information on means of introduction in the United States was found.

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

"Taxonomic Status:
Current Standing: accepted"

Kingdom Plantae
Subkingdom Viridiplantae
Infrakingdom Streptophyta
Superdivision Embryophyta
Division Tracheophyta
Subdivision Spermatophytina
Class Magnoliopsida
Superorder Rosanae
Order Fabales
Family Fabaceae
Genus *Mimosa*
Species *Mimosa pigra* L.

From CABI (2018):

"The nomenclature of *M. pigra* is rather confusing as this name has been widely applied to collections of *Mimosa pellita*. In 1991, Barneby corrected this mistake by clearly differentiating the two species. Accordingly, the name *M. pigra* corresponds with an endemic species restricted to the lower Paraná basin of Paraguay and Argentina. *M. pellita* on the other hand corresponded with the widespread weedy species which has been misidentified as *M. pigra* in numerous botanical and technical publications. Given the pervasive misapplication of *M. pigra*, this name was conserved with the type of *M. pellita* and therefore, the name to be used for the widespread species is *M. pigra*. In addition to the typical variety, *M. pigra* contains the narrow endemic *M. pigra* var. *dehiscens* restricted to parts of Venezuela."

Size, Weight, and Age Range

From CABI (2018):

"*M. pigra* is a spreading, multi-stemmed, thorny shrub usually up to 2 m tall, but occasionally up to 6 m, with a maximum lifespan of about 5 years."

Environment

From Walden et al. (2004):

"Mimosa can withstand the anaerobic conditions of inundation and flooded soils by sprouting adventitious roots near the surface where they can take up oxygenated water (Miller et al. 1981)."

"Mimosa has low nutrient requirements and consequently can grow within a wide range of soil types including nutrient-poor sands, alluvial red and yellow earths, silty loams and heavy black cracking clays (Miller 1983)."

Climate

From CABI (2018):

"*M. pigra* is found in tropical regions with >750 mm annual rainfall but is not found in tropical rain forest areas with a rainfall of >2250 mm. In areas of <750 mm annual rainfall, it may grow around dams and watercourses. *M. pigra* does not have any soil type preferences (Lonsdale et al., 1989). In Sri Lanka the species is currently found at an altitude of around 500 m above sea level (Marambe et al., 2001)."

Distribution Outside the United States

Native

GISD (2018) lists *Mimosa pigra* as native to Central and South America.

CABI (2018) lists *Mimosa pigra* as native to Mexico, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panama, Trinidad and Tobago, Argentina, Bolivia, Brazil, Chile,

Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela.

Introduced

GISD (2018) lists *Mimosa pigra* as alien, established, and invasive in Australia, Cambodia, Dominican Republic, Ghana, Guinea, Indonesia (Java and Papua), Kenya, Malaysia, Papua New Guinea, St. Lucia, South Africa, Sri Lanka, Swaziland, Tanzania, Thailand, Uganda, and Vietnam.

CABI (2018) lists *Mimosa pigra* as introduced and invasive in China, Indonesia, Malaysia, Myanmar, Singapore, Sri Lanka, Thailand, Vietnam, Kenya, Rwanda, South Africa, Tanzania, Zambia, Cuba, Jamaica, St. Lucia, Galapagos Islands, Australia, and Papua New Guinea; as introduced in Cambodia, India, Laos, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Côte d'Ivoire, Djibouti, Egypt, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Swaziland, Togo, Uganda, Zimbabwe, Barbados, Dominica, Dominican Republic, Grenada, Guadeloupe, Martinique, St. Vincent and the Grenadines, French Polynesia, New Caledonia, and New Zealand; as present with a restricted distribution in the Philippines, Taiwan, and Fiji; as present and widespread in Congo, Mauritania, and St. Kitts and Nevis.

Pallewatta et al. (2003:37):

"However, destructive economic impacts of IAS on rural households [in Laos] can be observed, including the golden apple snail (*Pomacea* sp.), the disease bakanea (*Fusarium fujikoroi*), and the weeds *Echinochloa colonum*, *E. crusgalli*, *Mimosa invisa*, and *Mimosa pigra*."

"*Mimosa pigra* (giant sensitive plant) was recently identified from Sri Lanka, growing luxuriantly in the riverbanks of the Mahaweli River, which is a major source of irrigation water that supports agricultural crops in the country. It is also known from other areas in the central province, spreading at an alarming rate (Amarasinghe & Marambe, 1997; Marambe et al., 2001a)."

"Invasive plants already identified in Thailand include: water hyacinth (*Eichhornia crassipes*), giant water fern (*Salvinia molesta*), giant sensitive plant (*Mimosa pigra*), […]"

"The species that have caused the greatest damage in Vietnam are the golden apple snail (*Pomacea* sp.) to rice production and the mimosa plant (*Mimosa pigra*) to biodiversity conservation in national parks."

Pallewatta et al. (2003) also list *Mimosa pigra* as a major invasive alien species in Peninsular Malaysia, an established alien species in Singapore.

From Walden et al. (2004):

"In the NT [Northern Territory, Australia], mimosa is found in most major Top End river systems from the Victoria River in the west (approximately 50 km from the Western Australia (WA) border), to the Phelp River in south-eastern Arnhem Land, and the Arafura swamp to the north-east. The size of infestations varies between river systems, with the largest infestations on the Adelaide, Mary and Finniss rivers and in the Daly River/Port Keats Aboriginal Land Trust. In February 2001, a small infestation of 800 to 1,000 plants was discovered at Peter Faust Dam, approximately 25 km west of Proserpine (just below 20°S) in Queensland (Chopping 2004)."

Means of Introduction Outside the United States

From CABI (2018):

"The species is now widely distributed in Africa and Asia but it is unclear how the weed was transported from tropical America. Although the species is thought to be introduced to Africa, Sheded and Hassan (1999) described it as 'endangered shrub' in Egypt, presumably considering it as a native species. Seburanga et al. (2013) report that *M. pigra* probably spread from Egypt through Uganda to Rwanda, where it first infested the country through the Akagera-Nyabarongon river system before the mid nineteenth century.

It was introduced, as an ornamental or seed contaminant, to the Darwin Botanic Gardens of Australia's Northern Territory before 1891. It remained an occasional nuisance around Darwin until the late 1950s. When it reached the open, treeless floodplains in the 1970s, *M. pigra* spread considerably to form monotypic stands. Vitelli et al. (2006) reported its presence near Proserpine in central coastal Queensland, suggesting that this was the only known infestation to have established in Australia outside the Northern Territory.

It was introduced to Thailand in 1947 as green manure and as a cover crop. It was thought that the prickliness of the weed would restrict access to the banks of water bodies and reduce erosion. It has now spread extensively and covers large areas of standing waters and the banks of water bodies. Based on population genetics, [Pramual] et al. (2011) suggest that there were multiple introductions in Thailand.

M. pigra is also spreading in Indonesia, Peninsular Malaysia and Papua New Guinea. In Malaysia it was first noted by the Peninsular state of Kelantan by farmers, who claimed that it had been introduced from Thailand to cure snake bites. The Department of Agriculture only recorded it in 1980 (Anwar, 2001), but Mansor and Crawley (2011) report its presence at 55 out of 106 sites of six main habitat types. Distribution in Vietnam is described by Nguyen Thi Lan Thi et al. (2011).

In Sri Lanka the weed was first noted in 1997 and now forms dense thickets along a 30- to 35-km strip of the Mahaweli River in the Central province (Kandy District) (Marambe et al., 2001).

M. pigra is probably now more common in Costa Rica than it was before European colonization."

"The seeds of *M. pigra* are spread by road construction equipment and the plant is thus typical of roadsides. In Vietnam, Nguyen Thi Lan Thi et al. (2011) report that transportation of sand for construction purposes is an important means of seed dispersal in the region."

From Pallewatta et al. (2003):

"Although the pathway of entry of this plant into the country [Sri Lanka] is not well understood, it is widely believed that this invasive alien plant was intentionally introduced to protect the river banks. The major mechanisms of spread of *Mimosa pigra* into other parts of the country have been identified as irrigation water, machinery, river sand used for construction purposes, and lopping branches with mature pods, as a result of the use of the stems of the plant as fuelwood by people (Marambe, 2000)."

From GISD (2018):

"Mimosa was probably introduced to the Northern Territory (Australia) via the Darwin Botanic Gardens. This may have been due to accidental contamination of seed samples. Alternatively it may have been introduced intentionally due to its unusual sensitive leaves (Miller and Lonsdale 1987, in Walden et al. 1999). Mimosa has been introduced and planted to reduce erosion (Walden et al. 1999). Mimosa has been introduced to new regions as an ornamental (Walden et al. 1999). The seeds may adhere to vehicles or other machinery (Lonsdale et al. 1985, in Walden et al. 1999)."

Short Description

From CABI (2018):

"*M. pigra* is a spreading, multi-stemmed, thorny shrub usually up to 2 m tall, but occasionally up to 6 m, with a maximum lifespan of about 5 years.

The plant is evergreen and bears bipinnate, sensitive leaves, up to 18 cm in length. Recurved spines (to 7 mm long) are located on the undersides of the petioles, petioules and stems.

The inflorescences, containing up to 100 flowers, are spherical (about 1 cm across) and pink. The species is androdioecious with both male and hermaphrodite flowers bearing eight short and long stamens. These flowers exhibit an intra-specific pollen polymorphism (El Ghazali et al. 1997). The flat pods of *M. pigra* are hairy and up to 15 cm long and clustered (up to seven pods) at the stem tips. They contain between 8 and 24 seeds. Each seed is about 5 x 2.4 mm and weighs 0.09 mg. The fruits ripen in about 3 months and, when mature, fragment into indehiscent one-seeded segments. The pods are covered with bristles which facilitate floating and enhance dispersal along river systems."

From GISD (2018):

"When mature, *Mimosa pigra* is an erect, much branched prickly shrub reaching a height of 3m to 6m. Stems are greenish at first but become woody, are up to 3m long, and have randomly scattered, slightly recurved prickles 0.5cm tocm [sic] long. Leaves are bright green, 20cm to

25cm long and bipinnate, consisting of about 15 pairs of opposite primary segments 5cm long with sessile, narrowly lanceolate leaflets that fold together when touched or injured and at night. The flowers are pink or mauve, small, regular and grouped into globular heads 1cm to 2cm in diameter. The heads are borne on stalks 2cm to 3cm long, with two in each leaf axil, while the corolla has four lobes with eight pink stamens. The fruit is a thick hairy, 20-25 seeded, flattened pod borne in groups in the leaf axils, each 6.5cm to 7.5cm long and 0.7cm to 1cm wide. The fruit turns brown when mature, breaking into one-seeded segments. The seeds are brown or olive green, oblong, flattened, 4mm to 6mm long, and 2mm wide (Walden et al. 1999)."

Biology

From CABI (2018):

"Flowering may start within a year of germination. Anthesis takes place about 8 days after bud formation. The spherical inflorescences, containing up to 100 flowers, last one day. One inflorescence is produced daily on main branches for 5 months during the rainy season. In evergreen forests, a few flowers and fruits are found throughout the year. Flowering occurs all year round in open and permanently moist sites. The fruits ripen in about 3 months and when mature, they fragment into indehiscent 8 to 24 one-seeded segments.

In Australia, Vitelli et al. (2006) reported that flowering and podding in Queensland occurs all year round, whilst flowering in the Northern Territory occurs from February to May and podding from March to July, though flowering can occur whenever sufficient water is available."

"In Australasia, on average, <5% of flower buds produce seeds; most of the seeds are produced by autogamy, although wind pollination may also occur.

In northern Australia, the soil seed banks can reach up to 12,000 seeds per square metre and the seeds remain viable for more than 2 years (Lonsdale et al., 1988). The seeds here generally germinate when they are first wetted and the rate of germination is high. More recent studies on a floodplain in northern Australia ten years after stand removal found that some viable seeds were still present, indicating that *M. pigra* seeds can remain viable under grass cover for over a decade unless work is performed to break seed dormancy (Lukitsch and Elliott, 2012). In Queensland, seed bank declined by 90% over a three year period at one study site (Vitelli et al., 2006).

Some workers have suggested that scarification is needed for high germination and Dillon and Forcella (1985) showed that the scarification effect was produced by alternating temperatures, an amplitude of 20°C having a much greater effect than 10°C. In Sri Lanka, 100% of seeds remained viable after storage at room temperature (28°C) and at 8°C, and 99% of the seeds germinated after sand scarification (Marambe et al., 2001).

Although *M. pigra* is adapted to seasonally flooded habitats, where fibrous adventitious roots are formed around the base of the multiple stems, it can also regenerate under some degree of canopy cover. The plants resprout freely after natural fires but *M. pigra* does not naturally reproduce vegetatively.

Once established as monotypic stands, *M. pigra* can regenerate under its own canopy. In these stands, the half life of plants taller than 20 cm varies between 13 and 22 months, depending on soil type."

From Walden et al. (2004):

"If chopped down, mimosa will easily resprout from the stump (Wanichanantakul and Chinawong 1979). If mimosa is burnt, the foliage may become desiccated and fall, but up to 90% of mature plants and up to 50% of seedlings may regrow."

"The plants mature quickly and can set seed in their first year of growth (Lonsdale et al. 1985). The seedpods are covered with bristles that enable them to adhere to animals and clothing, and to float on water for extended periods (Miller et al. 1981). The seeds are also dispersed in soil and mud, adhering to vehicles and other machinery (Lonsdale et al. 1985). Livestock and native animals sometimes graze mimosa plants (Miller 1988) and pass the seeds in their dung (Miller and Lonsdale 1987)."

"The lifespan of the seeds in the ground depends greatly on their depth in the soil and the soil type, and may be up to 23 years in sandy soils (S.E. Pickering, pers. comm., in Lonsdale 1992)."

"Seed rate production has been measured between 9,000 and 12,000 m^{-2} per year depending on the conditions (Lonsdale et al. 1988). The most productive plant observed in the field produced about 220,000 seeds per year (Lonsdale 1992)."

"Under the right conditions, mimosa grows quickly at a rate of about 1 cm per day, and infestations can double in area in one year. It can also withstand droughts (Lonsdale 1993)."

From GISD (2018):

"Seeds are extremely hardy and can remain dormant for more than 15 years depending on the environment. For example, half of a seed population was no longer viable after 99 weeks at a depth of 10cm in a light clay soil, while a similar loss in viability was observed after only 9 weeks in heavier cracking clay (Lonsdale et al. 1988, in Walden et al. 1999). In sandy soils the lifespan of seeds may be much longer. Dormancy of seeds in the soil is broken by expansion and contraction of the hard seed-coat by temperature changes ranging from about 25–70°C. Seeds buried deeper than 10cm generally do not successfully germinate unless brought to the surface (Walden et al. 1999)."

"Seeds are produced in individual segments of seed-pods that 'burst' apart when mature (Walden et al. 1999). Under optimal conditions annual seed production may reach up to 220,000 per plant. A study carried out within the Mekong Delta found that the average number of seeds in the topsoil was 100 seeds per metre squared (Triet et al Undated). In contrast, an average of 12,000 seeds per metre squared was reported for a mimosa-infested area in northern Australia (Lonsdale 1992, in Triet et al Undated)."

Human Uses

From CABI (2018):

"*M. pigra* has been declared a noxious weed in Florida and Hawaii, USA, northern Australia, Thailand and South Africa. The plant must either be eradicated or its spread controlled in these areas. In Western Australia and Queensland, legislation exists to prohibit the introduction of the plant. In Malaysia, the shrub was gazetted in as an A2 pest in the 4th Schedule of the Agriculture Pest and Noxious Plants (Import/Export) Regulation (Anwar, 2001)."

"In other parts of the tropics *M. pigra* still appears to be planted outside its native range despite its invasive tendencies but some caution appears to be shown by seed suppliers. For instance, Richardson (1998) reported that "ICRAF does not routinely supply *M. pigra* unless it appears that strict procedures will be implemented" although he does not indicate what these 'strict procedures' entail and how they can be successfully implemented."

"The species is used in a [sic] various herbal remedies and magic rites in Africa (Burkill, 1995). In Malaysia it is reported to be used to cure snake bites in traditional medicine (Anwar, 2001). It has also been used as a green manure, a cover crop, beanpoles, and for hedges and fuel wood. Silivong et al. (2013) report that methane production from rumen incubation is lower from *M. pigra* leaves than from *Gliricidia sepium*."

From GISD (2018):

"[…] some local people are ignorant of the negative impacts of *M. pigra* and plant it as a green fence."

From DeFilipps et al. (2004:193):

"In Guyana, a decoction is used to treat thrush in babies and bed-wetting in children. […] Leaves are macerated in the hands and rubbed on the eyes of babies or children to put them to sleep when they are irritable, by the Guyana Patamona."

Diseases

CABI (2018) lists *Lasipdiplodia theobromae*, *Microstrom ruizibelinii*, *Mycosphaerella mimosa-pigrae*, *Phloeospora mimosa-pigrae*, and *Sphaerulina mimosa-pigrae* as pathogens of *Mimosa pigra*.

Poelen et al. (2014) list *Burkholderia mimosarum*, *Wautersia taiwanensis*, *Mesopolobus ripicola*, *Risbecoma pigrae*, *Eurytoma risbecomaphaga*, *Ophelosia crawfordi* as parasites and pathogens of *Mimosa pigra*.

Threat to Humans

From GISD (2018):

"*Mimosa pigra* is expanding along the national highways obstructing the aesthetic value of the countryside and decreasing driver visibility (increasing the potential for traffic accidents)."

3 Impacts of Introductions

From Walden et al. (2004):

"Effects on ecosystems: Mimosa poses an enormous problem for conservation. In the Northern Territory (NT), a largely intact natural landscape is being completely altered, with floodplains and swamp forest being covered by dense monospecific stands of mimosa, which have little understory except for mimosa seedlings and suckers (Braithwaite et al. 1989). The severity of the impact of mimosa results from the following: (1) the high dominance by the invading species; (2) the gross change in vegetation structure; and (3) the conversion of a wide range of structural types of vegetation to a homogeneous tall shrubland (Braithwaite et al. 1989)."

"Effects on native flora: Once established, mimosa is able to outcompete native herbaceous layer vegetation for light, moisture and nutrients, although the relative importance of these three factors has not been determined. A comparison of incident light measurements beneath the mimosa canopy at two study areas found that the sedgeland sites received between 62% and 81% of the incident light when mimosa was present.

The Melaleuca-dominated swamp forests fringing the floodplains have a rather open canopy, and mimosa has also penetrated this habitat, preventing seedlings of the native forest trees from establishing themselves. Incident light measurements in this environment revealed that only 26% reached the ground flora with the additional presence of a mimosa canopy. Due to the demonstrated exclusion of native tree seedlings, it is proposed that the mature native tree canopy would eventually die out, and these swamp forests, like the sedgelands, would become mimosa-dominated shrubland. The light measurements were taken during the dry season when the weed has a relatively sparse canopy. The impacts could possibly be exacerbated in the wet season, when the denser canopy of a lush mimosa thicket may prevent around 90% of the incident light from reaching the ground."

"The abundance and species richness of terrestrial birds was positively related to the presence of mimosa. Waterbird abundance and species richness related negatively to mimosa. Treeless, species-rich, deep-water sedgeland is the prime habitat for waterbird populations, which rely on it for breeding and feeding. Further loss of this habitat through mimosa invasion would see an increasing negative impact on waterbird populations. The main rookery sites for species such as ibis, spoonbills and cormorants, and the main roosting and nesting sites of most of the raptors, are found in the wet forests (paperbark, riparian and monsoon). Destruction of these habitats would impact greatly on these and other similar bird species.

Mammals: Small mammals seemed to favor the dense mimosa canopy. The rodent *Rattus colletti* greatly favored the Adelaide River mimosa sites, whilst the small insectivorous dasyurid

Sminthopsis virginiae was particularly abundant in the Finniss River mimosa sites. Analyses showed that mammal abundance, related positively to mimosa cover/abundance and negatively to woody species diversity. It is thought that these small mammals will probably survive only as long as the mimosa occurs in patches from which they can make forays into the surrounding sedgelands for food (Lonsdale and Braithwaite 1988).

Reptiles and amphibians: Mimosa appeared to provide an unsatisfactory microhabitat for lizards, as few were found in mimosa-dominated areas. Amphibians showed no distinct pattern with respect to mimosa."

"It interferes with stock watering, irrigation projects, tourism, recreational use of waterways and the traditional lifestyles of Indigenous peoples. It can also smother pastures, reduce the available grazing areas and make mustering difficult (Miller et al. 1981), thus reducing the development of pastoral enterprises in addition to increasing the production costs."

From Thi et al. (2011):

"The invasion of mimosa in rice paddies has increased cultivation expenses for soil preparation, and the labor required to remove mimosa before cultivation. In some areas, this expense is so much greater than the income of agricultural products that local people fallowed (ceased to crop) part of or all of their land. It has also obstructed the aquatic traffic particularly in Tri An Reservoir, and damaged fishing-nets of fishermen living on the banks of Tri An Reservoir."

From Tan et al. (2012):

"In particular, *M. pigra* not only invades wetland areas on the sides of rivers and canals, it can infest undisturbed swamps as well as disturbed lands such as industrial tree plantations and rice fields. In addition to impacts on biota, *M. pigra* can prevent people accessing rice fields, reduces water flow in irrigation channels and keeps animals from feeding areas. For example, in Quang Nam province, in Central Vietnam, it grows spontaneously along roads and in rice fields [Hoang 2011a], and in Thuan Bac district, Ninh Thuan province, it has invaded bare lands planned for industrial parks [Hoang 2011b]."

"A similar issue occurs at the Ramsar site in Tram Chim national park. This is one of the last remnants of the Plain of Reeds wetland ecosystems in the Mekong delta and is an important habitat for the threatened Easter Sarus Crane (*Grus antigone*) as well as 9 other globally threatened migratory birds. According to the Director of Tram Chim national park, the number of Easter Sarus Crane has declined with the increase in Mimosa pigra over time (Hung Personal Communication)."

From Vanna and Nang (2005):

"In Cambodia, it interferes with irrigation systems (sediment accumulation), access to electric power lines, and is a safety hazard along roads. It also grows in fallow rice paddies making reclamation more expensive."

“One of the main problems of *Mimosa pigra* is that it forms dense monocultures and suppresses other vegetation, as well as impacting on aquatic habitats, because fish avoid areas infested with *Mimosa pigra*.”

“Farmers find it hard to cultivate their crops because Mimosa grows considerably faster than agricultural crops. Small Mimosa plants grow and migrate rapidly into planted land where crops are developing. Agricultural crops can be overrun within four or five days, if farmers do not meticulously weed their land and ensure the removal of all the Mimosa plants – including the roots. Farmers have to spend a considerable amount of time and labour to clear, root out and plough many times to remove all of the roots, stems, stalks and leaves from their land; otherwise the plants will grow again quickly. When faced with a Mimosa infestation some farmers have been forced to leave their land for other vacant land free of the plant, if they do not have adequate labour and financial resources to remove Mimosa from their land.”

From CABI (2018):

“In Thailand, *M. pigra* interferes with irrigation systems by causing the accumulation of sediment, affects access to electric power lines and is a safety hazard along roads. It also spreads readily into fallow rice paddies increasing reclamation efforts and costs.

In Malaysia it encroaches into immature oil palm plantations and fruit orchards and it is feared that the shrub will spread to the rice bowl states of Kedah/Perlis with serious repercussions (Anwar, 2001). In Vietnam, local farmers report negative impacts on agricultural activities, their fishery catch and cultivation and their crop productivity. In addition, *M. pigra* has reduced the appearance of the natural environment, and had a considerable negative impact on travel, sightseeing and research activities in Cat Tien National Park particularly in Bau Chim and Bau Sau Ponds. The invasion of mimosa in rice paddies has increased cultivation expenses for soil preparation, and the labour required to remove mimosa before cultivation. In some areas, this expense is so much greater than the income of agricultural products that local people fallowed (ceased to crop) part of or all of their land (Nguyen Thi Lan Thi et al., 2011).

In northern Australia, *M. pigra* poses a threat to the cattle industry as it is spreading into buffalo pasture. The spread of *M. pigra* into pasture land reduces herbaceous vegetation and greatly reduces the grazing capacity of the land.”

“The shrub completely alters floodplain and swamp forest. The main impact of the weed is to reduce the number of birds and lizards, and the level of herbaceous vegetation; it also hinders tree regeneration. The occurrence of *M. pigra* along irrigation systems increases sediment accumulation and restricts water flow.”

“It restricts access to waterways, particularly to fishermen. If the spread of *M. pigra* is not halted, it may affect the touristic value of the Kakadu National Park in Northern Territory, Australia, as many visitors come to see the wetland's birdlife. Tourism has been reported as affected in Cat Tien National Park, Vietnam, due to effects on the landscape of *M. pigra* infestations ((Nguyen Thi Lan Thi et al., 2011).”

From GISD (2018):

"The magpie goose is known to be threatened by the spread of *M. pigra*. It lives in shallow lowland grasslands and swamps and feeds on seeds, tubers and grass species. It is restricted to northern Australia and its breeding habitat is being invaded by para grass (*Brachiaria mutica*), *M. pigra* and introduced ponded pasture plants (such as *Hymenachne amplexicaulis*). These species are replacing its natural principal food sources (Garnett and Crowley 2000). Also, the Arnhem Sheathtail Bat (*Taphozous kapalgensis*) (considered to be a "near threatened" species by the Northern Territory) is losing suitable habitat due to the vegetation change associated with the invasion of exotic species such as *M. pigra* (Parks and Wildlife Commission UndatedC)."

"The yellow-billed Egret (*Mesophoyx intermedia*) is listed as Least Concern (LC) in the IUCN Red List of Threatened Species. Its habitat in the Northern Territory of Australia is under threat due to burning, grazing and the spread of invasive alien plants *Mimosa pigra* and *Salvinia molesta*."

"In northern Australia, as early as 1981, the economic effects of dense mimosa infestations started to affect the tourist industry (due to decreased access to wetlands) (Miller et al. 1981, in Walden et al. 1999)."

"*Mimosa pigra* stands obstructs [sic] irrigation canals, reducing water flow into rice fields. This negatively affects rice health and growth resulting in reduced crop yields and lower economic gains. As *M. pigra* is a suitable habitat for rats and crabs, it also encourages the presence of these animals, both of which also cause damage to rice plants.

Mimosa pigra chokes waterways and irrigation ditches. This reduces water flow in canals and rivers and accelerates the build-up of silt in reservoirs. Economically important reservoirs may be threatened by the presence of the weed. A reservoir has the potential to last for about 100 years in the absence of *M. pigra* and for about 25 years in the presence of the weed (Robert 1982, in Praneetvatakul 2001).

Mimosa pigra is expanding along the national highways obstructing the aesthetic value of the countryside and decreasing driver visibility (increasing the potential for traffic accidents)."

4 History of Invasiveness

Mimosa pigra is a plant native to Central and South America, which has successfully invaded large parts of the Globe via ornamental seed contaminants, use as a cover crop and green manure, and other unknown pathways. The plant is implicated in causing aesthetic and traffic accident potential increases, and does carry numerous plant diseases. The species is regulated in Florida and Hawaii. Impacts are well documented and include changes in biodiversity, including drastically altering entire ecosystems, outcompeting native plants, altering waterbird and reptile populations, and impacts on anthropogenic activities such as agriculture and construction. For these reasons the history of invasiveness is "High".

5 Global Distribution

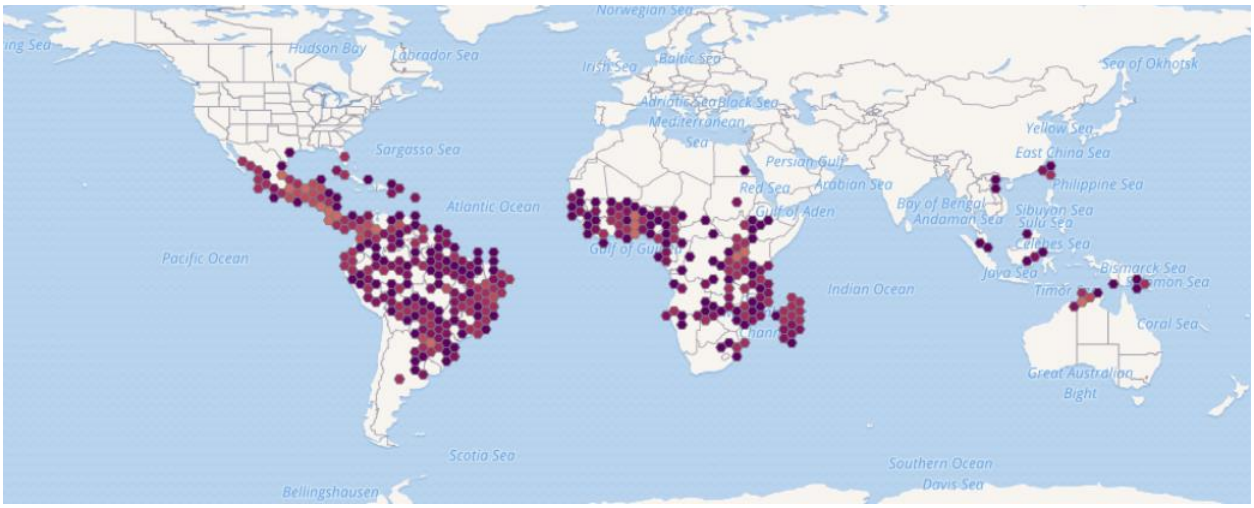

Figure 1. Known global distribution of *Mimosa pigra*. Locations are in North and South America, Africa, Southeast Asia, and Australia. Map from GBIF Secretariat (2018).

6 Distribution Within the United States

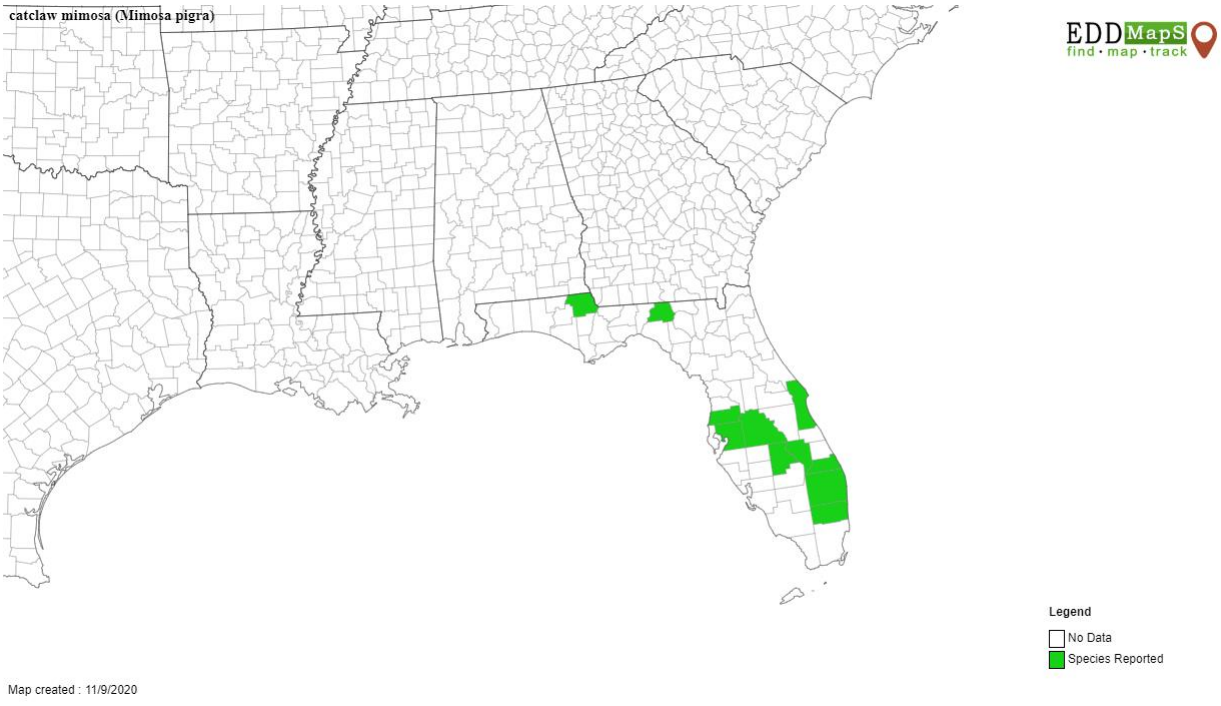

Figure 2. Known distribution of *Mimosa pigra* by county in the United States. Map from EDDMapS (2020).

Figure 3. Known distribution of *Mimosa pigra* in the contiguous United States. Map from BISON (2018).

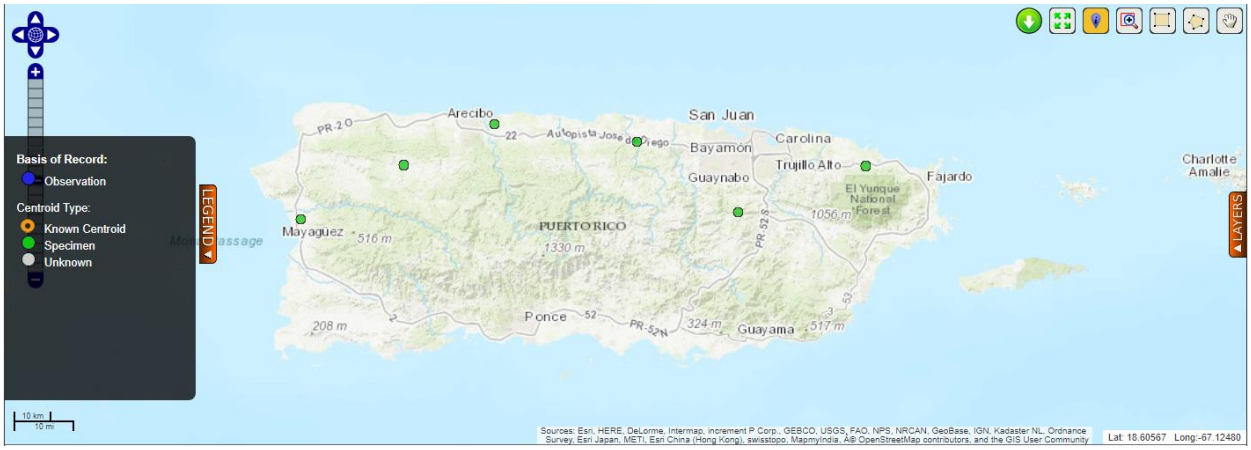

Figure 4. Known distribution of *Mimosa pigra* in Puerto Rico. Map from BISON (2018).

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Mimosa pigra* was high in the south from Arizona and New Mexico, along the Gulf Coast to Florida. The Northeast, most of the Great Lakes, upper Midwest, and west had a low match. Everywhere else had a medium match. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States. was by 0.201, high (scores 0.103 and greater are classified as high). The following states had individually high Climate 6 scores: Alabama, Arizona, Florida, Georgia, Kansas, Louisiana, Maryland, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, and Virginia. Arkansas, California, Colorado, Delaware, New Jersey, and Tennessee had medium individual scores. All other States had low individual scores.

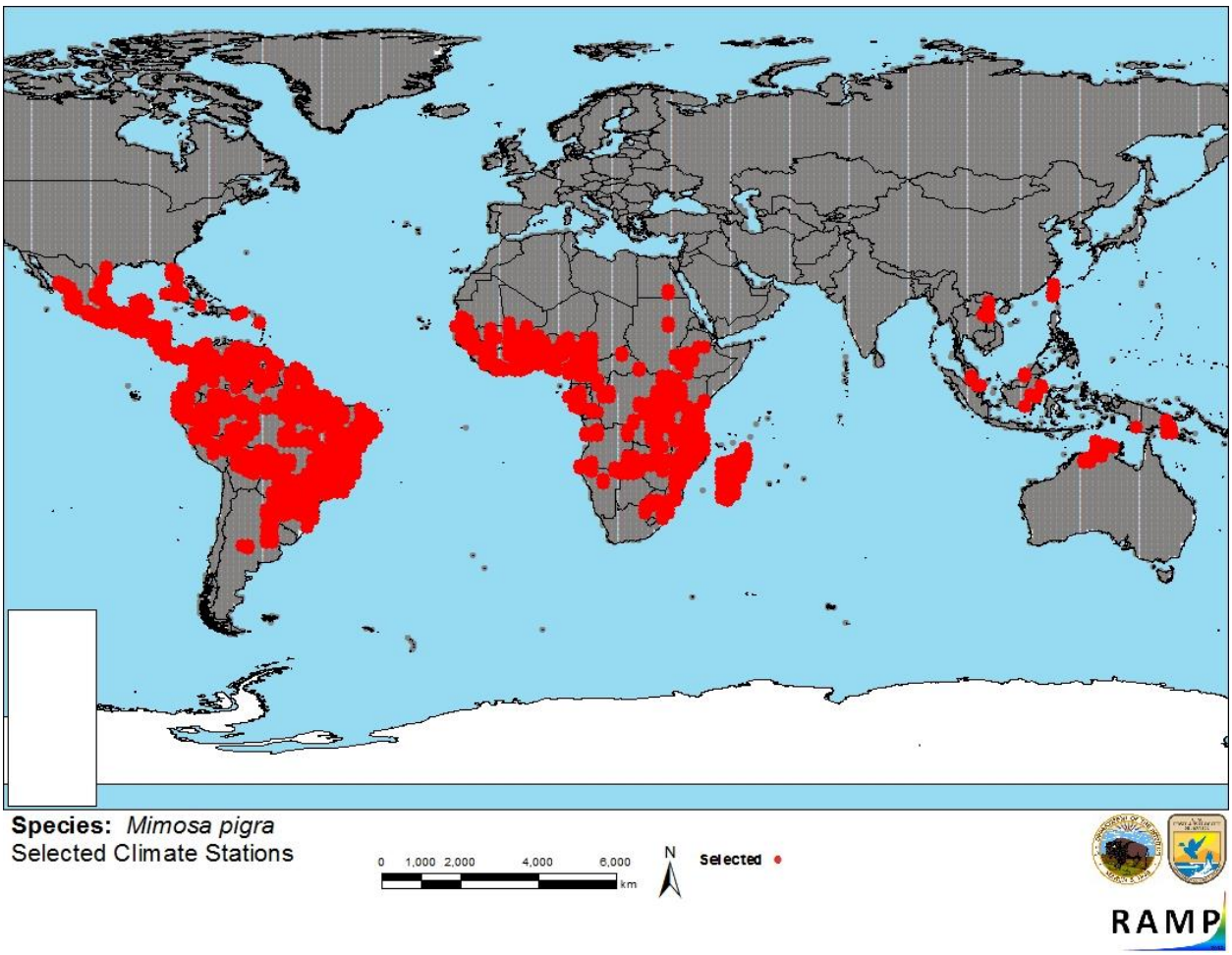

Figure 5. RAMP (Sanders et al. 2014) source map showing weather stations in North and South America, Africa, Southeast Asia, and Australia selected as source locations (red) and non-source locations (gray) for *Mimosa pigra* climate matching. Source locations from BISON (2018) and GBIF Secretariat (2018). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

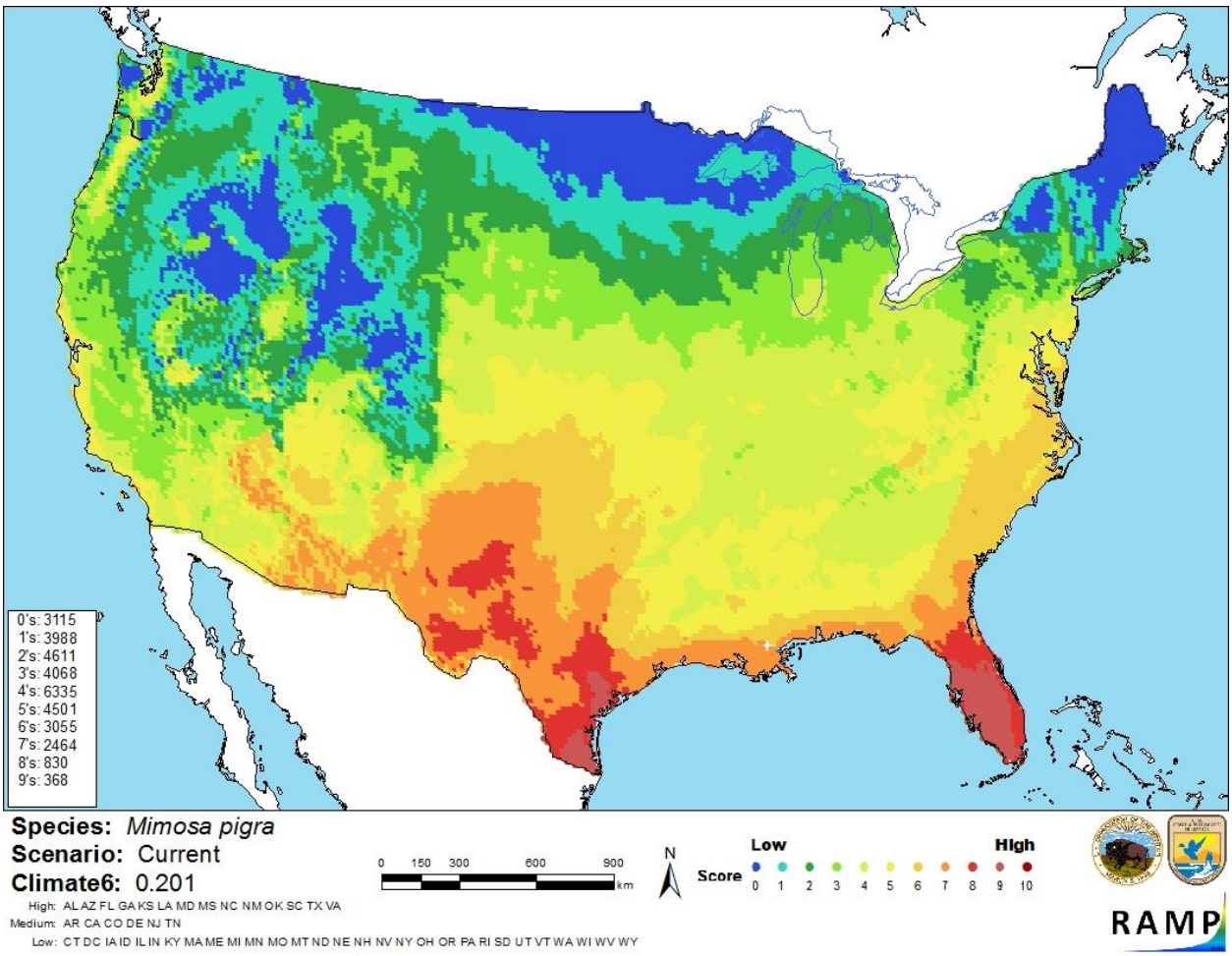

Figure 6. Map of RAMP (Sanders et al. 2014) climate matches for *Mimosa pigra* in the contiguous United States based on source locations reported by BISON (2018) and GBIF Secretariat (2018). Counts of climate match are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of assessment for *Mimosa pigra* is high. There is significant information on *M. pigra*, both its natural history and its native and introduced range. The information is from both grey literature and peer-reviewed publications. Information regarding impacts of introductions is available from peer-reviewed publications.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Mimosa pigra is a tall evergreen shrub that has become established in several countries outside of its native Central and South America regions. The history of invasiveness is classified as "high." *M. pigra* causes major economic losses in Australia, where the government has battled the invader for years. This plant can take over wetlands and river banks, reducing water access, and the number of native plants. It has been shown to be a great detriment to pasture land in Australia, and cause significant economic loss. It also reduces the number of native birds and lizards by eliminating native habitat. The economic and social losses are fairly well documented. Climate match is high, especially in Florida where the species is already established. The certainty of assessment is high. The overall risk assessment category is high.

Assessment Elements

- **History of Invasiveness (Sec. 4): High**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): High**
- **Remarks/Important additional information:** No additional information
- **Overall Risk Assessment Category: High**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

BISON. 2018. Biodiversity Information Serving Our Nation. U.S. Geological Survey. Available: https://bison.usgs.gov (April 2018).

[CABI] CABI International. 2018. *Mimosa pigra* (catclaw mimosa) [original text by Rojas-Sandoval J, Acevedo-Rodríguez P]. CABI Invasive Species Compendium. Wallingford, United Kingdom: CAB International. Available: http://www.cabi.org/isc/datasheet/34199 (April 2018).

DeFilipps RA, Maina SL, Crepin J. 2004. Medicinal plants of the Guianas (Guyana, Surinam, French Guiana). Smithsonian National Museum of Natural History.

EDDMapS. 2020. Early Detection and Distribution Mapping System. Tifton: University of Georgia, Center for Invasive Species and Ecosystem Health. Available: https://www.eddmaps.org/distribution/uscounty.cfm?sub=4548 (November 2020).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Mimosa pigra* L. Copenhagen: Global Biodiversity Information Facility. Available: http://www.gbif.org/species/2969431 (April 2018).

[GISD] Global Invasive Species Database. 2017. Species profile: *Mimosa pigra*. Gland, Switzerland: Invasive Species Specialist Group. Available: http://www.iucngisd.org/gisd/speciesname/Mimosa+pigra (April 2018).

[ITIS] Integrated Taxonomic Information System. 2018. *Mimosa pigra*. Reston, Virginia: Integrated Taxonomic Information System. Available: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=26789 (April 2018).

Pallewatta N, Reaser JK, Gutierrez AT, editors. 2003. Invasive alien species in South-Southeast Asia: national reports and directory of resources. Cape Town, South Africa: Global Invasive Species Programme.

Poelen JH, Simons JD, Mungall CJ. 2014. Global Biotic Interactions: an open infrastructure to share and analyze species-interaction datasets. Ecological Informatics 24:148–159.

Sanders S, Castiglione C, Hoff M. 2014. Risk Assessment Mapping Program: RAMP. Version 2.81. U.S. Fish and Wildlife Service.

Tan DT, Thu PQ, Dell B. 2012. Invasive plant species in the national parks of Vietnam. Forests 3:997–1016.

Thi N, Hung T, Triet T. 2011. The invasion of mimosa (*Mimosa pigra* L.) on the Dong Nai River basin, Vietnam. Weed management in a changing world. Cairns, Queensland, Australia: 23rd Asian-Pacific Weed Science Society Conference. Volume 1.

[USDA] U.S. Department of Agriculture. 2016. Federal noxious weed list (July 13, 2016). U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine.

Vanna S, Nang K. 2005. Cambodia – the *Mimosa pigra* report. Pages 78–79 in McKenzie P, Brown C, Jianghua S, Jian W. The unwelcome guest. Proceeding of the Asia-Pacific Forest Invasive Species Conference, August 2003, Kunming, Yunnan Province, China. Bangkok, Thailand: Food and Agriculture Organization of the United Nations. RAP Publication 2005/18.

Walden D, Van Dam R, Finlayson M, Storrs M, Lowry J, Kriticos D. 2004. A risk assessment of the tropical wetland weed *Mimosa pigra* in northern Australia. Darwin, Australia: Supervising Scientist.

11 Literature Cited in Quoted Material

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

Amarasinghe L, Marambe B. 1997. *Mimosa pigra* L: a new weed in aquatic habitats of Sri Lanka. Sri Lankan Journal of Agricultural Sciences 34:124–130.

Anwar AI. 2001. Impact and management of selected alien and invasive weeds in Malaysia with some action plans instituted for biological diversity. In Proceedings of the Third International Weed Science Congress, 2000, Foz do Iguassu, Brazil. Oxford, UK: International Weed Science Society. Manuscript number 446.

Barneby RC. 1991. Sensitivae Censitae Mimosa. New York: New York Botanical Garden.

Braithwaite RW, Lonsdale WM, Estbergs JA. 1989. Alien vegetation and native biota in tropical Australia: the impact of *Mimosa pigra*. Biological Conservation 48:189–210.

Burkill HM. 1995. The useful plants of west tropical Africa, volume 4. Families J-L. Richmond, UK: Royal Botanic Gardens Kew.

Chopping C. 2004. *Mimosa pigra* at Peter Faust Dam, Proserpine, Queensland. Pages 102–105 in Julien M, Flanagan G, Heard T, Hennecke B, Paynter Q, Wilson C, editors. Research and Management of *Mimosa pigra*. Canberra, Australia: CSIRO Entomology.

Dillon SP, Forcella F. 1985. Fluctuating temperatures break seed dormancy of catclaw mimosa (*Mimosa pigra*). Weed Science 33:196–198.

El Ghazali GEB, Satti AM, Tsuji SI. 1997. Intra-specific pollen polymorphism in *Mimosa pigra* (Mimosaceae). Grana 36:279–283.

Garnett ST, Crowley GM. 2000. Taxon summary: magpie goose. The Action Plan for Australian Birds. Environment Australia.

Hoang T. 2001a. Eradication *Mimosa pigra*. Available: http://www.tienphong.vn/tuong-tac/ban-doc/513046/tan-diet-ngay-cay-mai-duong.html (August 2011). (In Vietnamese.)

Hoang PC. 2011b. Eradication *Mimosa pigra*—a species invaded agricultural lands of Ninh Thuan province. Available: http://www.ninhthuan.gov.vn/chinhquyen/sonnnt/Pages/Tieu-diet-Mai-duong---loai-thuc-vat-ngoai-lai-dang-xam-chiem-vung-dat-nong-nghiep-tinh-Ninh-Thuan.aspx (August 2011). (In Vietnamese.)

Lonsdale. 1992. [Source material did not give full citation for this reference.]

Lonsdale. 1993. [Source material did not give full citation for this reference.]

Lonsdale et al. 1985. [Source material did not give full citation for this reference.]

Lonsdale WM, Braithwaite RW. 1988. The shrub that conquered the bush. New Scientist 1364:52–55.

Lonsdale WM, Harley KLS, Gillett JD. 1988. Seed bank dynamics in *Mimosa pigra*, an invasive tropical shrub. Journal of Applied Ecology 25:963–976.

Lonsdale WM, Miller IL, Forno IW. 1989. The biology of Australian weeds. 20. *Mimosa pigra*. Plant Production Quarterly 4:119–131.

Lukitsch B, Elliott L. 2012. *Mimosa pigra* seed bank remains significant 10 years after stand removal: further investigation on a floodplain in northern Australia. Pages 364–366 in Eldershaw V, editor. Developing solutions to evolving weed problems. 18th Australasian Weeds Conference, Melbourne, Australia. Frankston, Australia: Weed Science Society of Victoria.

Mansor A, Crawley MJ. 2011. Current status of *Mimosa pigra* L. infestation in Peninsular Malaysia. Tropical Life Sciences Research 22:37–49.

Marambe. 2000. [Source material did not give full citation for this reference.]

Marambe B, Amarasinghe L, Dissanayake S. 2001[a]. Growth and development of *Mimosa pigra*: an alien invasive plant in Sri Lanka. Pages 115–121 in Brundu G, Brock J, Camarda I, Child L, Wade M, editors. Plant invasions: species ecology and ecosystem management. Leiden, Netherlands: Backhuys Publishers.

Miller IL. 1983. The distribution and threat of *Mimosa pigra* in Australia. Pages 38–50 in Proceedings of an International Symposium on *Mimosa pigra* Management, Chaingmai, Thailand. Corvallis, Oregon: International Plant Protection Centre.

Miller. 1988. [Source material did not give full citation for this reference.]

Miller, Londsdale. 1987. [Source material did not give full citation for this reference.]

Miller IL, Nemestothy L, Pickering SE. 1981. *Mimosa pigra* in the Northern Territory. Darwin, Australia: Northern Territory Department of Primary Production. Technical Bulletin 51.

Nguyen TLT. Hung TP, Triet T. 2011. The invasion of mimosa (*Mimosa pigra* L.) on the Dong Nai River basin, Vietnam. Pages 403–404 in 23rd Asian-Pacific Weed Science Society Conference, Cairns, Queensland, Australia. Volume 1: weed management in a changing world. Cairns, Australia: Asian-Pacific Weed Science Society.

Parks and Wildlife Commission. No date c. Threatened species of the Northern Territory: Arnhem Sheathtail bat *Taphozous kapalgensis*. Northern Territory, Australia: Parks and Wildlife Commission.

Pramual P, Khumkratok S, Wongpakam K. 2011. Population genetics of invasive weed *Mimosa pigra* L. (Mimosoideae) in Thailand. Pakistan Journal of Botany 43:2721–2726.

Praneetvatakul S. 2001. An impact assessment of ACIAR Research Projects on biological control in Thailand. Bangkok, Thailand: Kasetsart University.

Richardson DM. 1998. Forestry trees as invasive aliens. Conservation Biology 12:18–26.

Seburanga JL, Kaplin BA, Bizuru E, Mwavu EN. 2013. The folk biology of South American-native shrub, *Mimosa pigra* L. [Leguminosae] and its invasive success in Rwanda. International Journal of Biodiversity and Conservation 5:486–497.

Sheded MG, Hassan L. 1999. Reproductive ecology of *Mimosa pigra* L. in Egypt. Feddes Repertorium 110:219–224.

Silivong P, Onphachanh X, Ounalom A, Preston TR. 2013. Methane production in an in vitro rumen incubation is reduced when leaves from *Mimosa pigra* are the protein source compared with *Gliricidia sepium*. Livestock Research for Rural Development 25:31.

Triet T, Kiet LC, Thi Lan Thi N, Dan PQ. No date. The invasion by *Mimosa pigra* of wetlands of the Mekong Delta, Vietnam. Available: http://www.ento.csiro.au/weeds/pdf/mimosa_symposium/07Trietetal.pdf (November 2004).

Vitelli JS, Madigan BA, Worsley KJ. 2006. *Mimosa pigra* in Queensland. Pages 251–254 in Preston C, Watts JH, Crossman ND, editors. Managing weeds in a changing climate. Victoria, Australia: Weed Management Society of South Australia.

Walden D, Finlayson CM, Van Dam R, Storrs M. 1999. Information for a risk assessment and management of *Mimosa pigra* in Tram Chim National Park, Viet Nam. Pages 160–170 in Proceedings of the EnviroTox'99 International Conference.

Wanichanantakul P, Chinawong S. 1979. Some aspects of the biology of *Mimosa pigra* in northern Thailand. Pages 381–383 in Proceedings of the Seventh Asian–Pacific Weed Science Society Conference, Sydney, Australia.