

INVASIVES

Newsletter of the Asia-Pacific Forest Invasive Species Network (APFISN)

Vol. 5



November 2006

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 32 member countries in the Asia-Pacific Forestry Commission (APFC). 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.

THREATS

- *Pueraria montana* var. *lobata* (Kudzu)
- *Puccinia psidii* (*Eucalyptus* rust)

NEW PUBLICATIONS

- A modeling approach to estimate the effect of exotic pollinators on exotic weed population dynamics: bumble bees and broom in Australia.
- Invasion dynamics and potential spread of the invasive alien plant species *Ageratina adenophora* (Asteraceae) in China.
- Growth of an invasive legume is symbiont limited in

INVASIVES, monthly newsletter of the Asia-Pacific Forest Invasive Species Network (APFISN) is intended to share information among countries in the Asia-Pacific region on Forest Invasive Species (FIS) and the threats they pose in the region. If you have any items of news value on FIS to share between national focal points of APFISN and more widely among foresters, agriculturists, quarantine personnel and policy makers, please pass them on to the editor (sankaran@kfri.org).

RECENT BOOKS

- Weed science : By Thomas J. Monaco, Steve C. Weller and Floyd M. Ashton, Published by John Wiley and Sons, 2002.

FORTHCOMING SEMINARS/SYMPOSIA/ WORKSHOPS

- 21st Asian Pacific weed science society (APWSS) conference, Colombo, Sri Lanka, 2-6 October 2007.

THREATS

Kudzu (*Pueraria montana* var. *lobata*)

Kudzu (*Pueraria montana* var. *lobata*), a native of Asia, is a climbing, woody or semi-woody, aggressive perennial vine (Fabaceae) capable of reaching heights of 20-30 m in trees. The leaves are deciduous, alternate and compound; the leaflets (14-18 cm long and 10 cm broad) may be entirely or deeply 2-3 lobed, and are pubescent underneath hairy margins. The flowers are borne in long panicles 10-25 cm long. Each flower is about 1-1.5 cm long, purple and highly fragrant. Flowering occurs in late summer and is soon followed by production of brown, hairy, flattened seed pods, each of which contains 3-10 hard-coated seeds which may not germinate for several years.

Kudzu kills or degrades other plants by smothering them under a solid blanket of leaves, by girdling woody stems and tree trunks, and by breaking branches or uprooting

entire trees and shrubs through the force of its weight. Large scale alteration of biotic communities is one of the biggest threats due to Kudzu. Dense thickets of the weed obstruct all views and movement in the affected area. It can grow rapidly at a rate of about 30 cm per day and may extend 10-30 m in length with stems 1-10 cm in diameter. Roots of Kudzu are fleshy, with massive tap roots 10-20 cm or more in diameter, 1-2 m or more in length and weighing as much as 180 kg. The plant grows well under a wide range of conditions and most soil types especially on forest ridges, disturbed areas, road sides, natural and planted forests, agricultural areas, grasslands and abandoned fields, where sunlight is abundant. It grows best where winters are mild and summer temperature is above 27° C. Kudzu will not survive in very cold climates (below -15°C) but the roots may send up new growth in the spring. Spread is through runners and rhizomes and vines that root at nodes. Spread through seeds is only at a limited level.



Kudzu smothering native vegetation in China

The plant was introduced in to the United States in 1876 at the Philadelphia Centennial Exposition, where it was promoted as a forage crop and ornamental plant. It was promoted as a suitable species to control soil erosion before the 1950's. Kudzu was successfully introduced also in to Switzerland and Queensland and New South Wales, Australia. But, it poses a serious weed problem only in southeastern United States.



Kudzu vines - leaves and flowers

Non-woody parts of Kudzu are edible; leaves are used as a salad or leafy vegetable and tuberous roots used as a root vegetable. It is now widespread in most of the southeastern United States as far north as Pennsylvania, and as far south as Key West, Florida. It has also been located in Oregon. Kudzu is known to occupy an area of 20 to 30 thousand km² in the USA, costing around US\$ 500 million annually.

Mechanical control of Kudzu involves removing the entire plant including the tap root and burning the biomass. Any remaining portions of the root crown can lead to re-infestation. Chopping of the vines just above the ground helps in controlling spread of the weed. Herbicides like glyphosate or triclopyr are also used successfully in controlling Kudzu. Herbicides are either applied at the cut end of the stem (25% solution of the herbicide) or sprayed (2 % concentration) on the foliage. A higher concentration of the herbicide (50%) applied at the cut end of the main root crown is also an effective method of control. Studies on biocontrol of Kudzu using native pathogens like *Pseudomonas syringae* pv. *phaseolicola*, *Myrothecium verrucaria* and *Colletotrichum gloeosporioides* are currently underway in the USA.

Weed status of Kudzu has not been reported from its native range so far. However, it is advisable to be vigilant on the rate of its spread within the native range and check incursions in neighboring Pacific countries

Eucalyptus rust (Puccinia psidii)

Puccinia psidii, a rust fungus native to South and Central America and the Caribbean, causes a serious leaf and shoot disease of a wide range of Myrtaceae (ten genera and 33 species) including *Psidium guajava* (guava), *Syzygium aromaticum* (clove), *Pimento*

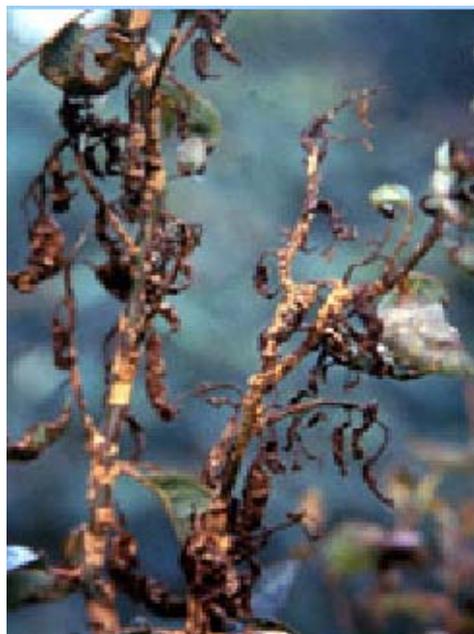
officinalis (allspice) and *Eucalyptus* spp. *Eucalyptus* species susceptible to the host include *E. camaldulensis*, *E. citriodora*, *E. cloeziana*, *E. globulus*, *E. grandis*, *E. maculata*, *E. microcorys*, *E. paniculata*, *E. pellita*, *E. phaeotricha*, *E. saligna*, *E. tereticornis* and *E. urophylla*. The fungus produces aeciospores, urediniospores, teliospores and basidiospores and all stages of its lifecycle occur on a single host. The spores of the fungus are both air and water dispersed.

The fungus attacks foliage, inflorescences and young, succulent twigs of the hosts. The initial symptom of the disease is appearance of tiny, circular, yellowish powdery eruptions on the leaf or stem surface. These eruptions turn a distinctive egg-yolk yellow color in a few days. The infection loci expand in due course and become necrotic and spread over the entire leaf, stem, shoot and fruits. Leaves and stem can be deformed by the disease and growing tips can die back if the infection is severe. Defoliation and mummifying of fruits are common. The symptoms are more likely to be seen on tender growing points. Recurrent infections can lead to death of trees or shrubs. The disease spread is generally through urediniospores. The spores germinate on the host surface in the presence of free water, in darkness and at temperatures between 15 and 25°C.



Leaf spots caused by *P. psidii* on *Eucalyptus*

P. psidii was first recorded on eucalypts in Brazil in 1944, where it apparently adapted from native members of the Myrtaceae. It is currently a serious problem on eucalypts in Central and South America and the Caribbean. There are unconfirmed reports of the occurrence of the fungus in India and Taiwan. Occurrence of the fungus on other hosts has been reported from South Florida and Hawaii islands. *P. psidii* is unusual amongst rust fungi in having a relatively broad host range. The full host range of the fungus is unknown and all genera of Myrtaceae can be regarded as potentially susceptible. *P. psidii* is considered to be one of the serious threats to eucalypts and other members of the Myrtaceae in Australia and other countries in the Asia-Pacific region and elsewhere (e.g., Africa and Europe) where eucalypts and other members of Myrtaceae are grown. The occurrence of the disease will also have indirect effects on native fauna and human lifestyles.



Dried and shrivelled leaves of *Eucalyptus* following severe infection by *P. psidii*

Spores of *P. psidii* are very small and can remain viable for months. The disease can spread from country to country through movement of infected plant material such as seeds, nursery stock and germplasm, spores on timber and wood packing, people carrying spores on clothing, shoes, equipment and contaminated freight containers. Wind-borne seeds are one major source of inoculum. To prevent spread of the rust from its native range, it is necessary to strengthen quarantine measures and import conditions, create public awareness, carry out surveillance programs for early detection of outbreaks, and analyse and block pathways through which incursions can occur.

Fungicides can be successfully employed for disease control in eucalypt nurseries and on coppice growth. Application of mancozeb (a protectant fungicide) 10 days prior to infection has been effective in preventing the occurrence of the disease. Systemic

fungicides such as triadimenol, oxycarboxin and diniconazole were also reported to prevent infection successfully. Products based on chlorothalonil are useful in controlling the disease in guava.

Tsunami may have helped spread of alien species in Sri Lanka

In Sri Lanka, the 500 million kg of rubble created by the tsunami has posed an enormous challenge to the solid waste management system in the country. Furthermore, studies conducted by the UN Environment Program have shown that tsunami waves have pushed seeds of alien invasive species from coastal areas, further inland on the island. In some areas, including important national parks, spread of mesquite (*Prosopis* sp.) and prickly pear (*Opuntia* sp.) has been noticed. These pose a major threat to local ecosystems.

NEW PUBLICATIONS

Stokes, Kate E., Buckley, Y.M., Sheppard, and A.W. 2006. A modeling approach to estimate the effect of exotic pollinators on exotic weed population dynamics: bumblebees and broom in Australia. *Diversity & Distributions*, 12: 593-600.

Wang, R., Wang Yin-Zheng. 2006. Invasion dynamics and potential spread of the invasive alien plant species *Ageratina adenophora* (Asteraceae) in China. *Diversity & Distributions*, 12: 397-408.

Parker, M.A., Malek, W., Parker Ingrid, M. 2006. Growth of an invasive legume is symbiont limited in newly occupied habitats. *Diversity & Distributions*, 12: 563-571.

RECENT BOOKS

Weed science: By Thomas J. Monaco, Steve C. Weller and Floyd M. Ashton, Published by John Wiley and Sons, 2002. This is an updated edition of the classic, fundamental book on weed science. The book provides a detailed examination of the principles of integrated weed management with important details on how chemical herbicides work and should be used.

FORTHCOMING SEMINARS/SYMPOSIUMS/WORKSHOPS

21st Asian Pacific weed science society (APWSS) conference, Colombo, Sri Lanka, 2-6 October 2007. Proposed program topic is "Integration and Utility of Biotechnology in Weed Science". Papers/posters on original research are accepted for presentation under the following thematic areas: Weed biology/ecology, integrated weed management, novel herbicides/bioherbicides, herbicide resistance in weeds/crops, weed/crop allelopathy, biological weed control, invasive alien weeds, impacts of herbicides on the environment, socio-economic aspects, crop-weed competition, herbicide physiology, herbicide application technologies, education and technology transfer in weed science, impact of global warming on weed/crop interactions and plant invasion, seed bank dynamics of weeds, application of molecular techniques in weed research. For more information: apwss21@pdn.ac.lk; apwss21@yahoo.com Tel: + 94-812-388657; Fax: + 94-812-388041.