INVASIVES

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

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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 Agriculture 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.

Threats

- Giant reed (*Arundo donax*)

News column

- Coffee - an invasive plant in the Western Ghats, India!

New publications

- Aphid fecundity and grassland invasion: Invader life history is the key
- Predictive models of weed population dynamics
- Predicting Argentine ant spread over the heterogeneous landscape using a spatially explicit stochastic model
- When can efforts to control nuisance and invasive species backfire?
- Biological invasions and the neutral theory.
- Habitat suitability modelling of an invasive plant with advanced remote sensing data.

Recent books

- Ecological impacts of non-native invertebrates and fungi on terrestrial ecosystems
- Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy, and Management

Arundo donax - Habit

Forthcoming Symposia/Workshops

- 28 February - 3 March 2010. Global Biosecurity 2010: Safeguarding agriculture and the environment.

INVASIVES, bimonthly newsletter of the Asia-Pacific Forest Invasive Species Network (AFPISN) 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 - Dr. K. V. Sankaran, APFISN Coordinator, Kerala Forest Research Institute, Peechi-680 653, Kerala , India (sankaran@kfri.org). The newsletter is supported by the Food and Agriculture Organization of the United Nations (FAO) and USDA Forest Service.

Giant reed (*Arundo donax*)

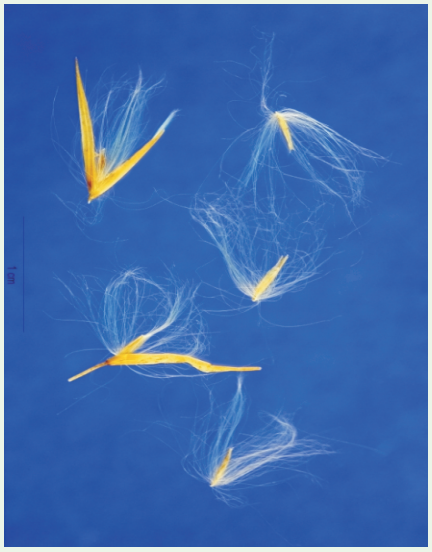
Arundo donax (giant reed, also known as wild cane) is a tall, perennial grass that can grow up to 10 m in height. It is one of the largest of the herbaceous grasses. A member of the family Poaceae, giant reed is native to tropical Asia and the Mediterranean region, but is now widespread and naturalized in about 23 countries including Australia, Fiji, Mexico, South Africa, Venezuela, New Zealand, Samoa and the USA. The Global Invasive Species Database has identified it as one of the 100 "World's Worst" invaders. Giant reed was introduced from the Mediterranean to California in the 1820s as a roofing material and for erosion control in drainage canals. It was also used as an ornamental plant and for making baskets, mats, fish poles and parts of instruments like the clarinet. Thus, it became naturalized throughout the warm coastal freshwaters of North America, and its range continues to spread. It is among the fastest growing terrestrial plants in the world (grows nearly 10 cm /day). In the USA, wild stands of giant reed yield 8.3 tons of oven dry cane per acre and it is being tested as a biofuel crop.

Giant reed- Flowers

Culms of giant reed are 3-10 m tall, erect or arching, un-branched or branched above, arising from thick, fleshy, scaly rhizomes, with nodes 12 - 30 cm long, glabrous, and usually concealed. Internodes are hollow and up to 4 cm in diameter. The leaves are strongly distichous, distributed rather uniformly along culm (except on old stems), 5 - 8 cm broad at the base and tapering to a fine point. The base of the leaves is cordate and more or less hairy-tufted, persisting long after the blades have fallen. The flowers are borne in large, plume-like terminal panicles from March to September. The spikelets are several-flowered, approximately 12 mm long with florets becoming successively smaller. The caryopsis is elongate, 1-1.5 mm long.

Giant reed has been cultivated in many countries for thousands of years. The main method of propagation of the plant is vegetative through rhizomes. The bulbous, creeping rootstocks form compact masses from which tough, fibrous roots emerge that penetrate deeply into the soil. The weed is dispersed to other areas through the nursery trade, by water currents and through agriculture. Once established, it can form homogenous stands, sometimes covering hundreds of acres outcompeting and replacing the native vegetation. It can modify the habitat of wildlife and also cause fire and flood hazards. Giant reed has invaded agricultural areas, coastlands, deserts, natural forests, planted forests, range/grasslands, riparian zones, ruderal/disturbed areas, scrub/shrublands, along stream banks, roadside habitats and in urban areas. It can tolerate a wide range of soil types ranging from heavy clays to loose sands and gravelly soils. In Hawaii, the weed is naturalized in coastal areas, often in thickets. In Fiji, it is widespread on hillsides, in open forest and along roadsides, up to about 200 m altitude. The plant can grow well near water tables or at the soil surface and can endure excessive salinity and severe drought.

Clasping leaf bases



Seeds of giant reed

Giant reed provides a poor habitat and food source for insects and wildlife because the stems and leaves contain harmful chemicals like silica and various alkaloids. In some areas it may totally invade irrigation ditches, thus affecting the water-carrying capacity. The plant itself uses large volumes of water, reducing the downstream flow in drier riparian areas. Giant reed produces thickets that restrict access to riparian areas or become floating mats that can impede the water flow or damage bridges during floods. Grazing animals such as cattle, sheep, and goats may have some effect on it, but are unlikely to be

Arundo donax- Infestation

useful in keeping it under control. It forms a thin canopy near stream habitats, which increases the water temperature, which in turn leads to a decreased concentration of oxygen and affects the diversity of aquatic animals.

Smaller infestations of the weed can be removed by hand pulling. Rhizomes can be dug up using picks and shovels, making sure to remove all parts. Larger machines can be used to remove above ground vegetation and dig up underground rhizomes. Chopping, cutting, mowing and burning are also methods that can be used for control. In many areas of California, the use of Angora and Spanish goats is showing promise as an effective control for the weed, especially in the dry season. Prescribed or broadcast burning has also been found useful, but this method alone will not control the weed. The application of glyphosate to leaves or cut stumps has been effective in many countries. Several insects and pathogens are under consideration as biocontrol agents.

News column

Coffee - an invasive plant in the Western Ghats, India!

Coffee invasion inside a forest ecosystem

Coffee, a native of Africa, is one of the most consumed beverages in the world. It is also the second most highly traded global commodity today. Two cultivated species of coffee, i.e., *Coffea arabica* and *Coffea conephora* (Robusta coffee), are widely grown in the tropics. The Western Ghats, one of the biodiversity hotspots in India, supports many cash crops and coffee is one of them, Coffee is planted near fragmented areas in the rainforests of the Western Ghats. A recent study by Joshi and coworkers from India (published recently in Biological Invasions) probed the possibility of coffee spreading as an invasive into rain forests in the Western Ghats. The study showed that the coffee species cultivated in the adjoining plantations was more abundant inside fragments, showing a clear decline in stem density from edge to interior. This suggested the influence of propagule pressure from adjoining plantations, coupled with the edge effect and seed dispersal by animals like elephants, lion-tailed macaque and sloth bear. A negative relationship between Robusta coffee and native shrub density indicated its potential detrimental effect on native plants. Also, a significant positive correlation between coffee density and canopy cover indicated the potential threat of coffee invasion even in closed canopy rainforests. The present study indicates that coffee is an invasive plant in tropical forests of the Western Ghats. Also, the Robusta coffee, which is replacing Arabica coffee in large areas, offers a poor habitat for wildlife in plantations, besides being of greater invasive potential in adjoining forests.

New publications

Borer, E.T., Adams, V.T., Engler, G.A., Adams, A.L., Schumann, C.B. and E.W. Seabloom. 2009. Aphid fecundity and grassland invasion: Invader life history is the key. Ecological Applications, 19: 1187 - 1196.

Freckleton, R.P. and P.A. Stephens. 2009. Predictive models of weed population dynamics. Weed Research, 49: 225 - 232.

Pitt, J.P.W., Worner, S.P. and A.V. Suarez. 2009. Predicting Argentine ant spread over the heterogeneous landscape using a spatially explicit stochastic model. Ecological Applications, 19: 1176 - 1186.

Zipkin, E.F., Kraft, C.E., Cooch, E.G. and P.J. Sullivan. 2009. When can efforts to control nuisance and invasive species backfire? Ecological Applications, 19: 1585 - 1595.

Pedro, D., Alberti, J. and O. Iribarne. 2009. Biological invasions and the neutral theory. Diversity and Distributions, 15: 547 - 553.

Margaret, E.A. and L.U. Susan. 2009. Habitat suitability modelling of an invasive plant with advanced remote sensing data. Diversity and Distributions, 15: 627 - 640.

Recent Books

Ecological impacts of non-native invertebrates and fungi on terrestrial ecosystems: Eds. David W. Langor and Jon Sweeney, Springer, 2009. Since the arrival of Europeans about 500 years ago, an estimated 50,000 non-native species have been introduced to North America. Though many introduced species are beneficial, there is increasing awareness of the enormous economic costs associated with non-native pests. In contrast, the ecological impacts of non-native species have received much less public and scientific attention. In particular, there is little information about the ecological impacts of hyper-diverse groups such as terrestrial fungi and invertebrates. A science symposium, "Ecological impacts of non-native invertebrates and fungi on terrestrial ecosystems," held in 2006, brought together scientists from the USA and Canada to review the state of knowledge in this field of work. This book includes review/synthesis papers on the topic and case studies on ecological impacts of non-native terrestrial invertebrates and fungi presented at the Symposium.

Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy, and Management: Eds. Reuben P. Keller, David M. Lodge, Mark A. Lewis and Jason F. Shogren, Oxford University Press, USA, 2009. This book brings ecology and economics together in new ways to address how we deal with the dynamics and impacts of invasive specie. It is also the outcome of many years of collaborative research between a small group of economists and ecologists. The book demonstrates the utility of combining ecological and economic models for addressing critical questions in the management of invasive species.

Forthcoming Symposia / Workshops

28 February-3 March 2010. Global Biosecurity 2010: Safeguarding agriculture and the environment. Brisbane, Australia. Biosecurity has become a major economic issue of concern to governments, agricultural industries and environmental organisations worldwide. This conference will provide a forum for stakeholders from across the biosecurity spectrum, including researchers, industry representatives, policy makers, primary producers and importers/exporters, to network and exchange knowledge on agricultural and environmental biosecurity, facilitate engagement and cross-fertilisation of ideas between researchers and their end-users (industry, regulators and other end-users) and build cross-disciplinary networks across all biosecurity related disciplines. Contact: biosecurity@con-sol.com

Compiled and edited by Dr. K. V. Sankaran, APFISN Co-ordinator on behalf of the Asia-Pacific Forest Invasive Species Network. For more information on the APFISN, please contact your national focal point or the APFISN Co-ordinator or Mr. Patrick Durst, Senior Forestry Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok. Email: patrick.durst@fao.org