INVASIVES

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

Volume 17 July - August '08

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Recent books

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- The Economics of Forest Disturbances: Wildfires, Storms and Invasive Species

Forthcoming Symposia/Workshops

- 26 - 31 October 2008. International Workshop and Training Course on Invasive Species. Wuhan, China

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.

Impatiens glandulifera - flower

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.

Himalayan balsam (*Impatiens glandulifera*)

Impatiens glandulifera (Balsaminaceae), commonly called Himalayan balsam, is a tall (typically 1 - 2 m but can grow up to 10 ft) succulent, glabrous, herbaceous annual plant native to India and the Western Himalayas. The name impatiens means “impatient” - referring to the explosive seed dispersal. This plant is also known by several common names like policeman's helmet, Indian touch-me-not, Himalayan Impatiens, and Ornamental Jewelweed. Although sometimes sold as an ornamental, Himalayan balsam found a place in the Washington state noxious weed list due to its invasive nature. In Britain, where the climate is similar to the Pacific Northwest, Himalayan balsam is considered extremely invasive and is one of the "top 20" non-native weeds. It is the tallest herb recorded in the British Islands. The plant is naturalized through out the United Kingdom and has been recorded as a weed in eighteen European countries. It appears that in 1839, the seeds of Himalayan balsam were sent from Western Himalayas to Kew. The naturalized populations of balsam were reported in 1855, and thereafter it continued to spread throughout moist, natural areas. By the 1900's *Impatiens glandulifera* was widespread in Ireland and England. The plant is currently distributed in 18 European countries between latitudes of 30 and 64 N.

Balsam - Habit

The stem of Himalayan balsam is upright, hollow, and with a purple or reddish tinge. It is brittle and easily broken. The leaf arrangement is either opposite or whorled, with three leaves on a node. The simple leaves range from oblong/ ovate to elliptic (egg shaped), in shape and 5 - 23 cm long and 7.5 cm wide. The leaf margins are sharply serrated with 20 or more teeth along each side. Each leaf has a stout petiole (stem), with small glandular stalks occurring at the base of the petioles. The crushed foliage has a strong musty smell. Several solitary flowers terminate in an elongated axillary stalk. The flowers are irregular, with five petals (two fused), three sepals (two fused) and five stamens with connate (fused) filaments. Flowering occurs from June to October. Pollinators include several species of bees, moths and wasps. The overall flower shape resembles an English policeman's helmet. The fused sepals form a spur less than six mm long. The flower color ranges from white to all shades of pink and purple. *I. glandulifera* is self compatible. The fruit is a five chambered capsule 2 - 3 cm long and 8mm wide. Seed set occurs about 13 weeks after flowering (August to October). When touched, the mature capsules explode and eject releasing ca. 2500 seeds per plant, which are viable for 18 months or more and can germinate even under water. The explosion of the capsules will take the seeds for up to 7 meters. The seeds which germinate in February - March may require cold stratification to break dormancy.

Leaf arrangement in balsam

Balsam infestation

Roots of balsam penetrate four to six inches deep in the soil with adventitious roots occurring along the lower stem nodes, which give it a buttressing appearance.

Though the plant tolerates a wide variety of soil types, it prefers acid, neutral and basic (alkaline) soils with high soil moisture content. Frost sensitivity may be a limiting factor for its distribution outside its native land. In the Himalayas, the species is frost tolerant and partially shade tolerant found at an elevation of up to 4,000 meters. The plant is distributed in riparian areas including moist forests, streams sides and roadside thickets. In the autumn, it die back, leaving the river banks bare of vegetation and vulnerable to erosion. Associated species in western Washington sites include: blackberries (*Rubus* spp), Japanese knotweed (*Polygonum cuspidatum*), elderberry (*Sambucus racemosa*), *Spirea douglassi* ssp *douglassi*, reed canarygrass (*Phalaris arundinacea*), willows (*Salix* spp.), and ivy (*Hedera helix*). The aggressive seed dispersal, coupled with high nectar production which attracts pollinators, often allows the Himalayan balsam to out compete native plants

Himalayan balsam is sometimes sold as a garden ornamental and is a late season source of nectar and pollen. Young leaves and shoots are cooked and

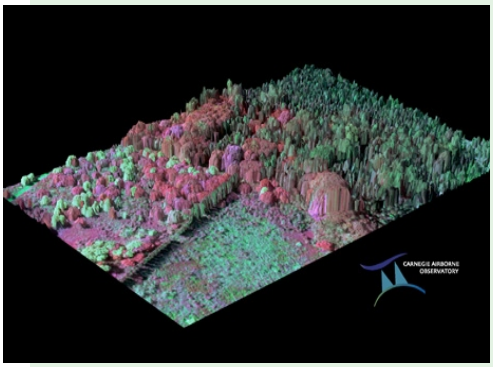
Balsam - seeds

used as food. Seed has a delicious nutty flavor, but difficult to harvest in quantity mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch. An edible oil is obtained from the seed which is also used for lighting. Control measures should aim to prevent flowering and if this is achieved before seeds are set, eradication is possible in two to three years. Mechanical control involves pulling or by cutting at ground level before the flowering starts in June. Cutting earlier than June promotes greater seed production in any plants that re-grow. Cutting should be repeated annually until no more growth occurs. Shallow rooted plants can be pulled up very easily and disposed of by burning or composting, unless seeds are present. Grazing by cattle and sheep is effective from April throughout the growing season. It should be continued until no new growth occurs. Use of glyphosate or 2, 4-D amine whilst the plant is actively growing in early spring gives best effect. Biological control of Himalayan balsam is not known.

News column

Alien Trees Destroying Native Hawaiian Forests

Alien trees invade and destroy native rainforests in Hawaii says Gregory Asner and colleagues at the Carnegie Institution of Washington's Department of Global Ecology in Stanford, California. Recently, his team of scientists surveyed about 850 square miles (about 220,000 hectares) of rain forest on Hawaii's Big Island using remote-sensing devices aboard aircraft. The instruments infiltrated the forest canopy to produce something like a three-dimensional CAT scan. This approach helped to identify species by their often-unique chemical and structural properties, both of which can be mapped from the air. From this data, they determined that invasive trees are changing the structure of the Hawaiian rain forest by denying native species valuable resources, such as sunlight. The Hawaiian rain forests are generally populated by the slow-growing *ohia* tree, which produces the red *lehua* flower. However, surveys indicated that the native trees are thinning out as invasive trees, such as tropical ash and firetree encroach their habitat. In addition to reducing rain forest diversity, invaders affect the basic life-giving services that forests provide to people. For example, the researchers have shown that these particular invasive species change the amount of carbon stored in ecosystems. In other words, more carbon



CAT scan of forest canopy

dioxide could end up in the atmosphere instead of stored in the forests natural sink. Moreover, the invasive trees negatively affect the recreational and cultural resources by creating an impenetrable layer of vegetation that makes it hard to access the forests by people. All these highlight the vulnerability of protected areas to invasive species and the need for aggressive management to maintain conservation values.

New publications

Fernandez-Quintanilla, C., Quadranti, M., Kudsk, P. and P. Barberi. 2008. Which future for weed science? Weed Research, 48: 297 301.

Juan, J.C. and H.Z. Bernard. 2008. Flame weeding effects on several weed species. Weed Technology, 22: 290 295.

Jogesh, J., David,C. and C. Naomi. 2008. Herbivory on invasive exotic plants and their non-invasive relatives. Biological Invasions, 10:797 804.

Larissa, L. S., Antonio, D., Johannes, L. and S. Greipsson. 2008. Effects of arbuscular mycorrhizal fungi on the exotic invasive vine pale swallow-wort (*Vincetoxicum rossicum*). Invasive Plant Science and Management, 1:142 152.

Rhonda, K. L. and C.C. Daehler. 2008. Influence of woody invader control methods and seed availability on native and invasive species establishment in a Hawaiian forest. Biological Invasions, 10: 805 819.

Inderjit, Timothy, R.S., Ragan, M. C., Jarrod, L. P. and K. Jasleen. 2008. Allelopathy and plant invasions: traditional, congeneric, and bio-geographical approaches. Biological Invasions, 10: 875-890.

Heinz, M. S. and U. Schaffner.2008. Classical biological control: exploiting enemy escape to manage plant invasions. Biological Invasions, 10: 859 874.

Ludovic, J.A.C., Wilson, H. F., Williamson, A.G., Michael, G. P., James, H. M. and V.S. Edzard. 2008. Invasion dynamics and genotypic diversity of Cogon grass *(Imperata cylindrica)* at the point of introduction in the southeastern United States. Invasive Plant Science and Management, 1:133 141.

Recent Books

Nematodes as Biocontrol Agents: Eds. P.S. Grewal, R.Ehlers and D.I. Shapiro-Ilan, CABI, 2008. This book aims to document and illustrate the major developments in the use of nematodes for biological control of insects and slugs. It covers the use of three main types of nematodes entomopathogenic nematodes, entomophilic nematodes, and slug-parasitic nematodes. The book discusses the biology, commercial production, formulation and quality control, application technology, strategy and safety of each of the nematode groups. Separate chapters are devoted to the application of nematodes in different cropping systems, and the efficacy of nematodes against specific pests. Potential of predatory nematodes to control plant-parasitic nematodes and mycophagous nematodes to control fungal pathogens is also reviewed. This book was first published as a hardback in 2005.

The Economics of Forest Disturbances: Wildfires, Storms and Invasive Species: Eds. Thomas P. Holmes, Jeffrey P. Prestemon and Karen L. Abt, Springer, 2008. This book provides a unique, state-of-the-art review of both traditional and emerging themes in the economics of natural forest disturbances. The authors show that neo-classical economic principles can be integrated with ecosystem analysis and modern econometric methods to uncover the causes and consequences of natural forest disturbances. The chapters encompass modern areas of concern in forest economics and policy, including temporal and spatial dynamics of economic-ecologic systems, risk-reducing mitigation and adaptation strategies, and the valuation of impacts on market and non-market resources. These topics are developed with case studies demonstrating rigorous empirical analysis with a policy-oriented focus. The book is intended for forest policy analysts and decision-makers, risk managers, forest economists and graduate students studying natural resource economics.

Forthcoming Symposia / Workshops

26 - 31 October 2008. International Workshop and Training Course on Invasive Species. Wuhan, China. This workshop is jointly organized by the Chinese Academy of Sciences, The Nature Conservancy China Program, USDA Forest Service Health Technology Enterprise Team, TNC Global Invasive Species Team and the Asia-Pacific Forest Invasive Species Network. The main objectives of the workshop are to provide the participants with 1) a basic understanding of invasive species and invasion biology; 2) principles and theory of integrated management of invasive species; and 3) information on international quarantine and biosecurity policy as well as advice on conducting outreach and public awareness campaigns against invasive species. Contact: Dr. Jianqing Ding dingjianqing@yahoo.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