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 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

Imperata cylindrica (Cogon grass/ Alang-alang)

Imperata cylindrica (cogon grass) is an erect, perennial rhizomatous grass native to Southeast Asia. It occurs throughout the warmer and tropical regions of the globe occupying nearly 200 million hectares of land. It is widely distributed in Africa, Australia, South Asia, and the Pacific Islands, and less extensively in southern Europe, the Mediterranean, the Middle East, South America, the Caribbean and the southeastern United States. Cogon grass is considered a pernicious pest plant due to its ability to successfully disperse, colonize, spread and subsequently compete with and displace desirable vegetation and disrupt ecosystems

Cogon grass

INVASIVES, monthly 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 (sankaran@kfri.org).

over a wide range of environmental conditions. It has been ranked as one of the top ten worst weeds of the world, reported in 73 countries and on all six continents.

Cogon grass can grow up to 3 m in height. The leaves are about 2 cm wide at the base and narrow to a sharp point at the top. The margins of leaves are finely toothed and embedded with sharp silica crystals. The main vein is a lighter color than the rest of the leaf and tends to be nearer to one side of the leaf. The upper surface of leaves is hairy near the base of the plant; the underside is usually hairless. The inflorescence is a many-branched panicle, that is plume-like, cylindrical, dense and silvery. Spikelets are 3-6 cm long, crowded and paired on unequal stalks with each spikelet surrounded by white hairs. Each plant produces as many as 3,000 seeds, which are highly germinable. Varying in form, from loose to compact tufts, cogon grass is strongly rhizomatous with extensive, sharply pointed, creeping, scaly rhizomes. The sheer mass and persistence of the rhizomes is one of the factors contributing to the ability of cogon grass to dominate an area.

Cogon grass - Panicle and rhizome

Cogon grass is commonly found in degraded forests, grasslands, agricultural areas, riparian zones, scrub/shrublands, urban areas and wetlands in tropical and sub-tropical areas with75-500 cm of annual rainfall, from sea level to over 2000 m elevations. It is tolerant of wide variations in soil fertility, organic matter, moisture and atmospheric temperature. The plant doesn't normally occur in closed forests, but can invade when forests are opened for agriculture or lumbering. It can rapidly colonize frequently burned, overgrazed and intensively cultivated areas and alter the structure and function of invaded communities. Also, it displaces a large variety of native plant species and in turn, the native animals that depend on them for forage and shelter. The weed negatively affects the growth of economically important plants like teak, cocoa, coffee, tea, citrus, cashew, oil palm, coconut, rubber, cassava and rice. In addition to yield loss, it increases the cost of production, reduces the market value of damaged tuber and root crops, and increases the risk of fire in perennial crops, plantations and forest reserves.

New incursions of cogon grass can take place through the transfer of rhizome segments from place to place by man and animals, vehicles and soil implements. The plant's rhizomes have high regenerative ability and can remain dormant but viable for a long time. Dispersal over long distances also occurs through windborne seeds. In some countries, it is extensively planted for ground cover and soil stabilization near beaches and areas subject to erosion. Uses of the plant include papermaking, thatching and weaving into mats and bags. Several medicinal properties have also been reported.

Mechanical control of cogon grass is usually done by hand pulling, which is very labor intensive. In small areas, cogon grass can be successfully controlled by digging and removing the plants and the underground rhizomes. Burning stimulates the growth of the weed and hence is not recommended as a stand-alone option. An integrated approach that involves burning the thatch layer, followed by dicing or mowing and late season application of broad-spectrum herbicides such as imazapyr or glyphopsate has been found effective. In most cases several applications may be needed. Several natural enemies to cogon grass have been reported, but, a successful biolgical control programme has yet to be developed. The gall midge *Orseolia javanica* and the pathogen *Colletotrichum caudatum* are considered as potential candidates for use in classical biological control.

Coconut leaf beetle (*Brontispa longissima*)


Brontispa - habit

The coconut leaf beetle (*Brontispa longissima*) is native to Indonesia (i.e. Aru Islands, Maluku Province, and possibly Papua Province) and Papua New Guinea, including the Bismarck Archipelago. The beetle is currently distributed in Australia (Darwin, Broome, Moa Island, Cooktown, Cairns, Innisfail, Marcoola and Townsville), the Pacific islands and parts of Asia (Malaysia, Singapore, Cambodia, Laos, Thailand, Vietnam, the Maldives and Hainan Island in China). The beetle has recently been reported from the Philippines and Myanmar. If not contained urgently, the pest may soon spread to southern India and Sri Lanka from the neighbouring countries.

The beetle infests more than 20 palm species with coconut (*Cocos nucifera*) being the most favored host. Royal palm (*Roystonea* sp.), Alexandra palm (*Archontophoenix alexandrae*) and areca nut palm (*Areca catechu*) are also attacked. Brontispa attacks the youngest leaf still in the throat (the spear leaf) of the palm. The larvae of the beetle chew on large areas of the surface of the leaflets which causes death of the underlying tissues. Such leaflets show longitudinal white streaks. As the leaf emerges, the leaflets curl and turn brown, giving a characteristic scorched and ragged appearance. Photosynthesis is reduced to zero in the affected leaflets. As the spear unfurls, the beetle moves on to other palms or the next emerging spear. The beetle does not attack leaves that emerge un-damaged. Severe attacks destroy unopened leaves, restrict growth and significantly reduce nut production. Prolonged attacks result in the death of the palms.Dry periods favor the development of the beetle populations. Young palms (2 - 3 years old) are attacked more frequently than old palms because the heart leaves of old palms are firmer and become less suitable as breeding grounds for the beetle. Also, stunted palms with less compact hearts are more susceptible to Brontispa attacks.


Coconut palm affected by leaf beetle

The adult coconut leaf beetle is 7.5 – 10 mm long and 1.5 – 2 mm wide, with a flat body that is black in color with an orange head and shoulders. The larvae are white with two pincer-like spines at the rear end of the body. Adult females lay their brown flat eggs (1.4 mm long and 0.5 mm wide) in the still-folded leaflets of both young and mature coconut palms. The eggs are surrounded by debris and excrement and laid longitudinally in rows of an excavated area of leaf tissue. They hatch in 3 - 7 days. The whole cycle from egg to adult takes 5 - 9 weeks. The adult beetle is fully mature two weeks after emergence from the pupa and lives for two to three months. The larvae and adults of the beetle are nocturnal in habit and remain in the still-folded leaflets, moving outside only to infest the nearby palms or for mating. The beetle is capable of short flight distances - often only a few hundred meters - so its natural spread is slow.

Several insecticides (e.g., imidacloprid, dieldrin, quinalphos, azinophos, methidathion and chlordane) are being used to control the coconut leaf beetle. However, the effect of these treatments only lasts 3 - 4 months. Repeated applications may be impractical and uneconomical and cannot be used as a long-term control measure. Two parasitoids of coconut leaf beetle viz., *Tetrastichus brontispae* and *Asecodes hispinarum* have been

successfully used in several countries to control the beetle. Use of the entomopathogenic fungus *Metarhizium anisopliae* is also promising.


Young coconut leaf with the leaf beetle

The coconut leaf beetle spreads mostly through the movement of infested palms. Palms that are to be transported from known areas of infestation should first be checked to make sure they are beetle-free. A simple inspection of the young leaves in the throat of the palm will be sufficient. To avoid further spread, non-infested countries in the region should adopt strict quarantine measures during the import of plant materials from infested countries. Raising awareness and capacity building through training programs will help to stop the beetle from spreading to non-infested countries. Countries that are already afflicted by the coconut leaf beetle may adopt intensive biocontrol programs to minimize losses due to disease and to check its further spread.

NEW PUBLICATIONS

Liu, J., Dong, M., Miao, S.L., Zhen, Y.L., Song, M.H., Wang, R.Q. 2006. Invasive alien plants in China: role of clonality and geographical origin. Biological Invasions, 8:1461-1470.

Dhileepan, K., Senaratne, K. A. D. W., Raghu, S. 2006. A systematic approach to biological control agent exploration and prioritisation for prickly acacia (*Acacia nilotica* ssp. *indica*). Australian Journal of Entomology, 45: 303-307.

RECENT BOOKS

Alien species and evolution: The evolutionary ecology of exotic plants, animals, microbes and interacting native species: By George W. Cox, Published by Island Press, 2004. This book reviews and synthesizes emerging information on the evolutionary changes that occur in plants, animals and microbial organisms when they colonize new geographical areas, and on the evolutionary responses of the native species with which alien species interact. It is broad in scope, exploring information across a wide variety of taxonomic groups, trophic levels, and geographic areas.

Biological control of invasive plants in the United States. Eds. Eric M. Coombs, Janet K. Clark, Gary L. Piper, and Alfred F. Cofrancesco, Jr. Published by Oregon State University Press, 2004. In this book, leading experts review the discipline of biological control of invasive terrestrial and aquatic plants. Topics addressed include ecology, safety testing, nontarget impacts, and the processes of identifying, introducing, distributing, and monitoring biological control agents.

FORTHCOMING SEMINARS/SYMPOSIA/WORKSHOPS

30 -31 January, 2007. Wildlife and invasive plants: Finding common ground to protect ecological diversity. Potola Plaza Hotel, Monterey, CA, USA. The symposium will provide a forum for wildlife and land managers, scientists, and representatives of regulatory agencies and other organizations to exchange ideas and identify critical information needs on the topic. Contact: Elizabeth Brusati or Cynthia Perrine: edbrusati@cal-ipc.org; cperrine@berkeley.edu

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