

FOREST HEALTH ISSUES IN SOUTH-EAST ASIAN COUNTRIES

BARRY POOLE

NZFP Forests Ltd, P.O. Box 648,
Tokoroa, New Zealand

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ABSTRACT

Although plantations are not yet a large part of South-east Asian forestry, they are becoming increasingly important as wood supplies from natural forests are depleted. Insect and fungal pathogens can have severely detrimental effects on tree plantations and usually where this has happened foresters have responded by changing tree species or siting. Awareness of the potential dangers of forest pathogens is highest in areas which already have a plantation crop industry, such as rubber or cocoa.

Keywords: quarantine; pathogens; tropical forests; insect pests.

INTRODUCTION

Tree plantations in South-east Asia are still small compared to natural forest areas. However, with increasing awareness worldwide of the consequences of forest depletion and the subsequent reduction in felling, forest tree plantations are growing in importance and area. Along with this, interest in plantation forest health is growing.

QUARANTINE

Awareness of the potential for importing exotic pests and diseases with plant material is high in most South-east Asian countries. Often a very long lead time is required to import seed for species/provenance trials. It takes time to secure the seed in the country of origin, and then to gain its release from the target country's agricultural or customs officers. The appropriate phytosanitary documentation is generally required for importation of plant material. Malaysia is particularly strict because of the fear of introducing South American leaf blight, *Microcyclus ulei* (P. Henn.) von Arx, which would have a detrimental effect on Malaysia's rubber plantations. With approximately 1.8 million hectares of rubber (*Hevea brasiliensis* Muell-Arg.), contributing significantly to the nation's export receipts, Malaysian authorities have good reason to be strict. Even today, any plant materials from South America have to pass through Kew Gardens in the United Kingdom before being imported into Malaysia. The country's airport arrival halls also carry posters advertising the dangers of plant and insect importation.

Many countries are not as particular with the export of their forest produce, and it is left largely to the importing countries to set the level of hygiene. Much of the forest produce is in the form of logs and timber, and wood with borer or sapstain is often

eliminated by visual inspection and end-painting to reduce drying/end split. Sometimes importing countries request bark removal from logs as an extra precaution.

PLANTATION PEST/DISEASE CAUSES

Once plantations have been established, threats from pathogens may result from local or imported sources. The tropical flora and fauna of South-east Asia are incredibly diverse and, despite the best efforts of forest resources managers, relatively innocuous local insects can become a pest in new plantations. For example, *Eurema blanda* (Boisduval), a bright yellow butterfly, can defoliate *Paraserienthes falcataria* (L.) I. Nielsen at certain times of the year in Sabah, eastern Malaysia. Local stem and shoot borers (hepialid and cossid moths) can also debilitate *Eucalyptus deglupta* Blume in the same location. Periodic but severe defoliation of pine species by *Dendrolimus punctatus* (Walker) occurs in Vietnam.

These depredations often throw into question the original species/provenance selections and site suitability. The earlier work with Caribbean pines in lowland Malaysia and Indonesia often centred on nutritional and fungal problems to explain poor growth. It may have been just as profitable to question whether a species could be moved 20 degrees in latitude and lower in altitude. More recently, the decline in tropical pine plantings has been caused by pine shoot moths, *Diorcytria* spp. and *Rhyacionia* spp. Speight & Speechly (1982) found that most pine shoot moth damage occurred at low altitudes and on more degraded soils. On top of the usual problems of fire, weeds, and browsing animals, the pine shoot moth outbreaks have effectively stopped the establishment of a lot of pine plantations planned in South-east Asia. A number of pine plantation projects have been changed to hardwood projects, largely owing to periodic outbreaks of shoot moth.

Changes in soil fertility influence the rate of tree growth and sometimes susceptibility to pest attack. Both *Acacia mangium* Willd. and *Araucaria hunstenii* K. Schum. grow well on relatively infertile soils, but are prone to termite attack on more fertile sites. Sometimes a change in species provenance can make a considerable difference to growth and tree health. Early plantings of *E. deglupta* in Mindanao, Philippines, were made with provenances from Papua New Guinea. The plantations were affected with *Agrilus opulensis* Kerremans (varicose beetle) and growth was not up to expectations. Later plantings with the indigenous provenances of *E. deglupta* solved the insect problem and growth rates improved.

Fungal diseases can often be severe in the moist warm tropics. *Cercospora pini-densiflora* Hori & Nambu can be debilitating in the nursery and in young plantations if weed control is not timely (Gibson 1979). The speed of fungal development in tropical environments often precludes remedial action. The writer can attest to this from personal experience having observed *Diplodia pinea* (Desm.) Kickx badly damage a seedling crop of *Pinus caribaea* Morelet and *P. oocarpa* Schiede within 24 hours of a hailstorm. Casual observation of eucalypt plantations in tropical regions often reveals leaf fungi and the incidence noted probably relates more to the intensity of observations than to the number and severity of foliage diseases. While the fungal loadings may not kill trees they may slow growth rates. A recent report from Sri Lanka (M.D. Wilcox pers. comm.), indicated that a *Cylindrocladium* sp. was defoliating (and

occasionally killing) a number of eucalypt species in newly established plantations. Alternative eucalypt species have been suggested and also a possible change to conifers.

As natural forest removal, followed by shifting agriculture and fire, continues in many parts of rural South-east Asia, increasing areas of low fertility soils are apparent. The cover vegetation is often a good indicator of degraded soil fertility, and grasses such as *Imperata cylindrica* (L.) Raeusch and shrub species such as *Eupatorium* spp. often predominate. This is giving rise to more use of vigorous leguminous species which can compete with these weeds — e.g., *P. falcataria*, *Leucaena leucocephala* (Lam.) de Wit, and species of *Acacia* and *Albizzia*.

A few years ago promising provenances of *L. leucocephala* from Central America, were being promoted enthusiastically by Filipino and American foresters. *Leucaena* plantings have suffered from a species of *Heteropsylla* (Psyllidae). This sap-sucking insect has spread across the Pacific from Central America, and now affects plantations in the Philippines, Taiwan, Thailand, Malaysia, and Indonesia. *Leucaena* has been used extensively as a shade cover (and nitrogen source) for coffee and cocoa crops in South-east Asea. In Indonesia it is used for shading a large proportion of the world's clove crop. It is the effect on the agricultural crop yields, rather than *Leucaena* yields, which has considerable economic significance. Acacias and albizzias, in the writer's experience, have not been widely affected by pathogens to date. There have been reports of a borer (*Xystrocera festiva* Thomson) on *P. falcataria* plantations in Sabah and green weevil defoliating *A. mangium* in Vietnam and Malaysia.

No discussion on forest health would be complete without reference to the effect of excess water, fire, and wind. Flooding after tropical rains can weaken trees by root anoxia or by soil fertility loss through erosion. Man's propensity to use fire as a land-clearing tool, often results in tree plantations being "scorched" and thus becoming more liable to attack by insects or fungi. Though Mindanao in the Philippines is regarded as being below the typhoon belt, in 1982 winds damaged approximately half of PICOP's (Paper Industries Corporation of the Philippines) *Paraserianthes* plantations.

Despite the forest health problems listed, it is still possible to grow trees very rapidly in a number of South-east Asian countries. Some of the problems now apparent in monocultural plantations could be ameliorated by planting mixtures of species, e.g., shoot borer problems (*Hypsipyla* spp.) in mahogany plantations (*Swietenia macrophylla* King) have been reduced by planting the mahogany as an understorey. Mixtures of *P. merkusii* Jungh & de Vriese and *Dipterocarpus obtusifolius* Teysm. in parts of Vietnam show little sign of defoliation by *Dendrolimus punctatus*, in contrast to pure stands of the pines. This may be a very desirable course of action, but the pressure of wood and fuel shortages plus the more favourable economics of fast-growing monocultures is likely to dictate.

The challenge is for foresters, geneticists, entomologists, and pathologists to combine their energies to create and maintain healthy, fast-growing, tropical tree plantations for the future.

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