Some Pests and Diseases of Forest Timber Estate in Indonesia

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Abstract

The demand for wood as raw material for construction, pulp and paper or energy industries which is likely to increase was estimated to reach 150 million m³ per year by the year 2000, even though the production of wood up to now only ranged from 23.9 to 61.6 million m³ year (Saleh *et al*., 1990). To overcome this situation the government of Indonesia through the Department of Forestry has implemented a Five Year Plan (Pelita Ⅳ) to increase the production by the establishment of forest plantations (Forest Timber Estate) which should reach 6.2 million ha until Pelita Ⅶ (Soemarsono, 1989).

The species established in forest timber estates consist of local and exotic species such as *Tectona grandis, Pinus merkusii, Dalbergia latifolia, Acacia mangium, A. auriculiformis, Eucalyptus* spp., *Paraserianthes falcataria, Swietenia macrophylla, Shorea* spp., etc. Since most of the forest timber estate plantations were established by a monoculture system, pests and diseases occur and require prevention and control.

A list of the forest pests and diseases attacking fruits/seeds, leaves, stems and the root system is presented in this report.

Introduction

Tropical forests in Indonesia cover an area of 143.969 million hectares classified as production forests: 64.391 million hectares (45%), protection forests: 30.316 million hectares (21%), conservation forests: 18.725 million hectares (13%) and conservation forests: 30.537 million hectares (21%).

Production forests covering 64.391 million hectares consist of natural forests, unproductive forests and plantation forests (1.8 million hectares). Assuming that the minimal rate of production for industrial species is 6m³ per year, core, 15m³ per year and fast-growing species, 25m³ per year, the need of wood as raw material for the wood industry, pulp and paper as well as for energy in the year 2000 will reach 150 million m³ per year. Meanwhile the production from existing natural forests and plantation forest areas is currently only about 23.9-61.6 million m³ per year (Saleh, 1990). In order to overcome the lack of wood stock, our government through the Ministry of Forestry, since the fourth until the sixth Fifth-Year Development Plans, has established man-made forests referred to as "Industrial Plantation Forests" (HTIs) covering about 6.2 million hectares (Soemarsono, 1989).

According to their industrial purposes various kinds of indigenous species and exotic species have been developed to fulfill the HTIs' needs, including *Tectona grandis, Pinus merkusii, Dalbergia latifolia, Acacia mangium, A. auriculiformis, Eucalyptus* spp., *Paraserianthes falcataria, Swietenia macrophylla, Shorea* spp., etc.

Generally these species have been planted in HTI areas by using a monoculture system. As a consequence various kinds of pests and diseases occur. Therefore it will become necessary to control these pests as early as possible. In this paper we indicate some of the important pests and diseases which attack seeds, seedlings, young plantations and old plantations in the field.

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Tree species selection for HTIs

Indonesia consists of thousands of islands with a remarkable species diversity: 4,000 tree species with 126 species showing an important economical value.

The purpose of the establishment of man-made forests basically is to achieve a stable and long-term supply of raw materials for wood industries (home, equipment and furniture), pulp and paper as well as for energy.

Based on these purposes, tree species selected for HTIs can be grouped into three categories with priority for the establishment of local or indigenous species. Based on the results of the workshop held in Bogor with the theme "Tree species selection for HTIs" (Wiradarma, 1984) some species have been grouped based on their utilization as follows:

1 Wood for wood industries: *Tectona grandis, Swietenia macrophylla, Shorea stenoptera* (yellow meranti), *Paraserianthes falcataria, Pinus merkusii, Eucalyptus deglupta* and *Dalbergia latifolia.*

2 Wood for pulp and paper
Pinus merkusii, Anthocephalus cadamba, Eucalyptus deglupta, Paraserianthes falcataria, Sesbania grandiflora, Leucaena leucocephala and *Gmelina arborea.*

3 Wood for energy
Acacia auriculiformis, Pterocarpus spp., *Calliandra calothyrsus, Glyricidia maculata* and *Leucaena leucocephala.*

It is anticipated that the development of these species will be easy, because most of them are indigenous species and the silvicultural methods used for planting them are well documented.

Other species such as *Shorea leprosulla, S. ovalis, S. bracteolata, S. accuminatissima, Peronema canesens* (for wood industries) and *Aleurites moluccana, Araucaria klinkii* and *Pinus caribaea* (for pulp and paper) will also be developed.

Table Some important forest pests and diseases*

Species	Tree species	Symptoms/damage and status
A. PEST		
LEPIDOPTERA		
Cossidae		
– *Zeuzera coffeae*	*Eucalyptus* spp.	Branches, stem ring borer. Medium pest in Sumatra and kalimantan.
– *Duomitus ceramicus*	*Tectona grandis*	Stem borer. Major pest in java.
Pyralidae:		
– *Dioryctria rubella*	*Pinus merkusii*	Borer stem and shoot. Endemic in North Sumatra (serious).
– *Pyrausta machaeralis*	*Tectona grandis*	Skeletonizes leaves. Major pest in Java.
– *Hypsipyla robusta* Moore	*Swietenia* spp.	Leaf and shoot borer. Major pest in Java and out of Java.
Geometridae:		
– *Millionia basalis*	*Pinus merkusii*	Defoliation, sporadic outbreaks only in Aceh, North and West Sumatra.
Hyblaeidae:		
– *Hyblaea puera*	*Tectona grandis*	Defoliation. Major pest.
Pieridae:		
– *Eurema hecabe*	*Paraserianthes falcataria*	Defoliation in nurseries, young and old plantations.

Continued

Species	Tree species	Symptoms/damage and status
– *E. blanda*		Minor - medium pest in some area in Java.
Psychidae:		
– *Cryptothelea variegata*	*Pinus merkusii*	Defoliation. Minor pest in Aceh and North Sumatra.
– *Acanthopsyche* sp.	*Bruguiera* spp.	Larvae feed on parenchymatous tissues. Major pest in Central Java.
HYMENOPTERA		
Diprionidae:		
– *Nesodiprion biremis*	*Pinus merkusii*	Defoliation. Minor pest in North Sumatra.
COLEOPTERA		
Cerambycidae:		
– *Xystrocera festiva*	*Paraserianthes falcataria*	Stem borer. Major pest in Java.
– *Monohamus rusticator*	*Tectona grandis*	Produces stem canker. Minor pest in Java.
Scarabacidae:		
– *Holotrichia constricta*	Seedlings and saplings of various tree species.	Major pest in Java, especially when the trees are planted on sandy soil rich in volcanic ash and organic matter.
– *Leucopholis rorida*		
– *Lepidiota stigma*		
– *Euchlora viridis*		
Scolytidae:		
– *Xyleborus destruens*	*Tectona grandis*	Stem borer. Major pest in Java.
– *Xylosandrus compactus*	Seedlings of *Acacia auriculiformis* and *Swietenia macrophlla*	Stem borer. Major pest.
Curculionidae:		
– *Nanophyes*	*Dipterocarp* seeds	Seed borer. Major pest on Dipterocarps in Java and out of Java.
ISOPTERA		
Kalotermitidae:		
– *Neotermes tectonae*	*Tectona grandis*	Swelling of teak baranches and stem. Major pest in Central and East Java.
Rhinotermitidae:		
– *Coptotermes*	*Pinus merkusii* and other species	Attacks root collar and lower part of stem.
Termitidae:		
– *Macrotermes gilvus*	Kayupute *Melaleuca leucadendron*	Major pest, attacks root collar and basal stem. Java, Sumatra and Kalimantan.
ORTHOPTERA		
Acrididae:		
– *Valanga nigricornis*	Many species of forest trees in nurseries and young plantations.	Minor-medium pest.
– *V. melanocornis*		
– *V. sumatranensis*		
Gryllidae:		
– *Brachytrypes portensus*	Many species, in nurseries.	Minor pest.

Continued

Species	Tree species	Symptoms/damage and status
MOLUSCA		
— *Achatina fulica*	Seedlings of *Acacia mangium* in nurseries.	Minor pest.
B. DISEASES		
— *Rhizoctonia* sp.	Damping - off disease in many species, especially on *Pinus merkusii* seedlings in nurseries.	Major disease in Java and out of Java.
— *R. solani*		
— *Pythium* sp.		
— *Fusarium* spp.		
— *F. neoceras*		
— *Fusarium* spp.	Seed-rot of many species.	Medium disease. Causes decrease of seed viability.
— *Diplodia theobromae*		
— *Cladosporium* sp.		
— *Penicillium* sp.		
— *Rhizopus.*		
— *Cladosporium*	Needle brown spot on *Pinus merkusii* seedlings.	Minor disease in Sumatra.
— *Helminthosporium* sp.	Leaf spot on *Eucalyptus* spp.	Major disease in Java, Sumatra and Kalimantan.
— *Curvularia* sp.		
— *Pestalotia* sp.		
— *Cylindrocladium* sp.		
— *Uromyces* sp. (rust)	*Acacia auriculiformis* seedlings and young plantations (rust disease).	Major disease, wilting, gall formation on leaves and branches.
— *Aecidium fragiforme*	*Agathis loranthifolia* seedlings (rust disease).	Major disease, gall formation on leaves, branches.
— *Fusarium solani*	Wilt disease on *Dalbergia latifolia*	Minor disease.
— *Pythium* sp.	Root rot, many species.	Minor disease.
— *Fusarium* sp.		
— *Diplodia*		
— Unidentified	Lancer disease on *Eucalyptus.*	Minor disease in Sumatra.
— *Oidium* sp.	Mildew of *Acacia auriculiformis, A. mangium*	Major disease in Java and out of Java.
— *Meliola* sp.	Black mildew of *Acacia mangium, A. auriculiformis.*	Minor disease.
— Ganoderma sp.	Root rot or stem on many soecies.	Minor disease.
— *Fomes* sp.		

* (Supriana and Natawiria, 1987 ; Asmaliah, Suharti and Hardi, 1992).

Research problems

Forest protection research and practice in Indonesia are lagging in comparison with the agricultural sector. Most of the activities have been confined to the inventory of insect pests and diseases damaging commercial and exportable tree species. Field work is still restricted to biological observations recording insect pests or diseases and quantitative assessments of the impact of insect or disease infection. Therefore information on the methods and techniques of forest protection is still lacking. There has been a misconception among forest managers and forest policy makers that forest pests and diseases are matters of scientific research only. It is also considered that every entomological and pathological problem can be solved by the application of silvicultural techniques. For this reason, susceptible trees are substituted for resistant species in the forestry sector. It is also considered that timber loss due to insect pests and diseases is not as significant as that due to forest fires or illegal felling and accordingly insect pest and disease problems are of minor importance.

Based on previous experience, the outbreak of a certain insect pest or disease can not be immediately controlled due to the lack of knowledge or information about pests or pathogens. Very often the problem is solved by replacing the tree species with a new one. This strategy will subsequently make it difficult to develop a comprehensive research program on pests and diseases. A research program on pests and diseases can only be developed if the tree species to be planted have been selected. Against this background, future studies on forest pests and diseases should focus on forest timber estates (Supriana and Natawiria, 1987).

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