

144079
4 10 81.97.

WOOD DESTROYING INSECTS AND THEIR ATTACK ON EIGHT
COMMERCIAL TIMBER SPECIES IN SRI LANKA

TABLES

LIST OF

LIST OF

LIST OF

LIST OF

BY

NILETHTHI SHILPA DE SILVA

ACKNOWLEDGEMENTS

DEDICATION

ABBREVIATIONS

ABSTRACT

CHAPTERS

1.1

1.2

CHAPTER

1.1

This thesis submitted in partial fulfilment of the requirements for the Degree of Master of Science (Forestry) of the Faculty of Applied Science, University of Sri Jayawardenepura, Nugegoda, Sri Lanka.

15 th May 1996.

144079

WOOD DESTROYING INSECTS AND THEIR ATTACK ON EIGHT
COMMERCIAL TIMBER SPECIES IN SRI LANKA

BY

NILETHTHI SHILPA DE SILVA

ABSTRACT

Wood destroying insects and their attack on eight commercial timber species were studied through a survey in different climatic zones in Sri Lanka, field experiments and laboratory experiments. Eight commercial timber species used for this study are Jak (*Artocarpus heterophyllus*), Eucalypts (*Eucalyptus grandis*), Rubber (*Hevea brasiliensis*), Tualang (*Koompassia excelsa*), Lunumidilla (*Melia dubia*), Pine (*Pinus caribaea*), Mahogany (*Swietenia macrophylla*) and Teak (*Tectona grandis*).

Common wood destroying insects were collected and identified as Longhorn beetle (*Batocera rubus*), Powder - post beetle (*Heterostrychus brunneus*), Subterranean termite (*Odontotermes redemanni*), Carpenter ant (*Camponotus abdominalis*), carpenter bee (*Xylocopa latipes*), Pinhole borer and weevil. Subterranean termite, Powder - post beetle and Longhorn beetle were found as the most important insects according to their damage.

Subterranean termite attack was studied in the field under natural condition using grave yard trials. Attacks of termite, powder - post beetle and longhorn

beetle were studied in laboratory experiments. These laboratory experiments were carried out according to the techniques developed by earlier authors, and using new techniques developed by the author.

Ants and *Cunningimella* fungus were observed as a biological control for termites in the field as well as in the laboratory experiment.

Results show that loss of weight due to insect attack was significant different between different timber species. Mortality of insects also significantly differ in different timber species. Based on these findings timber species were categorised into three groups: insect resistant species, moderately resistant species and susceptible species. Eucalyptus, teak and tualang were the most resistant species while freshly felled jak was highly susceptible to larvae of *Batocera* (Longhorn beetle). Mahogany was susceptible to powder - post beetle. Rubber was the most susceptible species, and it is recommended to use preservative treatment for the effective utilization of these species.

Wood parameters, density and moisture content of wood were determined under air dried condition. Moisture content of wood was positively correlated to the termite attack and the density was negatively correlated to the termite attack.

	Page
2.1.2 LONGHORN BEETLE (<i>Batocera rubus</i>)	14
2.1.2.1 THE ATTACK OF LONGHORN BEETLE	14
2.1.2.2 MORPHOLOGY	14
2.1.2.3 LIFE CYCLE	15
2.1.2.4 CONTROL METHOD FOR LONGHORN BEETLE	16
2.1.3 POWDER - POST BEETLE	17
(<i>Heterobostrychus brunneus</i>)	
2.1.3.1 THE ATTACK OF POWDER - POST BEETLE	17
2.1.3.2 MORPHOLOGY	17
2.1.3.3 LIFE CYCLE	18
2.1.3.4 CONTROL METHODS FOR POWDER - POST BEETLE	18
 CHAPTER - 3 MATERIALS AND METHODS	 19
3.1 SURVEY OF INSECTS IN DIFFERENT	
CLIMATIC ZONES IN SRI LANKA	20
3.2 INVESTIGATION OF WOOD PROPERTIES WHICH	
AFFECTS DUE TO INSECT ATTACK	21
3.2.1 DETERMINATION OF MOISTURE	
CONTENT OF WOOD	22
3.2.2 DETERMINATION OF BASIC DENSITY	
OF WOOD	22
3.3 STUDY OF THE ATTACK OF THE MOST HARMFUL	
INSECTS ON DIFFERENT TIMBER SPECIES	23
3.3.1 STUDY OF ATTACK OF SUBTERRANEAN	
TERMITES - FIELD EXPERIMENT	23
3.3.2 STUDY OF THE ATTACK OF SUBTERRANEAN	
TERMITES - LABORATORY EXPERIMENT	25

	Page	
3.3.3	STUDY OF ATTACK OF POWDER - POST BEETLE - LABORATORY EXPERIMENT	25
3.3.4	STUDY OF ATTACK OF LONGHORN BEETLES - LABORATORY EXPERIMENT	26
3.4	DATA ANALYSIS	27
CHAPTER - 4 RESULTS		37
4.1	SURVEY OF INSECTS	38
4.2	SUBTERRANEAN TERMITES ATTACK	38
4.2.1	RESULTS OF THE GRAVE YARD EXPERIMENT - FIELD TEST	38
4.2.2	RESULTS OF THE LABORATORY TEST	39
4.3	POWDER - POST BEETLE	39
4.4	LONGHORN BEETLE	40
4.5	PHYSICAL PARAMETERS OF WOOD	40
4.5.1	DENSITY	40
4.5.2	MOISTURE CONTENT	40
4.5.3	EFFECT OF PHYSICAL PARAMETERS ON THE INSECT ATTACK	41
CHAPTER - 5 DISCUSSION		62
5.1	SURVEY OF INSECTS IN DIFFERENT CLIMATIC ZONE	63
5.2	PROBLEMS IN STUDY OF INSECTS	64
5.3	WOOD PROPERTIES	65

	Page
5.4 STUDY OF ATTACK OF INSECTS	66
5.4.1 SUBTERRANEAN TERMITES ON WOOD	66
5.4.2 ATTACK OF POWDER - POST BEETLE	66
5.4.3 ATTACK OF LONGHORN BEETLE	66
<i>(Batocera rubus)</i>	
5.4.4 OVERALL DURABILITY AGAINST DIFFERENT INSECTS	67
CHAPTER - 6 CONCLUSION AND RECOMMENDATION	70
REFERENCES	73

APPENDIXES

1 APPENDIX A - 1 TO A - 5 THE SURVEY OF INSECTS IN DIFFERENT CLIMATIC ZONES IN SRI LANKA.	79
2 APPENDIX B - 1 TO B - 10 ANALYSIS OF VARIANCE	94

LIST OF TABLES

Table	page
01. EIGHT COMMERCIAL TIMBER SPECIES	21
02. WOOD DESTROYING PESTS OBSERVED IN DIFFERENT WOOD SPECIES	42
03 PERCENT OF PEST ATTACK IN DIFFERENT CLIMATIC ZONES (SURVEY RESULTS)	43