

STUDIES ON THE INFESTATION OF SCOLYTID BEETLES IN BLUE PINE FOREST OF MURREE HILLS, PAKISTAN

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ABSTRACT

Survey was conducted in three subdivisions of Murree Forest Division to find out the causes and extent of damage of blue pine forest. The result revealed that the top dried shoots and twigs of trees were infested by two bark beetles, *Ips longifolia* and *Scolytus major* belonging to the family Scolytidae, order Coleoptera. Feeding on the cambium of the tender branches, the pest infested blue pine in a range of 5-8% in Municiple Forest Division, 2-5% in Lower Topa and 3-7% in Sehrbagla Sub Divisions. Long droughts and warm winter followed by early spring helped these beetles to build up their population, particularly on exposed aspect and attacked even the green healthy trees.

INTRODUCTION

The blue pine (*Pinus wallichiana*) is a tall tree with glaucous foliage. This species grows gregariously in the Himalayas between an altitude of 1800 to 3500 meters and can be found in both pure and mixed forms in the forests of the Murree hills. The wood of blue pine is useful for building construction and furniture making. Trees of this species also aid in soil formation, check the soil erosion and reduce flooding.

Unfortunately such a valuable tree is attacked by a number of insect pests including some species of Coleoptera, Homoptera and Lepidoptera. However, among these pests bark beetles are the most devastating to blue pine trees. Bark beetles (Coleoptera: Scolytidae), also known as Scolytid beetles are the most economically important pests of the world forests. Bark and ambrosia beetles contain at least 6000 species from 181 genera worldwide (Byers, 1995). In the United States there are 477 species, and in North and Central America a total of 1430 species occur from 97 genera. During 2000-2001, severe southern pine beetles (Scolytidae) outbreak have occurred throughout much of central America killing over 60,000 hectares of mature and developing pine stands in Belize, Nicaragua and Honduras alone (Billings and Schmidtke, 2002). In Europe, the spruce bark beetle *Ips typographus* is the most destructive pest of Norway spruce. Out break of this insect are well documented in central and northern Europe (Engesser et al., 2002; SchrÖter, 2002). During the year 2000 Scolytid beetles severely damaged huge number of blue pine trees in the forests of Gallies and Murree in Pakistan and adjoining areas of the Azad State of Jammu and Kashmir (Gul and Khan, 2001).

Losses caused by these bark beetles are not confined to feeding activities alone but also intensified by disseminating disease pathogens. Bark beetles are frequently associated with specific fungi that are carried in specialized structures on their body. Both the fungi and the bark beetles have acquired mutualistic relationship (Paine et al., 1997). The majority of bark beetle species infest weakened and severely stressed, wind blown or wind- broken trees and caused limb or even tree death if present in high enough numbers (Lindeman 1978).

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MATERIALS AND METHODS

a. Field Survey

In order to find out the extent of infestation on blue pine trees, the following Sub-Forest Divisions of Murree Hills were visited.

Locality	Compartment No.
<u>Municipal Forest Division</u>	
Kashmir Point	1, 2, 3, 4, 5, 6, 7, 13, 14, 18, 19, 20, 21
Pindi Point	8, 9, 11, 12, 23, 24, 25, 27, 28
Sunni Bank	16/1 PF, 16/2 PF, 11/ PF, 12/PF, 9/ PF, 10/ PF
<u>Lower Topa Sub Division</u>	
Patriata East	21, 22, 23, 24, 35, 36, 26, 27, 28, 29
Patriata West	31, 32, 33, 34, 37, 38
Chah rehan	41, 42
<u>Sehrbagla Sub Division</u>	
Bhurban block	7-RF, 8-RF, 9-RF, 10- PF
Sehrbagla block	15-4 PF, 15-5 PF

In each compartment 50 trees were observed in 5 spots by taking 10 trees in each spot. Visual observations were recorded on the trees for beetles infestation on the basis of presence of top dried shoot and dry infested branches. Numbers of dry branches were counted on the infested trees to record the intensity of damage.

b. Identification of beetles

The infested branches were collected, cut into billets and caged in the laboratory at Pakistan Forest Institute (PFI) Peshawar for emergence of beetles. Two types of beetles emerged which were identified in the PFI Insect Museum as *Ips longifolia* and *Scolytus major*.

RESULTS AND DISCUSSION

Grubs of the small tiny beetles of *Ips longifolia* and *Scolytus major*, Family Scolytidae, Order Coleoptera, were found responsible for infestation of the branches of blue pine in the study area. Following is the extent of infestation of the pests.

Mild and sporadic infestation of trees occurred in three Sub-Divisions of Murree Forest Division, which ranged from 5 to 8% in Municipal Forest Division, 2 to 5% in Lower Topa Sub Division and 3 to 7% in Sehrbagla sub division. The intensity of infestation is more pronounced in Municipal Forest Division as compared to Lower Topa and Sehrbagla Sub Divisions. However in some compartments of Sehrbagla sub division the extent of infestation reached to 7%.

Table 1. Intensity of infestation caused by Scolytid beetles

Locality	No. of trees observed	No. of trees infested	% infestation
<u>Municipal Forest Division</u>			
Kashmir Point	650	52	8 %
Pindi Point	450	23	5 %
Sunni Bank	300	24	8 %
<u>Lower Topa Sub Division</u>			
Patriata East	500	25	5 %
Patriata West	300	30	5 %
Chah Rehan	100	2	2 %
<u>Sehrbagla Sub Division</u>			
Bhurban block	200	14	7 %
Sehrbagla block	100	3	3 %

Causes of damage

Long droughts and warm winter followed by early spring helped these beetles to build up their population and attack even the green healthy trees. Moreover trees growing on exposed aspects, poor soils and forming open stand became suitable host and fell easy prey to the dynamically growing population of bark beetles. However it was observed that the advance growth and young poles showed maximum resistance against the attack of these beetles. In favourable weather conditions these beetles flourished well in under stressed trees.

Nature of Damage

Both *Ips longifolia* and *Scolytus major* are typical bark beetles and their grubs feed on the cambium (bark) of the tender branches. These beetles usually confine their attack to weaker trees and those damaged by snow or other injuries of which the vitality of the host has been reduced and flow of sap has been decreased. The newly felled and wind fallen trees are readily attacked by the beetles.

REFERENCES

- Billings, R. F. and P. Schmidtke, 2002. Central American southern pine beetle/fire assessment. Unpublished report prepared for U.S. Agency for International Development and the USDA Foreign Agricultural Service, Washington, D.C. 45 p.
- Byers, J. A., 1995a. Host tree chemistry affecting colonization in bark beetles, in R.T. Cardé and W.J. Bell (eds.). Chemical Ecology of Insects. Chapman and Hall, New York, pp. 154-213.

Engesser, R., Forester, B., Meier, F., Odermatt, O., 2002. Waldschutzsituation 2001 in der Schweiz. Allg. Forst Z./Wald 57, 365-366.

Gul. H. and M. H. Khan, 2001. A note on the die-back of blue pine (*Pinus wallichiana*) due to beetle attack. Pak. Jour.Forest. 51(1):57-64.

Linderman, G. V., 1978. Means of adaptation of bark beetles (*Scolytus kirschi*, *Scolytus japonicus*, *Scolytus rugulosus*, *Scolytus moravtzi*) to a habitat on slightly weakened trees. The Soviet Journal of Ecology.9 (6): 538-543.

Paine, T. D., K. F. Raffa, T. C. Harrington, 1997. Interaction among scolytid bark beetles, their associated fungi, and live host conifers. Annu. Rev.Entomol. 42: 179-206.

Schröter, H., 2002. Waldschutzsituation 2000/2001 in Baden-Wurttemberg. Allg. Forst Z./Wald 57, 330-332.