

INSECT PESTS OF JUNIPER, THEIR PARASITES AND PREDATORS

M. Ismail Chaudhry* and Wali-ur-Rehman*

Abstract. *Juniper* forests of Baluchistan were surveyed and insect pests attacking *Juniperus excelsa* were studied in three localities. *Semanotus semenovi* Okun., *Anthaxia* sp., *Phloeosinus jubatus* and *Phloeosinus* sp. were recorded feeding on bark and sapwood of dead and dying trees to various extent. Infestation of these borers was mostly restricted to *Susnamana* where the trees were weakened and killed by the attack of dwarf mistletoe (*Arceuthobium oxycedri* M. Bieb.), a plant parasite. Healthy trees in *Sasnamana*, *Ziarat* and *Chautair* were found free from the attack of these borers. *Trichodes* sp. and *Teretrius* sp. were recorded as predators and *Heterospilus* sp. and *Agathis* sp. as parasites on these borers mostly in *Sasnamana* area. Fruit berries were heavily infested by fruit moth larvae in all the localities.

Introduction. *Juniperus excelsa* naturally growing at Ziarat and its suburbs forms a big chunk of pure juniper forest in Baluchistan. Most of the juniper stands comprise of over mature trees and are subject to the attack of insects. Natural regeneration of the species is not taking place. In order to record insect pests injurious to juniper and their natural enemies present in the area, a survey was conducted in Ziarat, *Sasnamana* and *Chautair* during October/November, 1976.

Review of literature. Chaudhry et al (1966) recorded *Semanotus semenovi* Okun. and *Anthaxia* sp. on *Juniperus excelsa* in Ziarat and Chautair. Acatay (1963) found *Leptura ciliciensis* (Cerambycidae), a secondary pest of *Juniperus excelsa* in Turkey. Covassi (1969) recorded for the first time *Semanotus ruscicus* (F.) on *Juniperus communis*, *J. phoenicis* and *J. oxycedrus macrocarpa* in Italy and *S. laurasi* (Lucas.) on *J. oxycedrus* in Sardinia (Ohio). He also studied biology of these borers. Berisford (1970 and 1975) reported *Oeme rigida* and *Atima* (*Atimia*) *confusa* (Cerambycidae) and a bark beetle, *Phloeosinus dentatus* (Say) attacking *Juniperus virginiana* felled during 1971 and 1972 in Georgia. Nine species of hymenopterous parasites and three clerid beetle predators have also been described. He also studied biology of *Heterospilus* sp. parasitizing *Ips* spp. on pine in Virginia. Hrubik (1974) described the occurrence and injurious activities of animals and insect pests important for exotic species of trees introduced in forests, parks and other areas in Czechoslovakia and found *Phloeosinus bicolor* (Brulle) attacking *Thuja* and junipers. Doom (1964) observed *Phloeosinus thujae* attacking species of *Juniperus*, *Thuja* and *Sequoia* in Netherland. Maisner (1962) reported *Phloeosinus thujae* Perris, *Anthaxia helvetica* Stierl., and *Phymatodes glabratus* Charp. on *Juniperus communis* L. in

*The authors are Forest Entomologist and Technical Assistant, respectively, at the Pakistan Forest Institute, Peshawar.

Austria, boring bast and sapwood. Beason (1941) reported *Phloeosinus jubatus* on *Cupressus torulosa* in India. Yakimenko (1967) tested various poisonous preparations against juniper fruit moth and fruit fly in which 8% aerosol of DDT and Chlorophos gave highest mortality.

Beason (1941) reported *Teretrius indus* and *T. mogul* predaceous in the tunnels of bostrychid borers of bamboo and *T. picipes* predaceous on *Lyctus brunneus* and *L. fuscus* while Chaudhry et al (1966) recorded *Teretrius* sp. nr. *mogul* on *Acacia modesta* in Campbellpur.

Method and material. Infested branches and twigs of juniper were collected from the forest. Adult borers were taken out by splitting and debarking of the infested material and immature stages were caged alongwith infested branches in the laboratory at Peshawar for emergence of borers, their parasites and predators. To assess the damage caused by borers 300 trees were observed at random in each locality examining every tree thoroughly and identifying the damage by types of emergence holes and gallery patterns. For assessing insect damage to juniper fruit 5,000 berries were collected by randomizing trees at 10 different points in each locality. Laboratory examination was carried out to determine the extent of damage to pulp and seeds.

Results and discussion. Larvae of *Semanotus semenovi* Okun. grooved the sapwood under the bark by irregular galleries packed with fine wood dust. At or near the end of the galleries pupal chambers, 25 to 40 mm long, oblique apically and parallel to the wood axis distally, were bored in the sapwood.

Anthaxia sp. made flat irregular galleries in the sapwood just beneath the bark tightly packed with fine wood dust. Pupal chambers, 15 to 20 mm long, were excavated in the sapwood at the end of the galleries.

Females of *Phloeosinus jubatus* and *Phloeosinus* sp. engraved straight monogamous mother galleries between the sapwood and inner bark parallel to the wood axis. Mother galleries measuring 15 to 46 mm in length, had 6-90 egg niches on both sides at equal intervals. The larval galleries bitten out from the egg niches were scored on the sapwood-surface and inner bark-surface packed with fine wood dust. Each larval gallery ended at pupal cell pitted 2 to 5 mm deep in the sapwood. Microlepidopterous fruit moth larvae bored the healthy fruit berries, fed on the pulp and damaged the seeds. 19-32% seeds were destroyed completely by penetrating into them.

Insect pests and their damage in various localities have been summarised below:

Insect pests	Stage of trees attacked	Percent tree infestation in		
		Sasnamana	Ziarat	Chautair
<i>Semanotus semenovi</i>	Dead	10-20	Nil	Nil
(Cerambycidae)	Dying	1-5	Nil	Nil
<i>Anthaxia</i> sp.	Dead	80-95	Nil	Nil
(Buprestidae)	Dying	20-50	1-5	1-4
<i>Phloeosinus jubatus</i> and	Dead	1-5	Nil	Nil
<i>Phloeosinus</i> sp.	Dying	1-2	Nil	Nil
(Scolytidae)				
Berry and seed borers.	Healthy fruit berries.	90-98	75-94	30-80

Attack of wood borers was found on the stem and main branches of standing dead and dying trees, mostly in Sasnamana where half of the growing stock has been killed by the attack of dwarf mistletoe. (*Arceuthobium oxycedri* M. Bieb.), a plant parasite.

Anthaxia sp. caused higher damage and extended to Ziarat and Chautair while *Semanotus semenovi* was next in injuriousness but confined to Sasnamana only. Injury by *Phloeosinus* species to standing trees was very little but dead fallen and freshly cut branches were heavily infested in all the three localities. None of the borers was found attacking living healthy trees in any locality except the microlepidopterous fruit moth larvae which were heavily infesting fruit berries on the trees all over the study area.

Besides these pests an adult each of family Curculionidae, Cucujidae and Carabidae was also recorded on juniper needles. Parasites and predators recorded on insect pests of juniper are as follows:—

Predator/Parasite	Insect host	Locality	Remarks
<i>Trichodes</i> sp. (Cleridae)	<i>Semanotus semenovi</i>	Sasnamana	Predator
<i>Teretrius</i> sp. (Histeridae)	<i>Phloeosinus</i> sp.	Sasnamana	Predator
<i>Agathis</i> sp. (Brachonidae)	<i>Phloeosinus</i> sp.	Sasnamana	Parasite on grubs.
<i>Heterospilus</i> sp. (Brachonidae)	<i>Anthaxia</i> sp.	Sasnamana, Ziarat and Chautair.	Parasite on grubs.

Beeson (1941) reported Cleridae among the principal predators of small bark boring Coleoptera both in larval and adult stages and three species of *Teretrius* predaceous on bostrychid borers. Adults of *Trichodes* sp., recorded by Chaudhry et al (1966) on the leaves of wild almond (*Canarium commune*) in Ziarat were found alive in fresh galleries of *Semanotus semenovi* while two of its larvae were observed in old galleries of the same borer on pupae of two nesting bees, *Megachile vera* and *Ceratina* sp.. Adults of *Teretrius* sp. were collected dead from the old galleries of *Phloeosinus* spp., *Agathis* sp. parasitized larvae of *Phloeosinus* spp. while *Heterospilus* sp. parasitized *Anthaxia* sp.. Adults of these parasites emerged in the laboratory from the infested wood. Besides the parasites and predators, *Xylocopa auripennis* bored circular tunnels turning downwards, 30 cm long and 2 cm wide, in the trunk of dying trees. In one of the empty tunnels two adults of *Vespula germanica* (Vespidae) were seen, which Thomas (1960) reported as beneficial by feeding on many harmful insects also recorded damaging fruits and beehives in New Zealand.

References

- ACATAY, A. 1963. The incidence of some forest pests in Turkey. Z. angew. Ent. 51(2) (115-21)
- BEESON, C.F.C. 1941. The Ecology and control of the forest insects of India and the neighbouring countries. pp. 115, 233, 305 and 377.

- BERISFORD, C.W. 1975. Patterns of attack by the eastern Juniper bark beetle. *Phloeosinus dentatus* and some common associates. Journal of the Georgia Entomological Society 10(1) 37-42. Department of Entomology, Georgia University, Athens, GA. 30602, U.S.A.
- BERISFORD, C.W., H.M. KULMAN and R.L. PIENKOWSKI. 1970. Notes on the biologies of Hymenopterous parasites of *Ips* spp. bark beetles in Virginia. Canad. Ent. 102(4), 484-490.
- CHAUDHRY, G.U., M.I. CHAUDHRY and S.M. KHAN. 1966. Survey of insect fauna of forests of Pakistan (Final Technical Report). pp. 6, 14, 23 and 61.
- COVASSI, M. 1969. New findings of *Semanotus ruscicus* in Italy and a first report on *S. laurasi* in Sardinia. Radia Firenze 51 (383-422).
- DOOM, D. 1964. *Phloeosinus thujae* Perris (Col. Scolytidae) and *Dendromyza* sp. (Dip. Agromyzidae) two of the lesser known forest insect pests of the Netherlands. Ned. Bosb. Tijdschr. 36(12), (354-357).
- HRUBIK, P. 1974. A summary of present knowledge of the occurrence and injurious activity of animals and exotic tree species. Suhrn doterajších poznatků o výskytu a škodlivěcinnosti živočichů na cizokrajných dřevinách Lesnictví, 20 (1) 939-950, Arboretum Mlynany, Ústav Dendrobiologie SAV, Czechoslovakia.
- MAISNER, N. 1962. Investigations on *Phloeosinus thujae*, *Phymatodes glabratus* and *Anthaxia helvetica* on *Juniperus communis* L. Anz. Schadlingsk—35 Pt. 4 pp. 55-58.
- THOMAS, C.R. 1960. The European wasp (*Vespula germanica* Fab.) in New Zealand. Inform. Ser. Dep. Sci. Industr. Res. N.Z. No. 27, pp. 74, Wellington, N.Z.
- YAKIMENKO, N.A. 1967 Chemicals for controlling pests of seeds of *Juniperus* spp. Lesn. Hoz. (4).