

# STUDIES ON SEED INSECT PESTS OF FOREST TREES

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## ABSTRACT

Studies on seed insect pests, conducted in the laboratory at the Pakistan Forest Institute, Peshawar revealed that seeds of 30 out of 70 tree species were infested with 24 insect species. Among them 86% Coleopterous and 5.6% Lepidopterous adults represented 23 species of seed pests while 8.4% adults belonged to a Hymenopterous parasite. 13 of the 24 insect species, identified by the I.I.E. London, belonged to Coleoptera (9 species), Lepidoptera (3 species) and Hymenoptera (1 species).

*Caryedon serratus* among Coleoptera and *Hypsipyla robusta* and *Didia* sp. among Lepidoptera were found the most serious pests infesting seeds of *Acacia tortilis* (80%), *Cedrela toona* (97.5%) and *Bauhinia variegata* (73.5%) respectively.

The unidentified pests caused heavy infestation of seeds of *Acacia catechu* (98.4%), *Aleurites fordii* (88.8%) and *Pongamia glabra* (62.3%) whereas seeds of 40 tree species were found free from insect damage.

A Hymenopterous parasite, *Phanerotoma* sp. caused 16% parasitism in each of Coleopterous and Lepidopterous pests.

## INTRODUCTION

Establishment of nurseries and new plantations depends on various factors, including

availability of healthy and viable seeds. Seed pests are one of the most important biotic factors adversely affecting seed production thereby limiting large scale nursery raising and new planting programmes. Majority of the seed pests destroy immature seeds in cones, pods and fruits on standing crops while others destroy seeds in the seed stores. Beeson (1941) reported many members of family *Pyralidae*, *Gelechidae*, *Bruchidae*, *Scolytidae*, *Curculionidae* and *Agromyzidae* as serious seed pests of forest trees in South Asia.

Chaudhry (1960) recorded *Dioryctria abietella* causing a loss of 30-50% chalthoza seeds in chalthoza (*Pinus gerardiana*) forest of Balochistan. Similarly, Rahman and Chaudhry (1986) found *D. abietella* infesting seeds of silver fir (*Abies pindrow*) in Galis. Chaudhry and Rahman (1979) also recorded a microlepidopterous pest damaging 75-98% berries and 19-32% seeds of juniper forest in Ziarat Valley of Balochistan.

Studies on seed pests of forest trees were carried out at the Pakistan Forest Institute, Peshawar to record insect pests and their natural enemies and find extent of their infestation.

## METHODS AND MATERIALS

The mature seeds of different tree species were collected from the field mostly from the Botanical Garden of the Pakistan Forest Institute.



Peshawar to record fresh and infestation. For study of stored seeds samples were taken from the seed store of the Institute. Seeds of 70 tree species were examined in the laboratory for pest incidence. Insect species found in the infested seeds were reared in glass chimneys in the laboratory for emergence of the adult pests and their natural enemies. Damage was then associated with the reared specimens. The insect species were identified from the International Institute of Entomology, London, U.K.

## RESULTS AND DISCUSSION

A total of 1220 insect adults belonging to 24 insect species emerged from the infested seeds. Out of these 1049 adults of 16 species belonged to Coleoptera, 68 adults of 7 species represented Lepidoptera and 103 adults of a parasitic species belonged to Hymenoptera. The data are presented in following tables.

Table 1. Order-wise emergence of seed pests and Parasites

Order	No. of adult	% adult	No. of species	% species
Coleoptera	1049	86.0	16	67
Lepidopter	68	5.6	7	29
Hymenoptera	103	8.4	1	4
Total	1220	100.0	24	100

The Coleopterous pests were found to be dominant covering 86% adults of 67% species while 5.6% adults of 29% species were Lepidopterous pests and 8.4% adults of 4% species of Hymenopterous parasites.

The 9 species of Coleoptera, 3 of Lepidoptera and 1 of Hymenoptera are listed below:

Table 2. Determination of seed pests and thier parasites

### Order and Family

#### Coleoptera

*Archaeocrypticidae*

*Bruchidae*

*Languriidae*

*Tenebrionidae*

### Species

*Sivacrypticus indicus*

*Bruchidius andrewesi* *Bruchidius*  
*sp.*, *Bruchus bilineatopygus*  
*Caryedon serratus*

*Cryptophilus integer* *Cryptophilus*  
*sp.*

*Tribolium castaneum* *Indenicmosoma*  
*sp.*



Lepidoptera  
Pyralidae

Apomyelois ceratoniae, Didia sp.  
Hypsipyla robusta

Hymenoptera  
Braconidae

Phanerotoma sp.

Among the unidentified species 7 belong to order Coleoptera and 4 to order Lepidoptera.

Out of 70 tree species the seeds of 30 species were infested to various degrees. Seed infestation of the pests is tabulated as under:

**Table 3. Pests and their extent of seed infestation**

Insect Pest	% Infestation	Host
<b>Lepidoptera</b>		
<i>Hypsipyla robusta</i>	97.5	<i>Cedrela toona</i>
<i>Didia</i> sp.	73.5	<i>Bauhinia Variegata</i>
<i>Apomyelois ceratoniae</i>	1.0	<i>Ceratonia siliqua</i>
<b>Coleoptera</b>		
<i>Caryedon serratus</i>	80.0	<i>Acacia tortilis</i>
<i>Cryptophilus integer</i>		
<i>Cryptophilus</i> sp.	29.5	<i>Acacia tortilis</i>
<i>Sivacrypticus indicus</i>		
<i>Indenicmosoma</i> sp.		
<i>Bruchus bilineatopygus</i>	26.5	<i>Albizzia lebbek</i>
<i>Tribolium castaneum</i>	16.8	<i>Gleditsia triacanthos</i>
<i>Bruchidius andrewesi</i>	6.7	<i>Acacia farnesiana</i>
<i>Caryedon serratus</i>		
<i>Caryedon serratus</i>	2.7	<i>Acacia modesta</i>

The above data shows that *Hypsipyla robusta* and *Didia* sp. among Lepidoptera and *Caryedon serratus* among Coleoptera caused heavy infestation of seeds of individual trees. *Hypsipyla robusta* caused damaged 97.5% seeds of *Cedrela toona* while *Didia* sp. damaged 73.5% seeds of *Bauhinia variegata* in the Botanical Garden at the Pakistan Forest Institute, Peshawar. Infestation of Coleopterous pests occurred in the stored seeds.

*Caryedon serratus* damaged upto 80% seeds of *Acacia tortilis* while *Cryptophilus integer*, *Cryptophilus* sp., *Sivacrypticus indicus* and *Indenicmosoma* sp. collectively infested 29.5% seeds of *Acacia catechu*. *Bruchus bilineatopygus* damaged 26.5% seeds of *Albizzia lebbek* while *Tribolium castaneum* infested 16.8% seeds of *Gleditsia triacanthos*. Other pests caused minor infestation of the seeds.



Seed infestation of the unidentified pests was categorized as field and stored seed infestation.

**Table 4. Extent of seed infestation in the field**

<u>Tree species</u>	<u>Seed Infestation</u>		
	<u>Examined</u>	<u>Infested</u>	<u>%</u>
<i>Acacia catechu</i>	127	125	98.4
<i>Acacia elata</i>	1282	466	36.3
<i>Dalbergia sissoo</i>	171	37	21.6
<i>Hiptage madablota</i>	456	74	16.2
<i>Terminalia arjuna</i>	124	18	14.5
<i>Gleditsia triacanthos</i>	742	63	8.5
<i>Pyrus pashia</i>	142	10	7.0
<i>Flacourtia indica</i>	1475	15	1.00

Heavy infestation of 98.4% occurred in the seeds of *Acacia catechu* while seeds of *Acacia elata* received 36.3% infestation. Seed infestation in *Dalbergia sissoo*, *Hiptage madablota* and

*Terminalia arjuna* was 21.6, 16.2 and 14.5%, respectively. Seed infestation in other tree species was low.

Seed infestation caused by insect pests in the Pakistan Forest Institute, Peshawar seed store is as follows:

**Table 5. Extent of seed infestation in the seed store**

<u>Tree species</u>	<u>Seed Infestation</u>		
	<u>Examined</u>	<u>Infested</u>	<u>%</u>
<i>Aleurites fordii</i>	18	16	88.8
<i>Pongamia glabra</i>	361	225	62.3
<i>Zizyphus jujuba</i>	229	43	18.8
<i>Cedrus deodara</i>	1247	147	11.8
<i>Phoenix dactylifera</i>	248	27	11.0
<i>Tecomella undulata</i>	362	38	10.5
<i>Prosopis cineraria</i>	722	63	8.7
<i>Abies pindrow</i>	3246	208	6.3
<i>Tamarix aphylla</i>	200	11	5.5
<i>Prosopis juliflora</i>	480	14	3.0
<i>Parkinsonia aculeata</i>	1187	32	2.7
<i>Acacia jacquemontii</i>	820	15	1.8
<i>Sesbania aculeata</i>	640	9	1.4
<i>Tecoma stans</i>	500	6	1.2
<i>Pinus wallichiana</i>	546	5	1.0



In the stored seeds serious infestation was caused to seeds of *Aleurites fordii* (88.8%) and seeds of *Pongamia glabra* (62.3%). Seed infestation of other tree species was less than 20%.

#### Fresh seeds

*Acer oblongum*,  
*Ailanthus altissima*,  
*Broussonetia papyrifera*,  
*Callistemon viminalis*,  
*Cassia didymobotrya*,  
*Cassia fistula*,  
*Dodonea viscosa*,  
*Cupressus sempervirens*,  
*Eucalyptus camaldulensis*,  
*Jacaranda mimosaeifolia*,

#### Stored seeds

*Acacia victoria*,  
*Amorpha fruticosa*,  
*Anogeissus pendula*,  
*Casuarina glauca*,  
*Azadirachta indica*,  
*Bombax ceiba*,  
*Callistemon lanceolatus*,  
*Casuarina suberosa*,  
*Heterophragma adensifolia*,  
*Juglans regia*,

Seeds of the following tree species were found free from insect infestation:

*Koelreuteria paniculata*,  
*Lagerstroemia indica*,  
*Leucaena leucocephala*,  
*Melia azedarach*,  
*Nyctanthes arborescens*,  
*Oroxylum indicum*,  
*Paulownia sp.*,  
*Pistacia integerrima*,  
*Sapindus mucorossi*,  
*Sophora secundiflora*

*Leucaena glauca*,  
*Moringa oleifera*,  
*Olea cuspidata*,  
*Pterospermum acerifolium*,  
*Robinia pseudoacacia*,  
*Sapium sebiferum*,  
*Schinus molle*,  
*Sophora griffithii*,  
*Sterculia diversifolia*,  
*Taxodium distichum*

## CONCLUSION

It may be concluded from these studies that 23 insect species are infesting seeds of 30 tree species to various degree in the field as well as in the store. *Caryedon serratus* is a serious pest of *Acacia tortilis* in the stored seeds while *Hypspyla robusta* and *Didia* sp. are the most destructive pests of seeds of *Cedrela toona* and *Bauhinia variegata*, respectively, in the field. Moreover seeds of *Acacia catechu*, *Aleurites fordii* and *Pongamia glabra* are also heavily damaged by the unidentified seed pests.

## REFERENCES

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