INSECT INFESTATION AT THE NURSERY LEVEL OF *TERMINALIA ARJUNA* (ROXB. *EX* DC.) IN PUNJAB

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Introduction

Terminalia arjuna (Roxb. *ex* DC.) is one of the most exploited plants. It finds wide usage in pharmaceutical, tasar, tanning and timber industry. It is a very common multi-purpose plant grown in India and is used in rearing of Tasar silk worm *Antheraea mylitta* Drury for obtaining one of the important types of silk. This plant is attacked by many insect pests (Singh, 1989; Beeson, 1941; Brown, 1968; Bhasin *et al.,* 1958; Mathur and Singh, 1958-61; Dhar *et al.,* 1988) whose incidence varied much in different months of the year (Singh *et al.,* 1992, 1994). Some workers (Mohanty and Behera, 1996; Joshi *et al.,* 1989; Pathak *et al.,* 1992) have also done work on the management of various pests.

It appears from literature that no systematic efforts have been made till date to find out the infestation of economically important insects especially at seedling stage of *Terminalia arjuna* in Punjab. Keeping paucity of knowledge in view, regular observations have been made at nursery level from sowing till transplanting of seedling of this plant so as to report the infestation of different insects on this important multi-purpose tree in Punjab conditions.

Material and Methods

Field experiments were conduted during year 2003-2004 in nurseries at four locations in Punjab falling in the following Forest Divisions viz. Ludhiana (Baddowal), Fatehgarh Sahib (Sirhind), Patiala (Sanor), Hoshiarpur (Forest Research Circle), to record the insect infestation at nursery level of *Terminalia arjuna.* Plots were laid out in randomized block design. Regular observations were taken at 7-10 days intervals and population was sampled by direct counting. Sucking pests viz. Gallfly was observed from 3 leaves, one each from upper middle and lower portion of seedling. Absolute population per seedling was recorded in the case of defoliating caterpillars, beetles and borers as per survey method of Bakshi (1976). Observations were recorded in morning and evening hours. Immature stages of insects were collected and reared in laboratory on their host in glass chimneys or cages (Joshi and Khan, 1990) to get the adults for identification wherever required.

Results and Discussion

It has been observed for the first time from Punjab that *Terminalia arjuna* carried as many as 35 different insects at

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different stages of seedling growth. The status of individual insects, their nature of damage along with taxonomic detail is presented in Table 1.

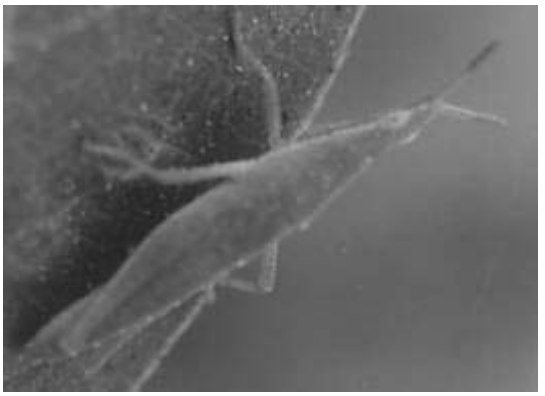
Among defoliators, around eight types of Orthopterans belonging to six families viz. Pyrgomorphidae (Fig. 1), Tetrigidae, Gryllidae, Tettigonidae, Acrididae and Tridactylidae were found defoliating seedlings especially during the months of May-June and from Sept to November.

Infestation of Lepidopteran defoliators comprised of 6 type of insects which were found damaging seedlings by folding top leaf, mining, folding or directly feeding on the mature leaves of seedlings. Attack of leaf miner, *Acrocercops* sp. (Fig. 2) was observed from October to April. Whereas infestation of *Macalla macusalis* was found in October only.

Chrysomelid beetles were found feeding mostly on the undersurface of leaves by scraping or making holes in leaves. Along with Curculionid and Halticin beetles, there were six types of Coleopterans feeding on seedlings.

Among sucking insect pests, infestation of Gall fly, *Trioza fletchri minor*

Figs. 1-4



1. Grasshopper, *Atractomorpha psittacina* 2. Leaf miner, *Acrocercops* sp.; 3. Gall fly, *Trioza fletchri minor;* 4. Gall fly, *Megatrioza hirsute*

Table 1

The insect-pests recorded in the Terminalia arjuna (Roxb. ex DC.) nursery ecosystem from March 2003-Feb. 2004 at Punjab

Sr. No.	Name	Family	Damage	Pest status	Locality
1	2	3	4	5	6
I. Order Orthoptera					
1.	***Chrotogonus trachypterus* (Blanchard)	Pyrgomorphidae	Defoliates leaves	Major	LDH, PTA, FGS, HSP
2.	***Criotettix subulatus* Boliver	Tetrigidae	-do-	Minor	LDH, PTA, FGS
3.	***Gymnogryllus* sp.	Gryllidae	-do-	Minor	LDH, PTA, FGS
4.	***Tettigonia caudata* (Charpentier)	Tettigoniidae	-do-	Major	LDH, PTA
5.	***Trilophidia annulata* (Thunberg)	Acrididae	-do-	Major	LDH, PTA, FGS
6.	***Oxya velox* (Fab.)	-do-	-do-	Major	LDH, PTA
7.	***Tridactylus variegates*	Tridactylidae	-do-	Major	LDH, PTA
8.	***Atractomorpha psittacina* (Haan)	Pyrgomorphidae	-do-	Major	LDH, PTA, FGS, HSP
II. Order Lepidoptera					
1.	*Seedling top leaf folder, *Laspeyresia* sp.	Tortricidae	Fold and feed on top leaf	Minor	PAT
2.	*Leaf miner, *Acrocercops* sp.	Lithocollectidae	Forms mines in leaves	Major	FGS,LDH
3.	*Leaf folder, *Macalla macusalis* Wlk.	Pyralidae	Leaf webber and folder	Major	LDH
4.	*Brush Hairy caterpillar, *Lymantria mathura* Moore *aurora* Butl.	Lymantiidae	Defoliator	Minor	PAT, LDH
5.	***Dichocrocis punctiferalis* (Guenee)	Pyralidae	Leaf scrapper	Minor	PAT

Contd...

1	2	3	4	5	6
6.	**Looper, *Ascotis imparata*	Geometridae	Defoliate leaves	Minor	FGS, PAT, LDH
III. Order Coleoptera					
1.	**Parasia lefevrei* Jac.	Chrysomelidae	Scrap underside of leaves	Minor	PAT
2.	*Red beetle, *Tricliona* sp.	-do-	-do-	Minor	PAT
3.	***Monolepta signata* (Olivier)	Chrysomelidae	Feed on young leaves	Minor	LDH, HSP
4.	**Green Weevil, *Lepropus* (=*Astycus*) *lateralis* Fab.	Curculionidae	Make holes in leaves	Minor	LDH, HSP, FGS, PAT
5.	***Haltica cyanea* (Oliv.)	Halticinae	Scrap leaves	Minor	PAT
6.	*Red pumpkin beetle, *Aulacophora foveicollis* (Lucas)	Chrysomelidae	Damage leaves	Minor	PAT
IV. Order Hemiptera					
1.	Gall insect, *Trioza fletchri minor* Crowf.	Psyllidae	Forms galls on leaves	Major	LDH, PAT, FGS, HSP
2.	*Gall insect, *Megatrioza hirsuta*	-do-	Deformity of leaves	Major	PAT
3.	***Dolycoris indicus* Stal.	Pentatomidae	Suck sap from leaves	Major	LDH, PAT
4.	***Eucercocoris ventralis* Westw.	-do-	-do-	Minor	LDH
5.	***Chrysocoris patricius* (Fab.)	-do-	-do-	Major	FGS
6.	***C. stolli* Wolff.	-do-	Suck sap from leaves	Minor	FGS
7.	***Homoeocerus signatus* Walk.	Coreidae	-do-	Major	LDH, PAT, HSP, FGS
8.	***Ashistocoris brevicornis* Dall	-do-	-do-	Minor	LDH, PAT
9.	***Dysdercus koenigi* (Fab.)	Pyrrhocoridae	-do-	Minor	PAT
10.	**Spittle bug, *Poophilus costalis* Walker	Cercopidae	Suck sap from nodes	Minor	LDH, HSP
11.	**Jassid, *Hishimonous indicus* (Sohi)	Cicadellidae	Suck sap from leaves	Minor	FGS, PAT, LDH
12.	**Tree hopper, *Oxyrhachis subjecta* Walker	Membracidae	Suck sap from shoots	Minor	LDH, PAT

LDH= Ludhiana; HSP= Hoshiarpur; FGS= Fatehgarh Sahib; PAT= Patiala
* New host record from Punjab and ** New host record from India

Table 2

The insect visitors recorded in the Terminalia arjuna (Roxb. ex DC.) nursery ecosystem from March 2003-Feb.2004 at Punjab

Sr. No.	Name	Family	Stage	Status	Locality
Order Lepidoptera					
1.	***Euproctis lunata* Walker	Lymantriidae	Adult	Minor	HSP
2.	***E. virgunculata* Walker	-do-	Adult	Minor	LDH
Order Coleoptera					
1.	***Casnoidea indica* Thunberg	Carabidae	Adult	Minor	PAT

LDH= Ludhiana; HSP= Hoshiarpur; FGS= Fatehgarh Sahib; PAT= Patiala
* mean new host record from Punjab and ** mean new host record from India

(Fig. 3) remained common feature on seedlings of *T. arjuna* at nursery level. Its infestation starts from month of March-April and goes up to November- December. Whereas attack of *Megatrioza hirsute* (Fig. 4) was observed between September-November. Apart from it, Pentatomid bugs like *Dolycoris indicus, Chrysocoris patricius* and *Homoeocerus signatus* were also found sucking sap of young leaves from August to November. By adding insects of Membracidae, Cercopidae, Cicadellidae, Pyrrhocoridae and Coridae families, it becomes highest numbers of 12 Hemipterans insects found infesting seedlings of *Terminalia arjuna.*

Two insect visitors (Table 2) belonging to family Lymantriidae and one Coleopteran of family Carabidae were also recorded.

New Record / Reports : As this is first of its kind detailed study in Punjab on this plant, therefore except *Trioza fletchri minor* all other insect pests are new reports from Punjab. But from India except *Laspeyresia* sp., leaf mining Lepidoptera, *Macalla macusalis, Lymantra mathura, Aulacophora foveicollis, Trioza fletchri minor* and *Megatrioza hirsute* all others are new host records.

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SUMMARY

It was explored that 35 insects species were infesting in overlapping manner the seedlings of *Terminalia arjuna*, starting from germination till transplanting in field, in the forest nurseries in Punjab. Among these there were highest number of Hemipterans (12) followed by

Orthopterans (8), Coleopterans (6), Lepidopterans (6) and three as insect visitors. Out of these thirty four are new host records from Punjab whereas twenty-eight are new host records from India.

पंजाब में *टर्मिनेलिया अर्जुना* (राक्स० निषेध डीकैण्डोले) पर रोपणी स्तर में कीटाक्रमण

वाई०एस० पांधा, एम०एस० सैनी व जे०एस० दरगन

सारांष

यह पता लगाया गया है कि पंजाब में अंकुरण से लगाकर क्षेत्र में प्रतिरोपण करने तक *टर्मिनेलिया अर्जुना* के पौधों को अधिछादन करते ढंग से पैंतीस प्रकार के कीड़े वन रोपणियों से अक्रान्त करते हैं। इन कीडों में सबसे ज्यादा संख्या (12) मत्कुणवंशियों की है जिसके बाद ऋजुपक्ष कीड़े (8), कंचुकपक्ष कीड़े (6) शल्किपक्ष कीड़े (6) और तीन परिदर्शी कीड़े आते हैं। इनमें से चौंतीस कीड़े इस वृक्षजाति पर पंजाब में लगते नवोल्लेख हैं जबकि अट्ठाईस कीड़े भारत में इस पर लगते नवोल्लेख है।

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