

COMPARATIVE BIOLOGY OF FRUIT AND ROOT FEEDING WEEVILS OF INDIA (COLEOPTERA: CURCULIONIDAE) – A REVIEW

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Abstract: The data pertaining to 11 species studied by the author and 26 species worked out by other researchers reveals a few significant differences in the short and long snouted weevils. The differences detailed below refer to place of oviposition, number of eggs laid, feeding behaviour, larval and pupal development. A few significant exceptions in both the groups have been highlighted.

Keywords: Weevils, Long snouted, Broad-nosed, Fruit, Root, India.

Introduction

It was Marshall (1916) who, for the convenience of study divided family Curculionidae into short snouted (Adelognathi) and long snouted species (Phanerognathi) irrespective of the subfamilies to which they belong. This division applies to a large number of species out of the vast number included in this family. However, the subdivision is not exhaustive as there are numerous example of such species which do not clearly fall in either division. As far as Indian fauna is concerned, most of the short snouted (Broad- nosed) weevils fall in subfamilies Otiorrhynchinae, Eremninae and Brachyderinae in addition to a few smaller families which also show this characteristic. It may be mentioned here that the Indian broad nosed species from Otiorrhynchinae, Brachyderinae & Eremninae along with several other new world taxa have been recently put under Entiminiinae (Bright & Bouchard, 2008). The clearly defined short snouted species & long snouted ones show some definite pattern in their biology although exceptions are there in both the groups. The author has studied 11 species and also collected information on 26 other Indian species. The present communication deals with the general pattern of biology among 37 indian species.

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Observations and Discussion

Short snouted weevils

Detailed observations were made on the biology of *Tanymecus indicus* Fst. (s.f. Brachyderinae) & *Myloccerus undecimpustulatus maculosus* Desb. (s.f. Otiorrhynchinae) and information was collected on some species studied by other workers. The latter include *M. discolor* Boh., *M. viridanus* Fab. (Khairmode & Sathe, 2013), *M. laetivirens* Fst (Bose, 1943), *M. undecimpustulatus undatus* Mshl. (O'Brien et al, 2006) *Episomus lacerta* (Fab.) (s.f. Otiorrhynchinae) (Ayyar, 1940) *Phyllobius* species (Ranga Rao & Shanower, 1999), *Hypomeces squamosus* (F.). (s.f. Brachyderinae) (Hill, 2008), *Sitona crinitus* Herbst (s.f. Sitoninae) (Saxena & Singh, 1984). All these species lay eggs in soil. The larvae feed on soft adventitious roots. The larval development is also completed underground. The pupation takes place within the earthen cells prepared by the mature larvae. There is generally one generation in the course of a year. The adults are leaf eaters and the host range is quite long in several species.

Long Snouted Weevils

Finding on 8 long snouted weevils namely *Curculio c- album* (Fab.), *Curculio ficusi* pajni & Singh, *Indocurculio minutus* Pajni et al (s.f. Curculioninae) *Barioscapus cordiae* (Mshl.), *Apotomorrhinus cribratus* Sch. (s.f. Baridinae) *Apion (Thymapion) majorinum* Fst. (s.f. Apioninae) *Sitophilus rugicollis* Casey (s.f. Rhynchophorinae), *Acalloplastus* sp. (s.f. Anthonominae) reveal some feature which are common to all. These include feeding of adults on floral components & fruits. They make feeding holes & ovipositional pits with the help of their long rostrum. The fresh larva upon hatching makes its way through the mesocorp & ultimately settles in the seed where it completes its pupal development. There is generally one generation in the course of a year & adults weevils diapause for the rest of the year. However, the behaviour of the above mentioned 3 members of subfamily Curculioninae i.e., *C. c-album*, *C. ficusi* & *I. minutus* along with *C. sikkimensis* (Heller) (Sharma & Verma, 2000; Talwar, 2014) is slightly different from the others because mature larvae pass their pupal stage in soil after escaping from the fallen fruits. Moreover *C. ficusi* & *I. minutus* pass 3 generations in the course of the year coinciding with 3 flowering period of the host tree *Ficus infectoria*.

In the case of *Hypera postica* (Gyll.), the larvae after initially entering into the hollow stem of the host ultimately reach terminal leaves to feed on the same externally. Out of 17 species studied by other workers, the only external feeders are *Cionus transsquamosus* Mshl. &

Cionus hortulans Geo. (s.f. Cioninae) (Mohammad et al, 2009). Out of the remaining 15 species, 8 species viz., namely *Sternochetus frigidus* (Fab.), *S. mangiferae* (Fab.)(s.f. Cryptorhynchinae) (Srivastava, 1997), *Paramecops farinosus* Sch. (Amritphale & Sharma, 2006) *Dyserus clathratus* (Pasc.) (s.f. Bagoinae) (Sachan & Gangwar 1980), *Alcides morio* Heller (s.f. Alcidodinae), (Rajapakse & Kumar,2014), *Apion amplum* (Fst) *Apion clavipes* Gerst. (s.f. Apioninae) (Sharnabasappa & Basavanagoud, 2005; Thakur & Firake, 2013) *Indozocladius (Ceutorhynchus) asperulus* Fst. (Reed et al, 1989) show a pattern which is similar to the general pattern of long snouted species studied by the author. However, 3 *Sitophilus* species namely *Sitophilus oryzae* (L.) *S. zeamais* Motsch. & *S. granarius* (L.) are pests of stored grains while *S. zeamais* Motsch. starts its attack in the field but later shifts to stores. All the three species show multiple generations during course of the year (Jotwani & Sirkar, 1965; Jadhav, 2006). An unusual behaviour is shown by *Echinocnemus oryzae* Mshl., *Hydronomidius molitor* Fst.(s.f. Erihinae), *Xanthochelus superciliosis* Gyll & *X. blumeae* (s.f. Cleoninae) because the larvae feed on the roots underground, a behaviour otherwise characterizing short snouted weevils. (Beeson, 1941; Kushwaha & Sharma,1980; Hill, 2008)

Apart from the major differences in the biology of long & broad nosed weevils, there are other variations concerning the pattern of oviposition and number of eggs laid by different species irrespective of their category. For example *H. postica* (Gyll.) usually lays eggs in cluster having 2-22 eggs each, a process not seen in any other long snouted weevil but common in broad- nosed species. It has also been observed that generally speaking, the broad nosed weevils lay a relatively more no. of eggs and that too in clusters as compared to the long snouted weevils where eggs laid are far less in numbers and deposited mostly singly as studied by the author and other workers.

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