

STUDIES ON SPECIES COMPOSITION AND HOST RANGE OF DIFFERENT SCARABAEID ADULTS UNDER RAINFED SITUATIONS OF BELAGAVI DISTRICT

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ABSTRACT : The present investigation on “Studies on species composition and host range of different scarabaeid adults under rainfed situations of Belagavi district” was carried out during *khari* 2014-15 at Chikkodi (Hattarwata) and Hukkeri (Akkiwata) taluks of Belagavi district. Irrespective of the different locations the faunistic study of different scarabaeid adults occurring in the groundnut growing tracts of Belagavi district revealed that *Holotrichia fissa* Brenske is most dominant species associated with groundnut. Irrespective of the occurrence of different species *Ziziphus mauritiana* Lam. attracted more numbers of adults. *Holotrichia fissa* Brenske was found to show the higher preference to ber (*Z. mauritiana*) followed by other hosts like *Lannea coromandelica* (Hautt.) Merrill. in all the locations. While *Bauhinia racemosa* Lam. and *Ziziphus horrida* Roth. are recorded as new hosts for *H. fissa*. On the contrary, *Holotrichia serrata* (Fabricius) showed a definite preference for neem.

Key words : Species composition, host range, scarabaeid adults, rainfed situations, Belagavi district.

INTRODUCTION

White grubs (Coleoptera: Scarabaeidae) are soil inhabiting and root feeding immature stages of scarab beetles. The white grub family, Scarabaeidae is the second largest family within the order Coleoptera. The world fauna of white grub exceeds 30,000 species (Mittal, 2000) and there are about 1300 North American species (Borror *et al*, 1975). The maximum number occurs in the tropical areas of the world, particularly in African and Oriental regions.

The fauna of the Indian sub-region is very rich and diverse but it is yet to be fully explored (Mishra and Singh, 1999). There are two major white grub pest species on groundnut in India *viz.*, *Holotrichia consanguinea* Blanchard and *H. serrata*. Of these *H. consanguinea* is the key white grub pest in the northern parts of the country and finds loose sandy, well drained soil to be quite suitable for its survival and multiplication. It is the dominant white grub species in the states of Rajasthan, Gujarat, Haryana, Punjab, Uttar Pradesh and Bihar, *H. serrata* is dominant in Karnataka., Maharashtra, Andhra Pradesh and Tamil Nadu and survives in well drained heavy, red alluvial and black cotton soils (Yadava, 1991). Another white grub *H. fissa* is recorded from Kerala, Karnataka, Haryana. (Verma, 1975; Veeresh, 1975; Abraham and Rajendran, 1978). In many districts of Maharashtra *H. fissa* is a serious problem in rain fed areas *viz.*, Ahemadnagar, Dhule, Nanded, Buldhana, Osmanabad, Sangli and Satara.

MATERIALS AND METHODS

Species composition

Monitoring of adult beetles was carried out during 2014 in two locations *viz.*, Hattarwata village of Chikkodi taluka and Akkiwata village of Hukkeri taluka from 22nd Meteorological Standard Week (MSW) (June) to 29th MSW (Aug). For this study, commonly available host trees *viz.*, neem (*Azadirachta indica*) and ber (*Zizyphus sp.*,) located along bunds and nearby cultivated fields were selected. Wherever feasible 125 watt fluorescent bulbs were installed and in other places a powerful torch was used for locating the beetles on host trees. Monitoring was carried out from 18.30 to 23.00 h in all the locations. Beetles collected from different locations were counted and average was worked out for respective MSW in all the study locations. Adults of the different species were collected and brought to the laboratory, preserved in absolute alcohol and later sent for identification.

Host range of adults

During survey the host plants infested by adult beetles were recorded to know the host preferences. A few plants were located during day time by identifying the feeding damage done by the beetles. These plants were again visited at night to conform the damage. The collected beetles were brought to laboratory and fed with different host plants on which they were collected to know their host preference. The collected samples of different host plants were sent for identification.

RESULTS AND DISCUSSION

Species composition

Hattarwata : Irrespective of the species adult emergence commenced from 23rd MSW and the peak

was observed between 24th MSW to 25th MSW and adult population gradually declined from 26th MSW onwards at both Hattarwata and Akkiwata. Totally 46.29 and 81.29 adults were trapped at Hattarwata and Akkiwata respectively. Of which *H. fissa* with numbers 39.29

Table 1 : Species composition and abundance of white grubs at Hattarwata under rain fed condition– 2014.

Sl. No.	Species	Weekly mean adult numbers in MSW*								Total No. of catches	Per cent catch
		23 (June)	24 (June)	25 (June)	26 (June)	27 (June)	28 (July)	29 (July)	30 (July)		
1	<i>Sophrrops karschi</i> (Brenske)	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.43	0.93
2	<i>Holotrichia fissa</i> Brenske	5.71	12.29	10.71	6.86	1.57	1.29	0.86	0.00	39.29	84.88
3	<i>Anomola ruficapilla</i> Burmeister	0.00	0.29	0.00	0.14	0.00	0.00	0.00	0.00	0.43	0.20
4	<i>Holotrichia rufoflava</i> (Brenske)	0.14	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.93
5	<i>Adoratus</i> sp. 1	0.29	1.43	0.57	1.00	1.14	0.43	0.00	0.00	4.86	10.49
6	<i>Apogonia</i> sp. 1	0.00	0.29	0.14	0.00	0.00	0.00	0.00	0.00	0.43	0.93
7	<i>Apogonia</i> sp. 2	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.14	0.31
8	<i>Phyllognathous dionysius</i> Fabricius	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.62
Total										46.29	-
Weekly Rainfall (mm)		22.63	24.67	10.72	5.30	2.43	2.11	0.00	0.21	-	-

(* MSW- Meteorological Standard Week)

Table 2 : Species composition and abundance of white grubs at Akkiwata under rain fed condition– 2014.

Sl. No.	Species	Weekly mean adult numbers in MSW*								Total No. of catches	Per cent catch
		23 (June)	24 (June)	25 (June)	26 (June)	27 (June)	28 (July)	29 (July)	30 (July)		
1	<i>Holotrichia serrata</i> (Fabricius)	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.53
2	<i>Sophrrops karschi</i> (Brenske)	0.29	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.70
3	<i>Holotrichia fissa</i> Brenske	12.00	28.71	9.29	10.00	5.14	4.14	1.00	0.00	70.29	86.47
4	<i>Anomola ruficapilla</i> Burmeister	0.14	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.43	0.53
5	<i>Holotrichia rufoflava</i> (Brenske)	0.43	0.14	0.00	0.14	0.00	0.00	0.00	0.00	0.71	0.88
6	<i>Adoratus</i> sp. 2	0.14	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.29	0.35
7	<i>Adoratus</i> sp. 1	1.29	1.71	1.43	1.00	1.29	0.71	0.29	0.00	7.71	9.49
8	<i>Apogonia</i> sp. 1	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.35
9	<i>Apogonia</i> sp. 2	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.18
10	<i>Phyllognathous dionysius</i> Fabricius.	0.14	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.53
Total										81.29	-
Weekly Rainfall (mm)		17.86	20.56	8.74	3.20	2.20	0.79	0.11	0.00	-	-

(*MSW-Meteorological Standard Week)

Table 3 : Scarabaeid fauna recorded on different host plants at Hattarwata during June-July 2014.

Sub family	Species recorded	Host plants	No. of beetles collected
Melolonthinae	<i>Holotrichia fissa</i>	<i>Z. mauritiana</i>	250
		<i>L. coromandelica</i>	15
	<i>Sophrops karschi</i>	<i>Z. mauritiana</i>	1
		<i>L. coromandelica</i>	2
	<i>Apogonia</i> sp.2	<i>L. coromandelica</i>	1
	<i>Apogonia</i> sp.1	<i>Z. mauritiana</i>	2
<i>L. coromandelica</i>		1	
	<i>Holotrichia rufoflava</i>	<i>Z. mauritiana</i>	3
Rutelinae	<i>Anomola ruficapilla</i>	<i>L. coromandelica</i>	3
	<i>Adoratus</i> sp. 1	<i>Z. mauritiana</i>	29
		<i>L. coromandelica</i>	5
Dynastinae	<i>Phyllognathus dionysius</i>	<i>L. coromandelica</i>	2

Table 4 : Scarabaeid fauna recorded on different host plants at Akkiwata during June-July 2014.

Sub family	Species recorded	Host plants	No of beetles collected
Melolonthinae	<i>Holotrichia fissa</i>	<i>Z. mauritiana</i>	415
		<i>L. coromandelica</i>	19
		<i>B. racemosa</i>	37
		<i>Z. horrida</i>	21
	<i>Holotrichia serrata</i>	<i>A.indica</i>	3
	<i>Holotrichia rufoflava</i>	<i>Z. mauritiana</i>	4
	<i>Sophrops karschi</i>	<i>Z. mauritiana</i>	3
		<i>L. coromandelica</i>	1
<i>Apogonia</i> sp. 2	<i>L. coromandelica</i>	1	
<i>Apogonia</i> sp. 1	<i>Z. mauritiana</i>	2	
Rutelinae	<i>Anomola ruficapilla</i>	<i>Z. mauritiana</i>	3
	<i>Adoratus</i> sp.1	<i>Z. mauritiana</i>	31
		<i>Z. horrida</i>	11
		<i>L. coromandelica</i>	20
<i>Adoratus</i> sp.2	<i>Z. mauritiana</i>	2	
Dynastinae	<i>Phyllognathus dionysius</i>	<i>L. coromandelica</i>	3

accounted for 84.88%, *Adoretus* sp. with 1.48 (10.49%) accounted while *Apogonia* sp.1, *A. ruficapilla*, *H. rufoflava*, *Sophrops karschi* with only 0.43 numbers accounting for 0.93 per cent (Table 1). *Apogonia* sp. 2 was least (0.14) accounting for only 0.31 per cent catch. The peak emergence of all the species was recorded during 24th MSW at weekly mean rainfall of 24.67 mm.

Akkiwata : Adult emergence commenced from 23rd

MSW (June 2014) and the peak was observed between 24th MSW to 25th MSW. However, *H. fissa* and *Adoretus* sp.1 adult emergence commenced from 23rd MSW, but maximum beetles were caught during 24th MSW. Adult emergence gradually declined from 26th MSW onwards but for *H. fissa* whose emergence continued up to 29th MSW reaching nil at 30th MSW. Irrespective of species, totally 81.29 adults were trapped during 2014 of which *H. fissa* was the most abundant accounting for 70.29 numbers with 86.47 per cent catches, followed by *Adoretus* sp.1 with 7.71 numbers and 9.49 per cent catch. While *H. rufoflava* accounted for 0.17 numbers and 0.88 per cent catch. The peak emergence of all the species was observed during 24th MSW (Table 2).

Present studies are in line with the reports of Tippannavar and Patil (2013) who recorded *H. fissa* as the economically important species at Hattarwata village of Belagavi district. The present results are in agreement with findings of Aland *et al* (2012), Theurkar *et al* (2012) and Lolage and Patil (1986) with respect to occurrence of *H. fissa* under rainfed conditions.

Host range of different scarabaeid adults

Hattarwata : Major host plants of this area were ber, *Ziziphus mauritiana* Lam. and Goddalu mara (*Lannea coromandelica* (Hautt.) Merrill) which were more concentrated near the field bunds and beside the roads. During the study period different species of adults were observed to feed on these two host plants. Irrespective of the different species, *Z. mauritiana* attracted more number of adults. Among the different melolonthids majority of *H. fissa*, *H. rufoflava* and *Apogonia* sp, and *Sophrops karschi* were found to feed on leaves of *Z. mauritiana*. Where as *Adoretus* sp.1 of rutelinds was found to feed on *Z. mauritiana*. While *L. coromandelica* was found to attract *H. fissa*, *H. rufoflava*, *Apogonia* sp. 1, and

Apogonia sp. 2 of melolonthinae, *A ruficapilla* and *Adoretus* sp. 1 of rutelinidae and *Phyllognathus dionysius* of dynastinae (Table 3).

Akkiwata : Major host plants of this area were *Z. mauritiana*, *L. coromandelica*, wild ber *Ziziphus horrida* Roth., *Bauhinia racemosa* Lam. and neem, *Azadirachta indica* A. Juss. During the study period irrespective of the species more numbers were found to

feed on leaves of *Z. mauritiana* followed by *L. coromandelica*. Majority of *H. fissa*, *H. rufoflava*, *Sophrops karschi* and *Apogonia* sp.1 of melolonthids, while *A. ruficapilla*, *A. bengalensis*, *Adoretus* sp.1 and *Adoretus* sp. 2 of rutelinds were observe to feed on *Ziziphus mauritiana*. *Holotrichia fissa* Brenske, *Apogonia* sp. 2 and *Sophrops karschi* of melolonthids, *Adoretus* sp.1 of rutelinae and *Phyllognathus* of dynastinae were found to feed on leaves of *L. coromandelica*. Further, *H. serrata* of melolonthinae was found to feed on *A. indica*. The endangered species of ber *Z. horrida* recorded as the host plant of different scarabaeids viz., *H. fissa* and *Adoretus* sp. 1 for the first time. But *B. racemosa* which is a fodder tree found to attract only the beetles of *H. fissa* (Table 4).

Irrespective of two locations the most preferred host for different species was *Z. mauritiana* followed by *L. coromandelica*. *H. fissa* preferred *Z. mauritiana* as compared to other hosts. The present report is in line with the reports of Tippannavar and Patil (2013) who have reported ber as host plant of *H. fissa* in Hattarwata village of Belagavi district. Further the present results are in line with Lolage and Patil (1986), Bakhetia and Brar (1985) for *H. consanguinea*, Brar and Sandhu (1982) for *H. consanguinea* (ber), and *H. serrata* (neem) and Anitha (1996) for *H. reynaudi* (ber).

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