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## Incidence and distribution of scarabaeoidea: coleoptera in Akola Vicinity

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### Abstract

Field sampling to study the incidence and distribution of beetles of superfamily Scarabaeoidea in different locations of Akola (M.S.) lead to collection of Scarabs from four families and seven subfamilies. Scarabs were collected from field crops by using net, hand picking as well as season long light trap was installed from June-November 2013 for assessing scarab beetles activity. Scarabs of four families viz Scarabaeidae, Hybosoridae, Trogidae and Geotrupidae were found active. However, Scarabaeidae proved its dominance in this locality. Subfamilies Scarabaeinae, Rutelinae and Hybosorinae showed abundance in light trap catches followed by Melolonthinae. Scarabaeoid faunal activity, observed from last week of May 2013 ie, 22<sup>nd</sup> meteorological week to 44<sup>th</sup> meteorological week, shows peak activity in 26<sup>th</sup> meteorological week (25<sup>th</sup> June- 1<sup>st</sup> July) in which total 145 beetles were collected. Second peak was recorded in 24<sup>th</sup> meteorological week (90 beetle) followed by 23<sup>rd</sup> week (72 beetle).

**Keywords:** Coleoptera, diversity, incidence, scarab beetles

### Introduction

Order Coleoptera which includes beetles and weevils is most diverse order of class Insecta and is a largest group of comparable unit among all animals. More than 75% of the known species of animals and approximately 0.9 million species of insects have been identified throughout the world. An updated checklist of the scarab beetles under super family Scarabaeoidea comprise about 167 species belonging to 52 genera, 9 subfamilies and 3 families (Chandra *et al.* 2012) [3, 8]. Scarab beetles under superfamily Scarabaeoidea comprise a species rich group and a conspicuous component of the beetle (Coleoptera) fauna of the world. Currently the superfamily Scarabaeoidea is divided into 12 families, 43 subfamilies, 118 tribes and 94 subtribes. The family Scarabaeidae is a very large and the most diverse and widely distributed group of beetles and according to some estimates about 30,000 species of this family are known throughout the world. The family Scarabaeidae is one of the largest families in the order Coleoptera having both positive as well as negative significance. Dung beetles play an important role in enhancing nutritional value of the soil, where as chafer beetles feed on vegetation (Chandra and Ahiwar 2005) [2].

The species of family Scarabaeidae are often called scarabs or scarab beetles and larvae are known as white grubs. White grub is a national pest. The scarabaeids causing damage to groundnut (Peanut) in the world, listing a total of 22 species from 9 genera associated with groundnut in India. They cause damage to roots of commercial crops. The damage caused by the White grubs is up to 70%. Scarabs causes economic loss to the crops like Jowar, Bajra, Maize, Cotton, Sugarcane, Mung bean, Urad bean, Groundnut, Sesamum, Rala (finger millate), Bhandi, Brinjal, Pumpkin and Soybean etc. The occurrence of one of the white grub *Holotrichia serrata* has been recorded earlier from Soybean ecosystem in Vidarbha (Dadmal *et al.* 2013) [4]. The information regarding the biodiversity of scarabs in Vidharbha, that too in agriculture sector is scanty.

To enhance production, new technologies developed by breeder faces the challenge of many emerging pests. Therefore correct identification of pests at least up to family and sub family level is necessary and taxonomy play an important role in this regard. The information on the activity of the particular fauna in particular agro-ecosystem is needed to generate the information on level of active fauna and its predominance in that ecosystem. Clear identification of the insect is based on the activities like, behavior and feeding habit to discriminate harmful scarab fauna. With this hypothesis present investigations were carried out.

## Materials and Methods

The study area is situated at latitude 20.7° North and longitude 77.07° East and at an altitude of 925 ft (282m) above sea level. Akola has a tropical savanna climate. On the north, Akola is bordered by the Melghat Hills and forest region and is adorned with various crop fields, nurseries, orchards and forest gardens with diverse flora and fauna.

Scarabs were collected from crop fields of Akola vicinity by using net, hand picking and from light traps installed at different places and preserved for further study. Long-season monitoring of scarab using light traps was conducted from June-November 2013 at Akola district. A nylon mesh was fixed for the collection of the trapped insects. Light trapped insects in the nylon mesh were collected each day, beetles are killed by Potassium cyanide or Ethyl acetate or Chloroform, pinned, dried in hot air oven, labeled appropriately and stored in insect collection wooden boxes. For studying the distinguishing morphological characters stereo zoom microscope (Nikon SMZ 800) with attached Nikon camera was used. On the basis of various morphological characters scarabs were categorized into different families and subfamilies with the help of taxonomic key given by Brett Ratcliffe and Mary Liz Jameson (2002) [5].

## Result and Discussion

### Collection of scarabaeid fauna

During this study, 652 specimens of Scarabaeoid fauna were collected and Categorized into seven sub families and four families from the Akola vicinity (Table 1).

**Table 1:** Categorization of collected Scarabaeid fauna in Akola vicinity (2013).

Superfamily	Family	Subfamily
Scarabaeoidea	Scarabaeidae	Scarabaeinae
		Rutelinae
		Melolonthinae
		Cetoniinae
	Hybosoridae	Hybosorinae
	Trogidae	Troginae
	Geotrupidae	Geotrupinae

Amongst superfamily Scarabaeoidea, family Scarabaeidae

emerged to be the most abundant and diverse of the scarabs. It can be further categorized into four subfamilies, Scarabaeinae, Rutelinae, Melolonthinae and Cetoniinae which are commonly found in the study area. Family Hybosoridae with subfamily hybosorinae appear to be the second dominant species. Family Trogidae with subfamily Troginae and Family Geotrupidae with subfamily Geotrupinae were the least distributed.

### Meteorological week wise scarabaeoid activity

Scarabaeid faunal activity was noticed from last week of May 2013 ie, 22<sup>nd</sup> Meteorological week to 44<sup>th</sup> Meteorological week (Table-2, Fig-1). It is revealed from the data that, peak activity was noticed in 26<sup>th</sup> Meteorological week (25<sup>th</sup> June-1<sup>st</sup> July) during this period total 145 beetles were trapped/hand picked and preserved. Second peak was recorded in 24<sup>th</sup> (90 beetle trapped) followed by 23<sup>rd</sup> week (72 beetle).

Earlier Sushil *et al.* (2004) [6] concluded that maximum numbers of white grubs were caught in the month of June-July. Thakare *et al.* (2012<sup>a</sup>) [8] conducted survey at Melghat reserve-forest of Vidarbha during monsoon and collected 8 sub families and 3 families under superfamily scarabaeoidea through light trap, pitfall trap and hand picking etc. Tagger *et al.* (2012) observed activity of chafer beetle damaging the field crop from Punjab.

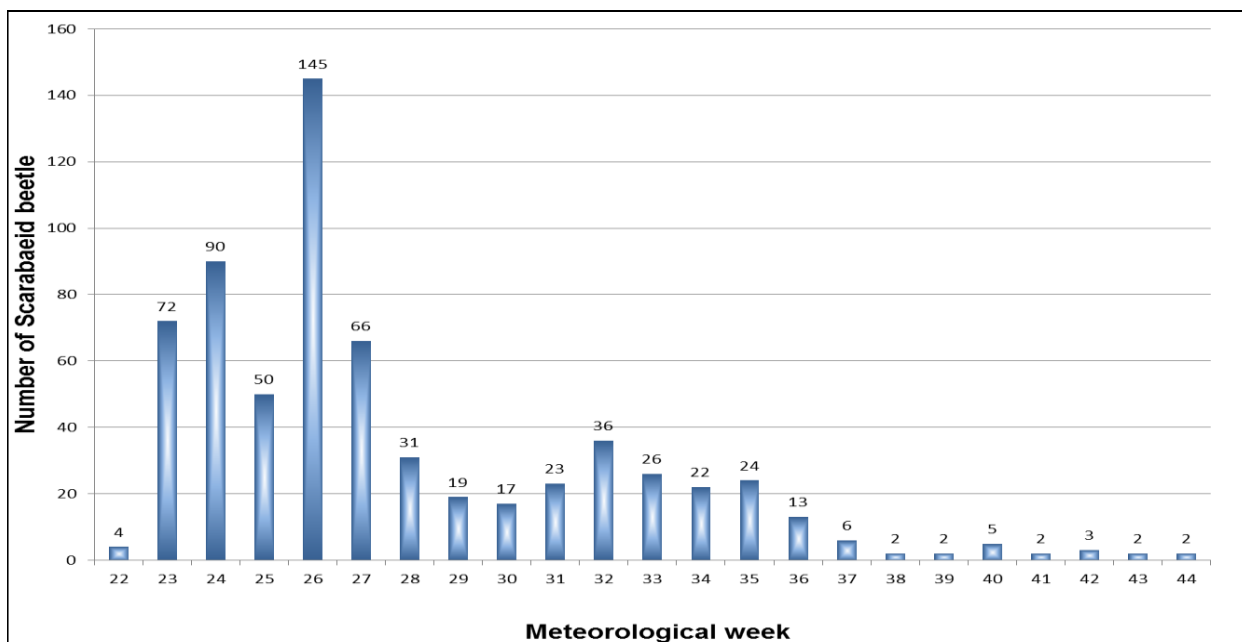
Bhawane *et al.* (2012) [1] have collected beetle after the first shower of monsoon through light trap and hand picking and reported 29 species of scarabaeidae from Kolhapur area. From the foregoing result and literature it can be inferred that Scarabaeoid beetles are more active during rainy season. Generally they emerge out after 1<sup>st</sup> shower of monsoon and remain active till the end of monsoon. Due to scanty literature on Meteorological week's data in relation to the emergence of beetles, the present- findings could not be discussed in depth as regards to the peak activity of the scarabaeoid beetle.

The member of Cetoniinae subfamily being the diurnal, handpicked from the field crops particularly okra and cotton ecosystem. Tagger *et al.* (2012) also have reported the similar type of findings. However, they reported the chafer beetles (Cetoniinae) damaging on leguminous crops. Cetoniinae being polyphagous in nature, if become established in this region would be challenging in future.

**Table 2:** Light trap catches/hand picked beetles in different meteorological week

S. No	Meteorological week	Date	Scarabaeinae	Rutelinae	Melolonthinae	Cetoniinae (Hand picking)	Hybosorinae	Troginae	Geotrupinae	Total
1.	22	28 may-3 Jun	3	-	1	-	-	-	-	4
2.	23	4-10	12	18	15	-	17	10	-	72
3.	24	11-17	28	28	7	-	19	8	-	90
4.	25	18-24	26	15	3	-	6	-	-	50
5.	26	25-1Jul	70	44	7	-	22	2	-	145
6.	27	2-8	30	30	1	-	2	3	-	66
7.	28	9-15	11	10	-	-	5	5	-	31
8.	29	16-22	14	5	-	-	-	-	-	19
9.	30	23-29	6	4	2	-	5	-	-	17
10.	31	30-5 Aug	11	4	-	-	8	-	-	23
11.	32	6-12	14	1	-	-	15	2	4	36
12.	33	13-19	4	-	-	-	14	-	8	26
13.	34	20-26	5	-	-	14	3	-	-	22
14.	35	27-2 Sep	6	-	-	9	9	-	-	24
15.	36	3-9	7	-	-	3	2	-	1	13
16.	37	10-16	2	2	-	-	2	-	-	6
17.	38	17-23	2	-	-	-	-	-	-	2
18.	39	24-30	1	-	-	-	1	-	-	2

19.	40	1-7 Oct	4	-	1	-	-	-	-	5
20.	41	8-14	2	-	-	-	-	-	-	2
21.	42	15-21	3	-	-	-	-	-	-	3
22.	43	22-28	1	-	-	-	1	-	-	2
23.	44	29-4 Nov	2	-	-	-	1	-	-	3



**Fig 1:** Activity of scarabaeid fauna in Akola vicinity

Summing up the observed results it can be concluded that, scarabaeoid beetles are an important group of fauna of Akola vicinity. The abundance of these beetles is observed during the monsoon season from 22<sup>nd</sup> to 44<sup>th</sup> meteorological week. As the developing stage of these beetles, white grubs, are polyphagous in nature, could prove to be havoc in near future if not controlled. This data can prove useful for carrying out the effective control strategies for white grubs in Akola vicinity.

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