

INVENTORY AND SEASONAL OCCURENCE OF WHITE GRUB BEETLES IN WESTREN PLAIN ZONE OF UTTAR PRADESH

Sandeep Kumar*, Man Mohan Kumar, C.S. Prasad, Gaje Singh, Gopal Singh and Rajendra Singh

Department of Entomology, Sadar vallabbhai Patel Uni. Of Agri. & Tech., Meerut - 250 115, India.

*e-mail : antal.0266@gmail.com

(Accepted 12 August 2015)

ABSTRACT : The abundance and diversity of scarabaeid beetles was examined at five different farming areas in northern western plain zone of Uttar Pradesh. Light trap and pheromone traps were used to monitor the beetles of genera and species were trapped during the two year 2011-12 and 2012- 13. The five most common subfamilies in the study area were rutelinae, melolonthinae, scarabaeinae, dynastinae and cetoniinae. Thirteen species of scarabaeids were recorded on sugarcane from different parts of western plain zone of Uttar Pradesh. They were identified to their respective genera and sub families, five genera under sub family Melolonthinae, three under Rutelinae two under Scarabaeinae, three under Dynastinae and two under Cetoniinae.

Key words : Scarabaeid beetles, diversity and species.

INTRODUCTION

Scarab beetles are the most diverse and widely distributed insects which belong to the largest order Coleoptera under superfamily Scarabaeoidea which includes approximately 31,000 species worldwide of which the family Scarabaeidae is composed of about 91% of all scarabaeoids and represented by 27,800 species worldwide (Jameson and Ratcliffe 2001).

Unlike the other groups of insects, the members of the family Scarabaeidae contains both beneficial (coprophagous) and harmful (phytophagous) beetles. Among which coprophagous beetles, through their habitat of burrowing and burying of dung, perform a series of ecological functions such as nutrient cycling, soil aeration (Mittal, 1993), secondary seed dispersal (Estrada and Coates- Estrada, 1991 & Larsen, 2004) and regulation of enteric parasites and dung breeding dipterans pests (Borenmissza, 1970 & Fincher, 1981). On the other hand phytophagous ones or leaf-chafers are agricultural pests of various commercial crops, feeding mostly on leaves, flowers, fruits, roots and other parts of the plants.

The first comprehensive account on the scarabaeid beetles of the Indian region was published by Arrow (1910, 1917, and 1931) in three volumes of Fauna of British India where in 72 species were reported from Uttarakhand. Later Mittal (1998) published an annotated list of the scarab fauna of Western Uttar Pradesh and recorded 151 species of these beetles belonging to 41 genera and 12 subfamilies. Recently Mittal (2005) also gave the diversity and conservation status of 136 species

of Laparostict Scarabaeidae belonging to 26 genera and 8 subfamilies from North India. Subsequently Chatterjee (2010) while studying the scarab beetle fauna of Uttarakhand reported 44 species belonging to 16 genera and 3 subfamilies.

In the present study the identification and seasonal occurrence of the phytophagous (Pleurostict) scarabs (Melolonthinae, Rutelinae, Dynastinae and Cetoniinae) in Western Plain zone of Uttar Pradesh are discussed because these beetles serve as a useful indicator for measuring species diversity in a particular region and they can be easily collected quantitatively by light trapping method due to their nocturnal flying activities. In addition, their food habits are generally well known; adults tend to feed on flowers, leaves, fruits and tree sap, whereas larvae feed on plant roots under the ground and rotten wood. The objective of the study was to analyze and assess the identification and seasonal occurrence of the phytophagous scarab beetles in Western Plain zone of Uttar Pradesh.

MATERIALS AND METHODS

Trap sites

A survey of adults of white grub were conducted at six locations in three district viz. Meerut, Muzaffarnagar, Baghpat and Saharanpur with light traps and pheromone traps. A single trap was operated (6:30 pm-4:00am) at each location from mid-March to mid-Oct. The trap was located in an area of contiguous open flat agricultural land devoted to sugarcane production and surrounded by trees. The light trap and pheromone trap were located

along the edge of a sugarcane field adjacent to a wooded area. The trap was operated from March-August 2012 and 2013. The light and pheromone traps were located in western region of Uttar Pradesh and is in a commercial sugarcane growing area of Uttar Pradesh. The beetles were handpicked from the host trees at dusk and preserved in 75% ethyl alcohol and labeled, giving details of date and place of collection, host on which collected.

Identification of species

The white grub adults collected during the surveys and also the adults emerging from the grubs collected were identified into different species based on their characters listed in Table 4 and Fig. I. The adult beetles were identified locally with the help of keys available and confirmation was also made with the help of Dr. V.V. Ramamurty, Professor, registration under RRS No. 710-750/13, Department of entomology, Indian Institute of Agricultural Research (IARI), New Delhi.

RESULTS AND DISCUSSION

The seasonal occurrence pattern for each species is unique and specific to a certain time period. In the subfamilies Melolonthinae occurrence pattern were early like *Meladera insanabilis* emerge as early during second fortnight of March to first fortnight of May, whereas *Holotrichia nagpurensis* emerge as first fortnight of July to second fortnight of September and it was the dominate species of white grubs in this region, *H. nr freyi* emerge as first fortnight of July to second fortnight of August, *H. sp. Indet* emerge as second fortnight of July to second fortnight of September, *Schizonycha ruficollis*, *melolontha cuprescens* and *Lepidiota sp.* were emerged as First fortnight of August to first and second fortnight of September during the year of 2011- 12.

In the subfamily Rutelinae occurrence pattern, *Anomala bengalensis* and *A. dimidiata* were emerge as first and second fortnight of July to second fortnight of August, *A. dimidiata* was the dominate species of this subfamilies. *A. rugosa*, *A. sp. indet*, *A. varicolor* and *A. ruficapilla* were emerge as first fortnight of August to second fortnight of August. The *Adoretus versutus*, *A. duvauceli* and *Mimela fulgidivittata* were emerge as first fortnight of August to first and second fortnight of September.

In the subfamily Scarabaeinae were consist of four species viz. *Onthophagus ramosellus*, *O. gazella*, *Catharsius pithecus* and *C. molossus*. The occurrence pattern of *O. ramosellus*, *O. gazella*, *Catharsius pithecus* were first to second fortnight of August and the *C. molossus* emerge as late from first fortnight of

September to Second fortnight of October.

In the Subfamily Dynastinae were consist of three species like *Oryctes rhinoceros*, *Protactia alboguttata* and *Phylloganthus dionysius*. The *P. alboguttata* was emerge earlier from first to second fortnight of August. The *O. rhinoceros* and *P. dionysius* were emerge from first to second fortnight of September.

In the Sub family Cetoniinae were consist of three species like *Oxycetonia albopunctata*, *O. vericolor* and *chiloloba acuta*. These species were emerge as first and second fortnight of August to first and second fortnight of September during the year of 2011-12.

During the year of 2012-13 the seasonal occurrence pattern for each species is unique and specific to a certain time period. In the subfamilies Melolonthinae occurrence pattern were early like *Meladera insanabilis* emerge as early during second fortnight of March to second fortnight April, whereas *Holotrichia nagpurensis* emerge as first frothnight of June to second fortnight of September and it was the dominate species of white grubs in this region , *H. nr freyi* emerge as second fortnight of June to second fortnight of August, *H. sp. Indet* emerge as second fortnight of July to second fortnight of September, *Schizonycha ruficollis*, *melolontha cuprescens* and *Lepidiota sp.* were emerged as first fortnight of July to second fortnight of August.

In the subfamily Rutelinae were consist of nine species like *Anomala bengalensis*, *A. dimidiata*, *A. rugosa*, *A. sp. indet*, *A. varicolor*, *A. ruficapilla*, *Adoretus versutus*, *A. duvauceli* and *Mimela fulgidivittata* and occurrence pattern, *Anomala bengalensis* and *A. dimidiata* were emerge as first fortnight of July to second fortnight of August, *A. dimidiata* was the dominate species of this subfamilies. *A. rugosa*, *A. sp. indet*, *A. varicolor* and *A. ruficapilla* were emerge as first fortnight of July to second fortnight of August and first and second fortnight of August. The *Adoretus versutus* and *A. duvauceli* were emerge as first and second fortnight of July to August and *Mimela fulgidivittata* was emerge as to first to second fortnight of August during the year of 2012-13.

In the subfamily Scarabaeinae were consist of four species viz. *Onthophagus ramosellus*, *O. gazella*, *Catharsius pithecus* and *C. molossus*. The occurrence pattern of *O. ramosellus*, *O. gazella* and *Catharsius pithecus* were first to second fortnight of July and the *C. molossus* emerge as late from first to second fortnight of September during the year of 2012-13.

In the Subfamily Dynastinae were consist of three

species like *Oryctes rhinoceros*, *Protaetia alboguttata* and *Phylloganthus dionysius*. The *Oryctes rhinoceros*, *Protaetia alboguttata* and *Phylloganthus dionysius* were emerge from first to second fortnight of August, first fortnight of July to first fortnight of August and second fortnight of July to first fortnight of August during the year of 2012-13.

In the Sub family Cetoniinae were consist of three species like *Oxycetonia albopunctata*, *O. vericolor* and *chiloloba acuta*. These species were emerge as first and second fortnight of July to second fortnight of August during the year of 2012-13.

REFERENCES

- Arrow G J (1910) *The Fauna of British India including Ceylon and Burma*. Col. Lamell. I (Cetoniinae & Dynastinae). Taylor & Francis, London, V-XIV, 1-322.
- Arrow G J (1917) *The Fauna of British India including Ceylon and Burma*. Col. Lamell. II (Rutelinae). Taylor & Francis, London, V-XIII, 1-387, 7 Fig., 5 pls.
- Arrow G J (1931) *The Fauna of British India including Ceylon and Burma*. Col. Lamell. III, (Coprinae). Taylor & Francis, London, XII : 1-428, 61 fig., 19 pls., map.
- Borenmissza G F (1970) Insectary studies on the control of dung breeding flies by the activity of dung beetle, *Onthophagus gazella* F. (Coleoptera: Scarabaeinae). *J. Aus. Ent. Soc.* **9**, 31-41.
- Chandra K, D Gupta, V P Uniyal, M Bharadwaj and K A Sanya (2012) Studies on scarabaeid beetles (Coleoptera) of govind wildlife sanctuary, Garhwal, Uttarakhand, India. *Biological Forum – An Int. J.* **4** (1), 48-54.
- Chatterjee S K (2010) Insecta: Coleoptera: Scarabaeidae (Cetoniinae, Dyanstinae, and Rutelinae), Fauna of Uttarakhand, State, fauna Series, 18 (Part-2): 311-321.
- Estrada A and R coates-Estrada (1991) Howler monkeys, dung beetles (Scarabaeidae) and seed dispersal: Ecological interactions in the tropical rainforest of Los tuxlas, Mexico. *J. Trop. Ecol.* **7**, 459-474.
- Fincher G T (1981) The Potential value of dung beetles in pasture ecosystem. *J. Georg. Entomol. Soc.* **16**(2), 316-333.
- Jameson, Mary, Liz and Ratcliffe, C Brett (2001) Scarabaeoidea: Scarabaeoid beetles (= Lamellicornia) (URL: <http://www.museum.unl.edu/research/entomology/Guide/Scarabaeoidea/Scarabaeoidea-ages/Scarabaeoidea-Overview/ScarabaeoideaO.html>). In, B.C. Ratcliffe and M.L. Jameson (eds.), Generic Guide to New World Scarab Beetles (URL: <http://www-museum.unl.edu/research/entomology/Guide/index4.htm>). Accessed on: 15.02.2012
- Larsen T (2004) Dung beetle extinctions and ecological function. <http://www.princeton.edu/kremen/trond.htm>
- Mittal I C (1993) Natural manuring and soil conditioning by dung beetles. *Tropical Ecology* **34**(2), 150-159.
- Mittal I C (1999) Annotated list of scarab fauna (Scarabaeidae: Coleoptera) of Western Uttar Pradesh (India). *Ann. Entomol.* **17**(2), 25-43.
- Mittal I C (2005) Diversity and Conservation Status of Dung Beetles (Laparosticti: Scarabaeidae: Coleoptera) in North India. *Bull. National Institute of Ecology* **15**, 43-51.