

Preliminary studies on biodiversity of dung beetle in Palus Tehsil, Dist- Sangli, (MS)

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Abstract

Coleoptera is the largest order of the phylum Arthropoda. It includes nearly about 3, 30, 000 species of beetles (Richard and Davis 1994). *Scarabaeidae* is one of the largest families of beetles in the order Coleoptera. *Scarabaeidae* is one of the largest families of beetles in the order Coleoptera. This family includes some of the largest and most striking of all coleopteran insects. Collected beetles were separated, counted species-wise, & preserved. The study was carried out from Dec. 2014 to April 2015. The beetles were identified with the help of available literature (Arrow, 1931) ^[10]. The diversity studies on the dung beetles from the Palus Tehsil, Sangli District, revealed the presence of 12 species of dung beetles under 7 genera in the two subfamilies, i.e., *Coprinae* and *Aphodinae*. The subfamily *Coprinae* represents 11 species of dung beetles, and *Alphodinae* one species of beetles. Studies on the diversity of coprophagous beetles in and around Palus Tehsil indicate this diverse assemblage of beetles from Sangli district will give a thorough understanding of dung beetles from Palus Tehsil, Sangli district.

Keywords: Dung beetle, diversity, species

Introduction

Coleoptera is the largest order of the phylum Arthropoda. It includes nearly 330,000 species of beetles (Richard and Davis 1994). The dung beetle is a member of the *Scarabaeidae* family and the order Coleoptera. Coleoptera is a vastly diverse order with a vast number of species found in both watery and terrestrial habitats worldwide. *Scarabaeidae* is one of the largest families of beetles in the order Coleoptera. This family includes some of the largest and most striking of all coleopteran insects. It is classified into 14 subfamilies, viz. *Coprinae*, *Pleocominae*, and *Agiatinae*, *aphodinae*, *ochodacinae*, *hybosserinae*, *glyphyrinae*, *geotrurinae*, *acanthicerinae*, *troginae*, *Melolonthinae*, *Rutelinae*, *Dynastinae*, and *Cetoniae* (Veeresh 1980) ^[13]. The term dung beetle has been applied to the members of three subfamilies of *Scarabaeidae*, i.e., *Coprinae*, *Aphodinae*, and *Geotrurinae*. These beetles are found in almost all parts of the world and in great abundance in warmer regions (Arrow 1931 and Balthasar 1964) ^[10, 11].

Dung beetles play a small but remarkable role in the pasture ecosystem. They feed on the animal's excrement and use excrement to provide housing and food for their young ones (Veeresh, G.K. Dung 1980) beetles are definitely beneficial insects to mankind. It is an observed fact that human or animal excrement remains on the surface for a longer period in those places where *scarabaeinae* are scarce or absent (Miller, 1954; Halffter and Mathews, 1966) ^[2].

The present information regarding dung beetles is from Palus Tehsil, Sangli District. In the present study, efforts have been made to determine the dung beetle diversity from this region.

Experimental

1. Materials

The following 8 sites were selected for the study of dung beetles: Kundal, Palus, Tupari, Ghogaon, Bambawade, Amnapur, Dudhondi, and Pundi. The dung beetles are easily drawn to the cattle droppings by odour. An average of 20 dung pads of 1-liter capacity (approx.) were selected for the sampling. All the dung beetles collected from dung pads were brought to the laboratory in a perforated plastic container along with some quantity of dung obtained from the same dung pads and maintained under laboratory conditions.

2. Methods

Usually one or two days-old dung pads were selected for the collection of dung beetles, and beetles were collected by handpicking from dung, then collected beetles were killed, separated, counted species-wise, and preserved. The study was carried out from Dec. 2014 to April 2015. The beetles were identified with the help of available literature (Arrow, 1931 and Balthasar, 1964) ^[10, 11].

3. Result and Discussion

The diversity studies on the dung beetles from the Palus Tehsil, Sangli District, revealed the presence of 12 species of dung beetles under 7 genera in the two subfamilies, i.e., *Coprinae* and *Aphodinae*. The

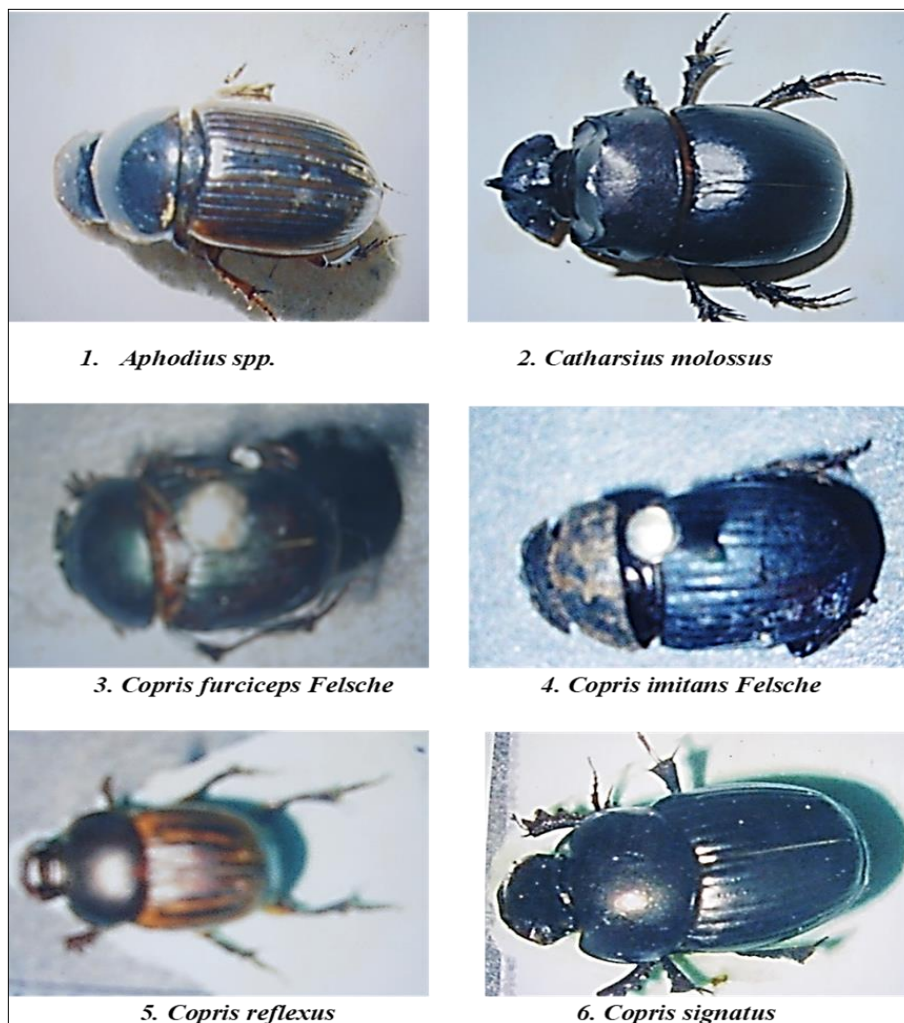
subfamily *Coprinae* represents 11 species of dung beetles, and *Alphodinae* one species of beetles. The dung beetles that were encountered during the study are presented in Table No. 1.

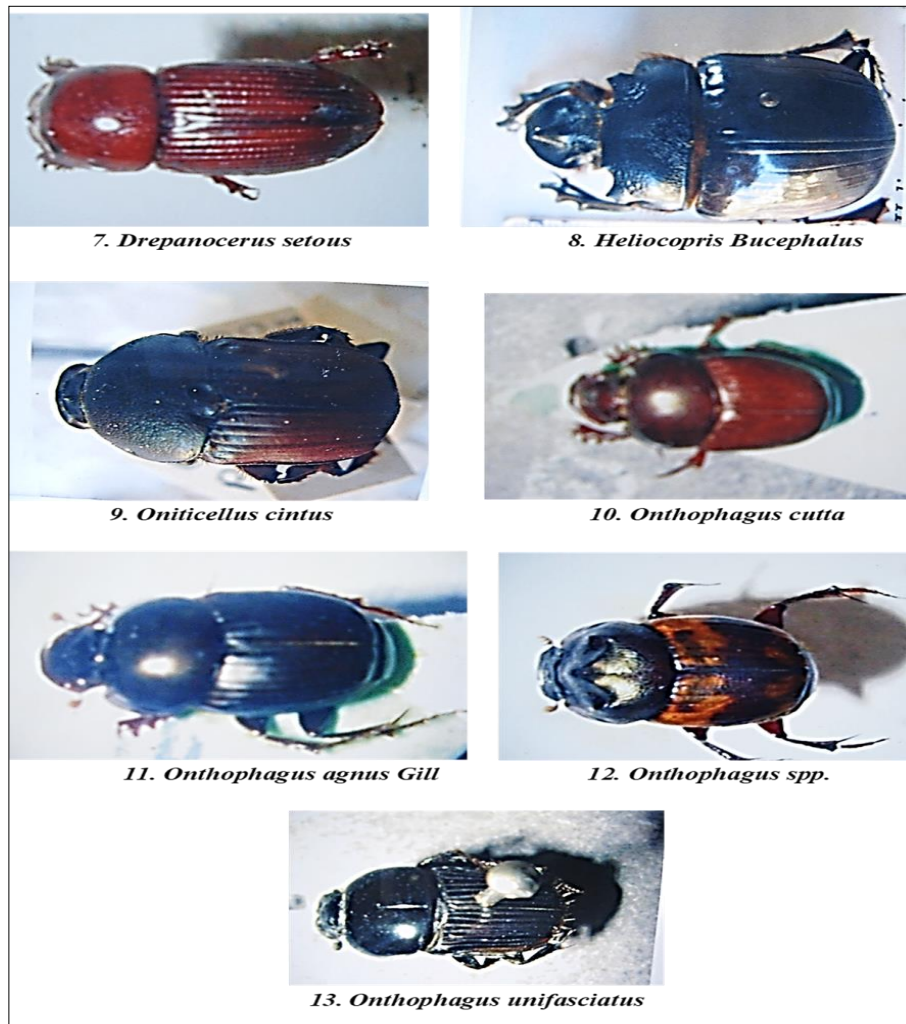
Table 1: Dung beetles were reported during the present study

Sr. No	Sub – family	Scientific Name	Collection sites
1.	I. Coprinae	<i>Helicorhis bucephalus</i>	Kundal, Palus, Tupari, Ghogaon, Bambawade, Amnapur, Dhudhandi, Pundi.
2.		<i>Catharsius molossus</i>	Kundal, Palus, Tupari, Bambawade, Amnapur, Dhudhandi.
3.		<i>Copris imitans</i>	Kundal, Palus, Tupari
4.		<i>Copris furciceps</i>	Bambawade, Amnapur, Dhudhandi, Pundi.
5.		<i>Copris reflexus</i>	Bambawade, Amnapur, Dhudhandi, Pundi.
6.		<i>Copris signatus</i>	Kundal
7.		<i>Onthophagus catta</i>	Palus, Pundi
8.		<i>Onthophagus agnus</i>	Kundal, Palus, Tupari, Ghogaon, Pundi. Bambawade, Amnapur, Dhudhandi,
9.		<i>Onthophagus spp.</i>	Palus, Tupari, Ghogaon, Bambawade
10.		<i>Onthophagus unifasciatus</i>	Kundal, Palus, Tupari, Ghogaon, Bambawade,
11.		<i>Oniticellus cintus</i>	Amnapur, Dhudhandi, Pundi. Kundal, Palus, Tupari, Ghogaon, Bambawade,
12.	II. Aphodinae	<i>Drepanocerus setous</i>	Amnapur
13.		<i>Aphodius sp.</i>	Kundal, Palus, Tupari, Ghogaon, Bambawade, Amnapur, Dhudhandi,

the selected sites are *Onthophagus agnus*, *O. unifasciatus*, *Oniticellus cintus*, *Aphodius spp.*, *Heliocopris*, and *Catharsius molossus*. This means the members of the subfamilies Coprinae and Aphodinae are common in all the sites (M.J. Jadhav and R.M. Sharma, 2012) [8]. Kailash Chandra (2000) [4]. studies the diversity and scarabacid beetle in Madhya Pradesh and reported the presence of 94 species and 30 genera distributed over nine subfamilies. Newton and Malcom (1985) studied the coprophagous beetle of Kanha Tiger Reserve. They reported 22 spp. of dung beetle from Kanha Reserve, but the dung beetles collected from the Palus region during the study period were very few; it is because of compact soil from these sites that prevents the nidification of beetles. Previously it was proved

that the shallow soil contains reduced scarabaeid fauna (Halffter 1991) [3]. In addition to this, one more threat to the Coprophagus beetles in the pasture ecosystem is the widespread use of insecticide. Increased fertilizer uses and higher-producing forage varieties have boosted forage yield. Increasing in turn the animal carrying capacity per unit of pasture, and also the extensive use of insecticides, herbicides, fungicides, and anthelmintic may be responsible for reducing dung beetle population. (Habeck *et al.* 1990) [1]. Studies on the diversity of coprophagous beetles in and around Palus Tehsil indicate this diverse assemblage of beetles from Sangli district will give a thorough understanding of dung beetles from Palus Tehsil, Sangli district.





Conclusions

This study provides a preliminary understanding of the dung beetle biodiversity in Palus Tehsil there is still much to explore. Future studies should aim to provide a more comprehensive survey of dung beetle species throughout different seasons, as dung beetle activity and composition can vary with seasonal changes. Furthermore, more detailed ecological studies focusing on the specific habitat requirements and the impacts of various land-use changes on dung beetle populations are needed.

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References

- Habeck DH, Bennett FD, Frank JH, Classical biological control in southern United States. Southern cooperative series Bulletin, 1990, 355.
- Halffter G, Mathewa EG, Folia Entomologica Mexicana,1996:12(14):1-312.
- Halffter G. Historical geological distribution of beetles Coleoptera: Scarabaeidae: Scarabaeinae. Folia Entomologica Mexicana,1991:82:195-238.
- Chandra K. Inventory of scarabaeid beetles (Coleoptera) from Madhya Pradesh, India. Zoos Print Journal,2000:15(11):359-362.
- Miller. Studies on dung beetles and other insects in relation to human faeces in a book worm area of southern Georgia, 1991.
- Richards OW, Davies RG. Imm s. General Text Book of Entomology. 10th Ed. Chapman Hall, London, 1977.
- Veenakumari AK, Veeresh GK, Dung beetle Coleoptera: Scarabaeidae: Scarabaeinae fauna of Bangalore, Karnataka. Journal of the Bombay Natural History Society,1997:94(1):171-173.
- Jadhav MJ, Sharma RM, Insecta: Coleoptera: Scarabaeidae: Scarabaeid beetles. Fauna of Maharashtra, State Fauna Series,2012:20(2):489-494.
- Nichols E, Spector S, Louzada J, *et al.* Ecological functions and ecosystem services provided by Scarabaeinae dung beetles. Biological Conservation,2008:141:1461-1474.
- Arrow GJ. Coprinae the fauna of British India including Ceylon and Burma. Vol. V-XII. Taylor & Francis, London, 1931, 128.
- Balthasar. Monographie der Scarabaeidae Aphodiidae der Palaearktischen and Orientalischen Region. Prague, Verl. Tschechosl Akad. Wissensch,1964:3:652.
- Trigunayat K, Sharma J. Diversity and ecology of Coleoptera in India: A review. Journal of Entomology and Zoology Studies,2017:5(2):1422-1429.
- Veeresh GK, Larval taxonomy of white grubs with special reference to Melolonthinae beetles. Final report of ICAR Ad-hoc project. Department of Entomology, Agricultural College, Hebbal, Bangalore, 1980.