



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(2): 2560-2562

© 2018 JEZS

Received: 10-01-2018

Accepted: 16-02-2018

Farheen Deeba SoomroDepartment of Zoology,
University of Sindh, Jamshoro,
Pakistan**Riffat Sultana**Department of Zoology,
University of Sindh, Jamshoro,
Pakistan

Incidence of darkling beetles (Coleoptera: Tenebrionidae) from lower Sindh Tando Jam Hyderabad

Farheen Deeba Soomro and Riffat Sultana

Abstract

Family Tenebrionidae has great economic importance as it contains insect pest that are cosmopolitan in nature and most imperatively are associated with stored products. Darkling beetles are a large group of insects that belong to the family Tenebrionidae. Therefore, this study was under observation. During this survey a total of 120 specimens of Tenebrionidae were collected and sorted out into 06 species Viz: *Tribolium castaneum* (Herbst, 1797), *Tribolium confusum* (Jaquelin du Val, 1863), *Trachyderma hispida* (Forsk., 1775), *Eleodes obscures* (Say, 1824), *Gonocephalum misellum*, *Alphitobius diaperinus*. (Panzer, 1797). However, it was noticed that more dominate genera were *Tribolium* (Herbst, 1797) and *Alphitobius* (Panzer, 1797) in this region. It was a first ever effort carried out from this region.

Keywords: Tenebrionidae, incidence, economic important, agriculture

1. Introduction

Beetle is a very diversity group of class insecta. The family Tenebrionidae, the darkling beetles, is one of the largest beetle family. The family name comes from the Latin *Tenebrio*, meaning one who loves darkness. People raise darkling beetle larvae, known as mealworms, as food for birds, reptiles, and other animals. Beutel RG, Leschen RAB ^[1]. It is of a great economic importance as it contains insect pests that are cosmopolitan in nature and most imperatively are associated with stored products. Tenebrionidae is the fifth largest and most diverse family within order Coleoptera that contains more than 18,000 insect species (15000 described) worldwide. Tahir *et al.* ^[2-3] (Anwar *et al.* ^[4-5]). The Considerable taxonomic work has been carried out on Tenebrionidae in cultivated areas. These darkling beetles that inhabit in the most torrid desert can survive in temperature of 50°C. They normally burrow under the stones bark and leaf litters and they have long legs that keep their bodies at a safe distance from the burning sand and enable them to move speedily. Many darkling beetles have a very interesting defense mechanism. If disturbed, they assume a head down and tail up position, and if handled roughly, they emit a dark-colored, foul-smelling fluid. This behavior is enough to discourage all but the most determined predators. Infect other families of beetle have been studied from the Sindh but there is no work has been done on the Incidence of this. Yet, therefore present attempt is being carried out.

2. Material and Method

i. Sampling

Due to enlarge size specimen easily collected by hand directly. The main sources of collection for this family are.

1. Soil surface of different farm.
2. Soil surface of Jungle area.
3. Under the rocked of mountain area.
4. Store grain storages area

However, some insect also collected by using aspirator (stored grains), light traps and pitfall traps. The light traps having 250 W mercury vapors light and paced next to a white sheet of cloth (3x2 sqm. However, pitfall traps involved plastic containers (8 cm top width, 10cm bottom width) fill with animal dung (1/3 portion) and sunk in the ground. Further these traps monitored monthly for insect collection and all insect species brought at Entomology Bio-

Correspondence

Farheen Deeba SoomroDepartment of Zoology,
University of Sindh, Jamshoro,
Pakistan

Control Research Laboratory (EBCRL) Department of Zoology, University of Sindh for further analysis.

ii. Depository

All the collected insect specimens put in the close glass tubes those were further cover with a close plastic and kept inside the refrigerator thus killing and saving of specimen assured for several days until the stapling performed. The stapling performed by using insect pins on the black enamel of different sizes (2, 3 and 4). A label adhered containing the information regarding areas of the insect collections.

1. Dates of collection.
2. Name of the collector.
3. Number of specimen and depository centers.

iii. Imaging

The whole body image and scale characters of the insects observed by using Nikon Camera 18 Mega Pixels and 42 HD Coolpix (P-520).

3. Result

During present survey a total of 120 specimens were collected in month of September 2016 to 2017. Sub family Tenebrioninae is representing by four genera with five species i.e *Tribolium castaneum*, *Tribolium confusum*, *Eleodes obscures*, *Gonocephalum misellum*, *Alphitobius diaperinus*. While one species i. e. *Trachyderma hispida*, of subfamily Pimeliinae reported from different localities of lower Sindh. It observed that most dominant species was *Alphitobius diaperinus* by *Tribolium castaneum*.

1. *Tribolium castaneum* (Herbst, 1797)

Tribolium castaneum, the flour beetle. It is a pest in flour and dried foods. Its life span can be as long as ten years, and it can fly. The last three segments of the antennae are abruptly enlarged to form a club flat and elongated. The antenna of the red flour beetle ends in a 3-segmented club and the sides of the thorax are slightly curved. The head of the red flour beetle visible from above does not have a beak. Flour beetles are tiny creatures and their appendages even smaller, so all observations must be done under a light microscope. On females, the genital papillae are pointy, with 2 darker dots on the tip of each, and roughly half the size of the urogomphi (they resemble tiny fingers). On males, the genital papillae are stubby, conjoined, and barely noticeable. If female papillae resemble with fingers, these look more like 2 conjoined thumbs.

Table 1: The measurement of various body parts of *Tribolium. Castaneum*

Parameters	Mean \pm S. D	
	Male(n=8mm)	Female (n=8mm)
Antennal segment	9.8 \pm 0.4	9.8 \pm 0.4
Antennal length	1.89 \pm 0.45	1.87 \pm 0.7
Length of Head	1.68 \pm 0.43	1.1.52 \pm 0.3
Distance between Eyes	1.33 \pm 0.34	1.6 \pm 0.23
Length of Pronotum	2.34 \pm 0.28	2.07 \pm 0.3
Length of Abdomen	0.8 \pm 1.17	7.17 \pm 1.48
Length of Femur	2.34 \pm 0.28	2.30 \pm 0.72
Length of Tibia	1.9 \pm 0.25	1.9 \pm 0.8
Total body Length	11 \pm 1.4	5 \pm 1.24

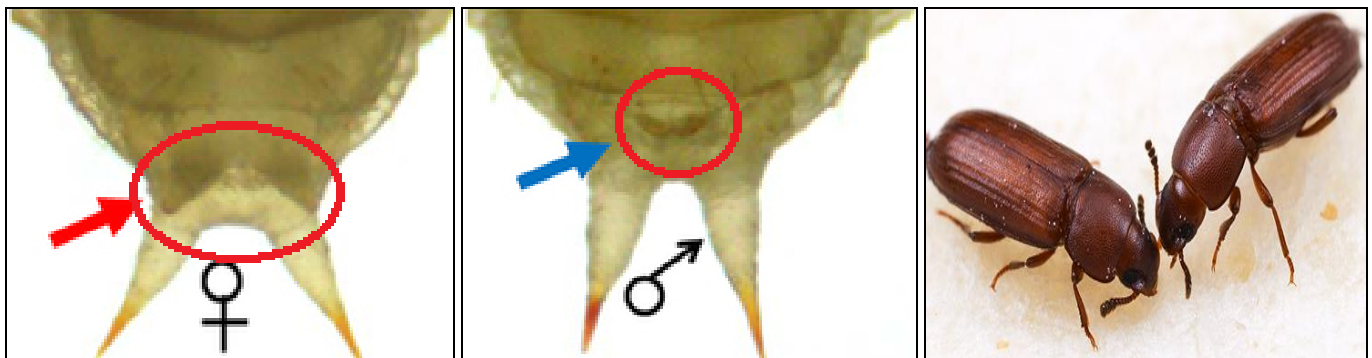


Fig 1: Difference between male and female in pupal stage

Remarks

Weston and Rattlingour [6] Fozia Dars *et al.* [7] Khalil [8]. Stated that red flour beetles attack on stored grain products such as flour, cereals, meal, crackers, beans, spices, pasta, cake mix, dried pet food. These species do not feed or damage the structure of a home or furniture. We have collected this species from PARC (Pakistan Agriculture Research Centre) Tando jam and observed that this species has dried chewing

mouthparts, but do not bite or sting.

2. *Alphitobius diaperinus* (Panzer, 1797)

Body surface is dotted with puncture-like impressions. The antennae are paler at the tips and are covered in tiny, yellowish hairs. Elytra shiny black, brown or reddish brown in color. Color variation associated with sex and age of the individual. Elytra has shallow longitudinal grooves.

Table 2: The measurement of various body parts of *Alphitobius diaperinus*

Parameters	Mean \pm S. D	
	Male (n=10mm)	Female (n=10mm)
Antennal segment	7.3 \pm 5.68	9.16 \pm 4.49
Antennal length	0.33 \pm 0.29	0.90 \pm 0.63
Length of Head	1.41 \pm 0.12	1.24 \pm 0.38
Distance between Eyes	1.51 \pm 0.17	1.72 \pm 0.51
Length of Pronotum	2.01 \pm 0.44	2.23 \pm 0.27
Length of Abdomen	2.40 \pm 0.31	3.58 \pm 0.68
Length of Femur	2.34 \pm 0.27	1.63 \pm 0.29
Length of Tibia	2.04 \pm 0.30	1.63 \pm 0.29
Total body Length	3.32 \pm 0.25	5 \pm 1.24

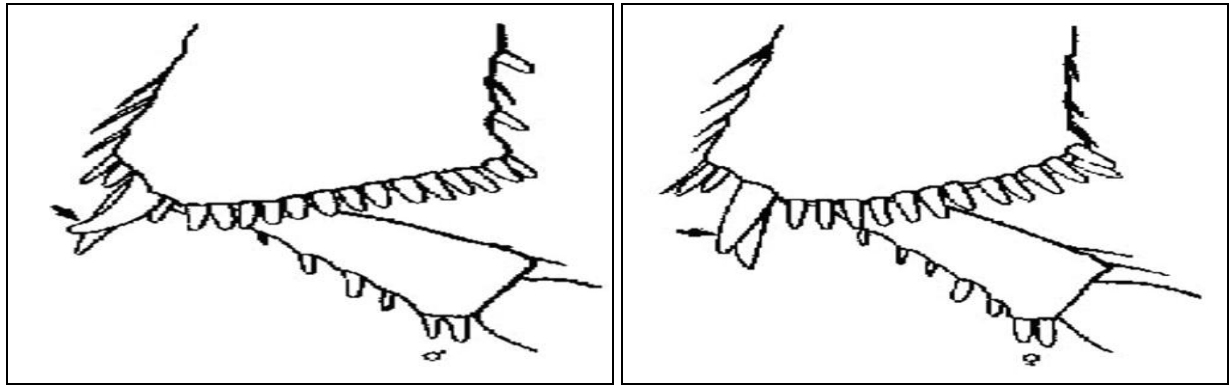


Fig 2: One straight and one curved metathoracic tibial spine in male, while both spines were straight in female of *Alphitobius diaperinus*

Remarks

Grimm, ^[9-10]. *Alphitobius diaperinus* is usually infesting flour, meal, and other grain products, especially in poorly maintained grain processing plants Spilman ^[11]. It has also been reported from linseed, cottonseed, oilseed products, tobacco, and drugs Hosen *et al.* ^[12]. Because of its tropical origin, the lesser mealworm is well suited for warm, humid conditions. The lesser mealworm may be found in any area where there is damp or moldy manure, litter, grain, milled products, or spoiling food. This condition is usually found wherever there is livestock or poultry, occurrence. High populations of the beetles may become a nuisance in farms and surrounding communities. It easily colonizes agricultural establishments with abundant food sources and warm conditions such as grain processing and storage facilities and poultry housing. During this survey we have collected this species from a poultry form of different areas of lower Sindh Hyderabad. And we observed under microscope that there is one straight and one curved met athoracic tibial spine in male, while both spines were straight in female.

4. Conclusion

It has been conducted that two subfamilies i. e. Tenebrioninae and Pimeliinae of family Tenebrionidae especially considering darkling beetles in Pakistan (Sindh) as it has significant impact worldwide. All the insects collected through different methods like light trap and pitfall trap to observed their distribution and seasonal abundance. But most of the insect species in these subfamilies were large in size and collected by hand directly from different part of Sindh Pakistan during September 2016 to 2017. These traps monitored monthly and a total number of Tenebrionidae calculated from all study sites. During this survey were captured 06 species. viz: *Tribolium castaneum*, *Tribolium confusum*, *Trachyderma hispida*, *Eleodes obscures*, *Gonocephalum misellum*, *Alphitobius diaperinus*. Were captured with two dominate genera i. e. *Tribolium* (Herbst, 1797) and *Alphitobius* (Panzer, 1797) from this region. It was also noticed that many of the larger species are flightless and not capable for high flight. i. e. *Tribolium molitor*. But this behavior is under observation needed more research on this expect by future workers.

5. Acknowledgement

First author is highly thankful to Mr. Manzoor Ahmed Khoro owner of Latif Farm Tando jam who allow me regular visit and insulation of Pitfal trap in the various places in his farm.

6. References

1. Beutel RG, Leschen RAB. Handbook of Zoology: A Natural History of the Phyla of the Animal Kingdom.

Volume IV Arthropoda: Insecta, Part 38. Coleoptera, Beetles. Volume 1: Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim), 2005.

2. Tahir S, Anwar T, Ahmed I, Aziz S, Ashiq M, Ahad K. Determination of pesticide residues in fruits and vegetables in Islamabad Market. Journal Environment Biology. 2001; 2(1):71-74.
3. Tahir S. Pesticide effect on Human Health in Pakistan. Policy and strategy for rational use of pesticide, Pakistan 99/002/FAO, 2000, 57.
4. Anwar MA, Mubarak A, Noor U. Thermodynamic of wheat stored in metallic bins and its relationship with insect pest development. Pakistan Entomology.1995; 17:46-50.
5. Anwar T, Tahir S, Ahmad I, Hayat YH. Pesticide residues in vegetables collected from markets of Mardan (NWFP), Lahore and Faisalabad (Punjab), Pakistan, 2004.
6. Weston PA, Rattlingourd PL. Progeny production by *Tribolium castaneum* (Coleoptera: Tenebrionidae) and *Oryzaephilus surinamensis* (Coleoptera: Silvanidae) on maize previously infested by *Sitotroga cerealla* (Lepidoptera: Gelechiidae) Journal of Economic Entomology. 2000; 93:533-536.
7. Dars F, Rustamani MA, Khuhro RD, Baloch HB. Effect of grain moisture on infestation of red flour beetle, *Tribolium castaneum* (Herbst.) on wheat varieties. Pakistan Journal of Zoology. 2001; 33:189-192.
8. Khalil SK, Irshad M. Field estimates and population growth rate of some important grain pests and wheat stored at farm level in northern Pakistan. Sarhad Journal of Agriculture. 1994; 10:273-278.
9. Grimm. aus Indien und Thailand (Coleoptera, Tenebrionidae, Palorinae). Entomological Basiliensia. 2004; 26:293-298.
10. Grimm R. Guanobius borneensis n. gen. n. sp. from Borneo (Coleoptera: Tenebrionidae: Alphitobiini). *Stuttgarter Beiträge zur Naturkunde A, Neue Series*. 2008; 1:375-379.
11. Spilman TJ. 11, Darkling Beetles (Tenebrionidae, Coleoptera). In Insect and Mite Pests in Food. (Gorham JR, ed). United States Department of Agriculture, Agricultural Handbook. 1991; 655:185-214, 589-598.
12. Hosen M, Khan AR, Hossain M. Growth and development of the lesser mealworm *Alphitobius diaperinus* (Panzer) (Coleoptera: Tenebrionidae) on cereal flours. Pakistan Journal of Biological Sciences. 2004; 7:1505-1508.