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POPULATION FALUCTUATION OF (TENEBRIONIDAE: COLEOPTERA) IN LOWER SINDH

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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 100 specimens of Tenebrionidae were collected and sorted out into 04 species Viz: *Tribolium castaneum* (Herbst, 1797), *Tribolium confusum* (Jaquelin du Val, 1863), *Trachyderma hispida*(Forskal, 1775), *Trachyderma lima* (L. Petagna, 1819)**.** However, it was noticed that more dominate genera were *Trachyderma* in this region. It was a first ever effort carried out from this region.

1. INTRODUCTION

The family Tenebrionidae, the darkling beetles, is one of the largest beetle family. Beutel and Leschen [1] reported that family Tenebrionidae contains about 20,000 species and 2,300 genera belonging to tropical habitats. 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. Beetle is a very diversity group of class insecta [2,3,4,5]. 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 50ºC. 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-

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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. MATERIALS AND METHODS

2.1 *Sampling*

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

- Soil surface of different farm.
- Soil surface of Jungle area.
- Under the rocked of mountain area.
- Store grain storages area knock down, sweeping of vegetation

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 from the different regions of lower Sindh which is Hyderabad, Jamshoro, Tandojam Research center . Subfamilies and tribes were given in phylogenetic order. The information concerning specific name, describer and description date, locality and date of collection, place/ plant on which the species were collected, determinant and number of species was given. Further these traps monitored monthly for insect collection and all insect species brought at Entomology Bio- Control Research Laboratory (EBCRL) Department of Zoology, University of Sindh for further analysis.

2.2 *Imaging*

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

3. RESULTS

During present survey a total of 100 specimens were collected in month of May 2-5-2018 to August 2-7-2018 at during these months temperature was higher about 48^0C due to the high temperature *Trachyderma lima* collected more and the number of population was more in female as compared to male. The lifespane of female is long due to high resistance power. They can live without food ,water and air more than 6 to 7 month because of hard exoskeleton. Tenebrioninae is representing by species i.e*Tribolium castaneum*. While one species i. e. *Trachyderma lima*, of subfamily Pimeliinae reported from different localities of lower Sindh. It observed that most dominant species was *Trachyderma lima*, followed by *Tribolium castaneum*.

3.1 *Trachyderma lima* (L. Petagna, 1819)

Head slightly rectangular with reddish hairs and separated tubercles. Antennae long surpassing. Pronotum convex .Anterio rand posterior margins straight, with rounded angles. Elytra elongated wider than base of pronotum .Legs thick, tuberculated, and hairy. Abdomen with fine tubercles and short hairs.Emits a brown pungent fluid from the abdomen when handled, raises abdomen tip up to aprox. 80-70 degrees when a water droplet is placed on the back of the shell. Shell is hydrophobic. Dorsally covered with light erect setae; prosternal apophysis horizontally projecting black; more than 20 mm.

Ventral view of *Trachyderma lima*

Figure 1- *Trachyderma lima* with short setae and is diamond shaped

Table 1: The measurement of various body parts of *Trachyderma lima*

Parameters	Mean ± S.D	
	Male	Female
Antennal segments	8.33 ± 2.25	9.16 ± 5.49
Antennal length	7.7 ± 6.6	8.3 ± 5.03
Length of head	3.2 ± 2.25	4.0 ± 1.61
Distance between eyes	4.29 ± 1.85	4.75 ± 2.5
Length of pronotum	7.0 ± 2.58	7. 16 ± 2.75
Length of abdomen	17.5 ± 3.8	18.3 ± 3.16
Length of femur	9.8 ± 4.43	9.9 ± 4.75
Length of tibia	8.28 ± 2.85	9.5 ± 3
Total body length	25.15 ± 4.96	27.2 ± 5.5

Remarks:

Maeno *et al.* [6] reported that darkling beetles are being used as a bioindicator of environmental pollution after locust control operations involving the use of chemical insecticides.*Trachyderma lima* is a oval- shaped species with a wide projection between the forelegs.*Trachyderma lima*is a typical Mediterranean species and relatively rare throughout its distribution range. In lower sindh it was always found near old abandoned houses and close to old farmsteads

3.2 *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.

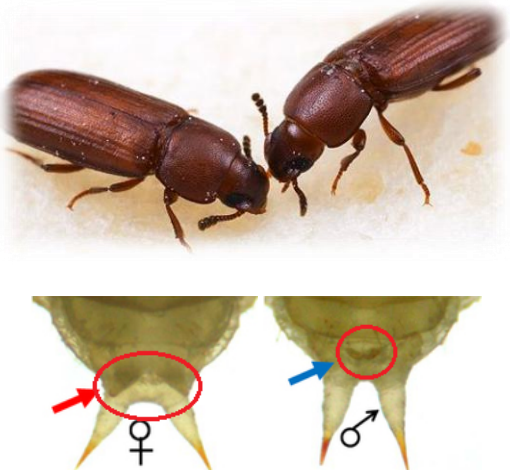

Figure 2- Difference between male and female of *Tribolium castaneum* in pupal stage.

Table 2: The measurement of various body parts of *Tribolium castaneum*

Parameters	**Mean ± S.D**	
	Male	**Female**
Antennal segment	10.8 ± 1.4	10.8 ± 1.4
Antennal length	2.89 ± 1.45	2.87 ± 1.7
Length of Head	2.68 ± 1.43	2.52 ± 1.3
Distance between Eyes	2.33 ± 1.34	2.6 ± 1.23
Length of Pronotum	3.34 ± 1.28	3.07 ± 1.3
Length of Abdomen	1.8 ± 2.17	8.17 ± 2.48
Length of Femur	3.34 ± 1.28	3.30 ± 1.72
Length of Tibia	2.9 ± 1.25	2.9 ± 1.8
Total body length	13.0 ± 2.4	6.0 ± 2.24

Remarks

Stated that red flour beetles attack on stored grain products such as flour, cereals, meal, crackers, beans, spices, pasta, cake mix, dried pet food [7,8,9]. 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.

4. CONCLUSION

It has been conducted that two subfamilies i. e. Tenebrioninae and Pimeliinae of family Tenebrionidae representing darkling beetles as it has significant pest 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 May 2018 to July 2018. These traps monitored monthly and a total number of Tenebrionidae calculated from all study sites. During this survey 04 species. viz: *Tribolium castaneum, confusum, Trachyderma hispida, lima, w*ere captured with two dominate genera i. e *Trachyderma lima*(L. Petagna, 1819). *Tribolium* (Herbst, 1797) respectively 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 it is further detail is expected in our next paper

6. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interest regarding publication of this article.

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