



TAXONOMY OF TWO GENERA *ACRIDA* AND *TRUXALIS* FROM SINDH JAMSHORO

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ABSTRACT

The grasshopper belonging to family Acrididae are of considerable economic importance to crop and rangeland fields. A total number of 100 specimen of the grasshoppers has been collected and studied from Sindh University Jamshoro, during 5 months (January-May) 2013. We identified 3 species from Jamshoro while conducting the research. Of the one species belongs to Genus *Acrida* : *Acrida exaltata* (Walker) (Green) and two species belongs to Genus *Truxalis* (a) *Truxalis eximia* (Brown) (Eichward), (b) *Truxalis fitzgeraldi* (Pink) (Drish). The genera *Truxalis* and *Acrida* were studied by Drish (1950, 1954 & 1958).

1. INTRODUCTION

There are several closely related groups of insects in the order Orthoptera that are sometimes called grasshoppers. However, most entomologists and non-entomologists consider only insects in the family Acrididae to mean grasshoppers. Acrididae are sometimes referred to as short-horned grasshoppers, a reference to their relatively short antennae. Acridids may be winged or wingless, but if winged they are fore winged. Wing size varies considerably. Short-winged grasshoppers are flightless, whereas long-winged grasshoppers are sometimes strong flyers. The forewing or first pair of wings are somewhat thickened and pigmented, they are called tegmina. The hind-wings are not thickened and may range from un-pigmented to brightly color. When the insect is not flight, the hind-wings often are large, fan-shaped and fold up under the fore-wings. Grasshoppers tend to have long legs. The hind-legs are specially elongated and enlarged to facilitate leaping as well as armed with spines for defense.

Grasshoppers produce sound by rubbing one part of body against another, though the parts involved may vary. Their hearing is often aided by the presence of tympana, auditory organs on the sides of the first abdominal segment. Singing is performed principally by males as part of their courtship ritual.

Several authors have included reference on Grasshoppers species from Sindh over considerably period of time. The genera *Truxalis*, *Acrida* were studied by Drish (1950, 1954 & 1958). Ahmed (1975-1980) surveyed the Grasshoppers from various provinces of Pakistan. Naheed Balouch (1995-1997) surveyed the taxonomy of Acridid Grasshoppers of Punjab. The first significant information was provided by Kirby (1914) in fauna of British India Acrididae.

2. MATERIALS AND METHODS

The grasshoppers were collected from sport complex club from wild weed, herbs, shrubs and vegetation during the year 2013 from January to May.

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The collection of grasshopper was made with the insect net (3.5 inches in diameter and 20 inches in length) and put into the jar containing cotton soaked in chloroform and filter paper to kill insects. Pinning of the specimen was mount within the few hours as the specimens were flexible, we inserted the insects pin on the right side of the pronotum as the insects could be fixed in the insect's storage box. We noted the time date and partial location from which the insect was collected. Stretching board were used, we pinned the specimen in center of stretching board to hold them and their wings were hold with the help of

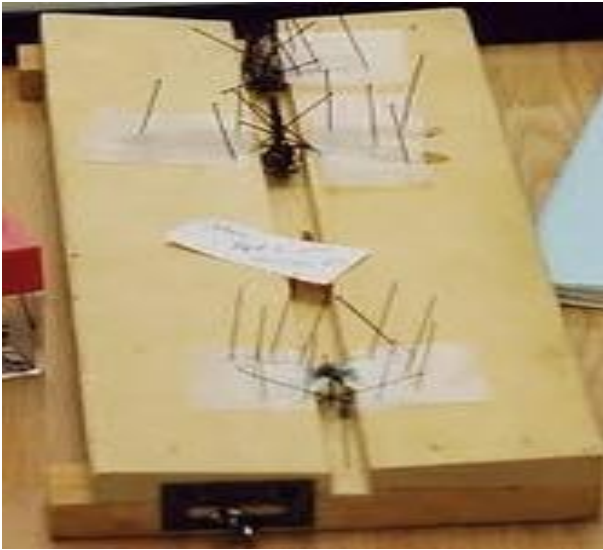


Figure.1. Stretching board



Figure.2. Insect net

3. RESULTS AND DISCUSSION

DESCRIPTION OF GENUS *ACRIDA*

The genus can be distinguished on the following basis characters; large sized insects, body elongate, almost stick like, head elongated, conical antennae enciform, gradually tapering to the apex, fastigium of vertex projecting strongly in front of eyes, fastigial foveolate absent, frontal ridge narrow, shallowly sulcate, pronotum elongate, dorsum crossed by posterior transverse sulcus only, median and lateral carinae low, but distinct tegmina and wings fully developed with acute or obtuse apex, lobes of hind knee with acute to obtuse apices, upper inner lobe slightly longer than external, arolium moderately large, shorter than claw, male with supra-anal plate triangular, circus short, conical, sub-genital plate conical, epiphallus with ancorae large, lophi bilobate, female with sub genital plate obtuse angular, weakly trilobite or almost turniculate, ovipositor short, robust with robust and slightly curved valves.

DESCRIPTION OF *ACRIDA EXALTATA*

There are short-horned grasshoppers, their body is elongated almost stick like, the size of male is short and the size of female is large. They are paler or green in color. The hind femur and hind tibia are paler brown in color. Supra-anal plate obtuse rounded. They have cercie (pair of appendages at the end of abdomen) un jointed, male have single valve at the end of abdomen, female have two valves (triangular shape) pairs at the end of abdomen used in sand when lying eggs. They have conical antennae (enciform), these are the herbivores feed on the different plants. Two pairs of wings are present, forewings narrow and relatively hard and hind-wings are membranous.

DESCRIPTION OF GENUS TRUXALIS

Body is much longer in size, paler brown or greenish in color. Antennae are the enciform, the segments are present, as long as head and pronotum together. Head larger, fastigium of vertex elongated with median carimula and rounded or widely obtuse angular margin, fastigial foveolae absent, frons in profile strongly in curved frontal ridge narrow, elongated with high carinae. Pronotum elongated, median and lateral carinae distinct, dosum crossed by posterior sluci only, metazoan much broad and raised its

posterior margin actually angular. Mesosternal inter space narrow, elongate, open tegmina and wings fully developed. Wings with tessellated pattern. Hind femur slender much elongated, dorsal genicular lobe developed into spiny like structure. Hind tibia long, narrow, spinose. Arolium small. Male supra-anal plate long, obtusely rounded posteriorly. Sub-genital plate long generally curved upward and with obtusely rounded apex. Cerici narrow and conical. Ovipositor short with curved valves.

KEY TO GENUS ACRIDA AND GENUS TRUXALIS

- 1. They are green in color. Their tegmina with a row of spots in the middle wings, with light pale green in color. Prosternal process present in*Acrida*
- _They are brown in color. Their tegmina with uniform median band wings pink or purple in color. Prosternal process absent.....*Truxalis*
- 2. Body is elongate almost stick like elongated head with enciform antennae.....*Acrida*
- _Their body is much longer in size pale brown or greenish in color enciform antennae.....*Truxalis*

Table 1: Measurement of *Acrida exaltata* females in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	60.2mm	10.5mm	10.16mm	10.6mm	10.5mm	10mm	13	green
2	70.1mm	10.18mm	10.3mm	30.6mm	10mm	10mm	10	green
3	60.4mm	10.9mm	10.14mm	20.9mm	10.3mm	10.3mm	6	green
4	60.1mm	10.4mm	10.7mm	20.1mm	10mm	10mm	9	green
5	50.5mm	10.9mm	10.1mm	30.3mm	9mm	10.9mm	12	green
6	60mm	10.5mm	10.5mm	20.3mm	10.2mm	10mm	11	green
7	70.2mm	10.3mm	10.6mm	20.2mm	40mm	10.9mm	10	green
8	71.7mm	10.5mm	10.4mm	30.1mm	10.5mm	10mm	16	green
9	62.2mm	10.9mm	10.13mm	20.8mm	10mm	0.9mm	14	green
10	60mm	9.4mm	10.mm	30.2mm	10.1mm	0.7mm	12	green
11	58.1mm	10.2mm	10.3mm	20mm	9.8mm	10.2mm	11	green
12	60mm	10mm	10.5mm	10.9mm	7.2mm	0.9mm	10	green
13	30.7mm	10.8mm	10.8mm	30.4mm	10.1mm	0.9mm	9	green
14	39.4mm	9.9mm	10.9mm	30mm	11.2mm	0.9mm	13	green
15	60mm	10.1mm	10.1mm	20.8mm	11.4mm	10mm	14	green
16	60.5mm	10.4mm	10.5mm	16.9mm	11.9mm	0.9mm	16	green
17	80.1mm	10.2mm	10.9mm	29.4mm	10.3mm	10mm	11	green
18	59.2mm	10.1mm	10.2mm	32.2mm	10.2mm	0.7mm	12	green
19	60mm	10.9mm	10.1mm	30.1mm	10.3mm	0.8mm	10	green
20	60mm	10.1mm	10.4mm	20.9mm	10.4mm	10mm	9	green
21	72.1mm	10.9mm	10.5mm	20.8mm	10.5mm	10mm	16	green
22	80.7mm	9.7mm	10.10mm	30.5mm	10.2mm	10.2mm	13	green
23	60.5mm	8.9mm	10.mm	10.2mm	7.1mm	9.5mm	12	green
24	50.4mm	10.6mm	10.1mm	20.2mm	11.6mm	10.1mm	14	green

Table 2: Measurement of *Acrida exaltata* males in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	50.1mm	10.1mm	10.16mm	10.3mm	10mm	mm	10	green
2	50.2mm	10.3mm	10.14mm	10.3mm	30.1mm	mm	10	green
3	40.3mm	10.2mm	10.3mm	20.3mm	20.3mm	mm	8	green
4	40.5mm	10mm	10.1mm	12.3mm	20.4mm	mm	10	green
5	30.8mm	10.3mm	10.14mm	11.3mm	10.1mm	mm	7	green

Table 3: Measurement of *Acrida exaltata* nymphs in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	30.4mm	0.9mm	0.9mm	0.6mm	0.7mm	0.5mm	09	green
2	30.6mm	0.5mm	0.9mm	20.1mm	30.1mm	0.6mm	09	green
3	20.3mm	10.5mm	10.14mm	1.9mm	10.9mm	0.5mm	08	green
4	40.2mm	10.4mm	0.8mm	0.8mm	0.7mm	0.6mm	09	green
5	30.9mm	10.1mm	10.3mm	0.8mm	0.9mm	0.9mm	13	green
6	30.9mm	10mm	10mm	20mm	20.1mm	0.8mm	16	green
7	30.7mm	10mm	10.2mm	0.7mm	0.9mm	0.7mm	10	green
8	30mm	0.9mm	10mm	0.6mm	0.7mm	0.4mm	17	green
9	20.8mm	0.5mm	0.8mm	0.7mm	0.7mm	0.7mm	16	green
10	20.5mm	0.9mm	0.8mm	0.5mm	0.8mm	0.6mm	17	green

Table 4: Mean and Range of *Acrida exaltata* in millimeters

Body parameters	n	Mean	Range
Total Length	25	39.2mm	39.5mm
Length of head	25	5.46mm	2mm
Length of antennae	25	7.33mm	2mm
Length of femur	25	17.47mm	19mm
Length of tibia	25	11.76mm	4mm
Length of pronotum	25	2.88mm	8mm
Segments of antennae	25	11.84mm	7mm

KEY TO *TRUXALIS EXIMIA* AND *TRUXALIS FITZGERALDI*

- They have large head and pronotum. The antennae are filiform with 18 segments.....*Truxalis eximia eximia*
_They have large head but short pronotum. The antennae are enciform with 15 segments.....*Truxalis fitzgeraldi*.
- Wings are pale yellow or deep purplish in color, the fore wings (tegmina) with series of spots found in middle region. Mesosternal inner space narrow and elongated..... *Truxalis eximia eximia*
_Wings are bright deep pink in color. The fore-wings (tegmina) with uniform median band wings are present. Mesosternal inner space narrow and short..... *Truxalis fitzgeraldi*.

Table 5: Measurement of *Truxalis eximia eximia* females in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	60.5mm	20mm	10.4mm	30.9mm	30.7mm	10.2mm	16	Brown
2	60.6mm	10.6mm	10.8mm	40.1mm	30.6mm	10.2mm	13	Brown
3	50.7mm	10.4mm	10.5mm	30mm	30.8mm	0.6mm	09	Brown
4	40.9mm	10.8mm	9.7mm	29.8mm	29.9mm	0.7mm	10	Brown
5	47.8mm	11.2mm	10.2mm	40.4mm	40.4mm	0.9mm	11	Brown
6	60.4mm	12.4mm	10mm	35.6mm	30.1mm	10mm	12	Brown
7	58.9mm	11.6mm	8.7mm	40mm	28.9mm	1.5mm	08	Brown
8	57.4mm	12.1mm	6.2mm	37.2mm	28.1mm	0.8mm	07	Brown
9	60.7mm	10.3mm	10.1mm	30mm	32.1mm	0.7mm	11	Brown
10	50.8mm	10mm	9.9mm	30.4mm	40.1mm	0.4mm	10	Brown

Taxonomy of two genera Acrida and Truxalis

11	40.7mm	20.1mm	9.7mm	29.9mm	30mm	0.9mm	12	Brown
12	48.9mm	14.2mm	10.6mm	40.2mm	25.2mm	10mm	14	Brown
13	50.2mm	10.3mm	10mm	42.0mm	26.1mm	10.3mm	09	Brown
14	60.8mm	10.7mm	9.0mm	38.9mm	18mm	9.8mm	07	Brown
15	50.4mm	10.8mm	8.9mm	40.4mm	30.7mm	0.8mm	12	Brown
16	50.3mm	10.1mm	10.4mm	35.2mm	36.4mm	0.7mm	18	Brown
17	60.2mm	10mm	10mm	40.1mm	33.2mm	0.5mm	12	Brown
18	58.9mm	10mm	10.1mm	43.2mm	30.1mm	0.3mm	10	Brown

Table 6: Measurement of *Truxalis eximia eximia* males in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	40.6mm	10.3mm	10.4mm	20.5mm	20.6mm	0.6mm	6	Brown
2	40.4mm	10mm	10.2mm	20.1mm	27mm	0.6mm	9	Brown
3	40.4mm	0.7mm	10.4mm	10.9mm	20.9mm	0.8mm	7	Brown
4	30.6mm	0.4mm	10.2mm	20.4mm	10.7mm	0.4mm	5	Brown
5	30.6mm	0.4mm	10mm	10.2mm	10.9mm	0.9mm	11	Brown
6	30.9mm	0.4mm	10.1mm	11.1mm	10.3mm	0.5mm	13	Brown

Table 7: Measurement of *Truxalis eximia eximia* nymphs in millimeters

Body parameters	n	Mean	Range
Total Length	6	35.45mm	10mm
Length of head	6	3.7mm	9mm
Length of antennae	6	10.21mm	2mm
Length of femur	6	15.53mm	9mm
Length of tibia	6	10.7mm	16mm
Length of pronotum	6	3.8mm	2mm
Segments of antennae	6	40.16	8mm

Table 8: Mean and Range of *Truxalis eximia eximia* in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	30.6mm	0.5mm	10mm	0.7mm	0.8mm	0.7mm	6	Brown
2	50.2mm	0.6mm	10.1mm	0.9mm	10.00mm	0.5mm	12	Brown
3	40mm	0.5mm	10.2mm	10.2mm	0.9mm	0.4mm	6	Brown
4	30.7mm	0.4mm	9.1mm	0.6mm	7mm	0.3mm	11	Brown
5	30.1mm	0.5mm	8mm	0.5mm	0.9mm	0.5mm	10	Brown
6	30.9mm	0.4mm	10.4mm	0.7mm	0.5mm	0.7mm	7	Brown

Table 9: Measurement of *Truxalis fitzgeraldi* females in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	30mm	10mm	0.7mm	30.2mm	30.5mm	10mm	12	Brown
2	60.3mm	10.3mm	20mm	40.3mm	40mm	10.5mm	11	Brown
3	70.3mm	10.4mm	20mm	30.1mm	30.1mm	9.6mm	10	Brown
4	50.5mm	0.4mm	10.8mm	29.9mm	30.4mm	8.9mm	10	Brown
5	60.5mm	10.4mm	10.7mm	30mm	32.2mm	10mm	13	Brown
6	50.4mm	10mm	0.9mm	32.4mm	36.9mm	10.9mm	10	Brown
7	59.1mm	9.9mm	10.4mm	31.3mm	30mm	10.2mm	9	Brown
8	30.5mm	10.3mm	10mm	40.1mm	27.2mm	10.7mm	8	Brown
9	40.2mm	10.4mm	10.3mm	42.2mm	31.4mm	10mm	11	Brown

Table 10: Measurement of *Truxalis fitzgeraldi* males in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	30.3mm	0.4mm	10.2mm	20.2mm	10mm	10.2mm	8	Brown
2	30.6mm	0.5mm	9.2mm	30.1mm	20.4mm	8.1mm	9	Brown
3	40.5mm	0.4mm	10mm	20.4mm	30.2mm	10mm	7	Brown
4	32.8mm	0.5mm	10.2mm	10mm	40mm	9.9mm	10	Brown
5	39.2mm	0.7mm	10.4mm	10.4mm	10.9mm	16.4mm	11	Brown
6	40.1mm	0.6mm	8.9mm	10.7mm	9.9mm	10.2mm	12	Brown
7	42.2mm	0.4mm	10.1mm	10.6mm	21.2mm	10.2mm	13	Brown

Table 11: Measurement of *Truxalis fitzgeraldi* nymphs in millimeters

S.NO.	T.L	L.H	L.A	L.F	L.T	L.P	S.A	C
1	40.9mm	10.5mm	20.1mm	30.1mm	20.6mm	10mm	5	Brown
2	60.5mm	10.7mm	10.7mm	30mm	30.5mm	10.2mm	11	Brown
3	50.1mm	10.1mm	10.3mm	20.7mm	20.7mm	10.2mm	10	Brown
4	30.4mm	10.1mm	10.2mm	6.7mm	0.6mm	0.5mm	10	Brown
5	20.1mm	10.1mm	10.5mm	0.7mm	30mm	0.6mm	12	Brown
6	30.5mm	10.5mm	10.1mm	10.1mm	10.9mm	0.9mm	15	Brown
7	40.5mm	10.5mm	10.6mm	20.9mm	20.4mm	10mm	12	Brown

Table 12: Mean and Range of *Truxalis fitzgeraldi* in millimeters

Body parameters	n	Mean	Range
Total Length	10	39.00mm	40mm
Length of head	10	11.8mm	1mm
Length of antennae	10	10.2mm	10mm
Length of femur	10	119.1mm	29mm
Length of tibia	10	45.5mm	25mm
Length of pronotum	10	6.05	9mm
Segments of antennae	10	10.71mm	10mm

4. CONCLUSION

As a result of present research, 100 specimens were collected from Sindh University Jamshoro. Of these one species from Genus *Acrida* and two species from Genus *Truxalis* were identified. From Genus *Acrida* we identified *Acrida exaltata* and from Genus *Truxalis*, *Truxalis eximia eximia* and *Truxalis fitzgeraldi*. We have collected 25 females, 6 males and 10 nymphs of *Acrida exaltata*. We also have collected 20 females, 4 males and 7 nymphs belonging to *Truxalis eximia eximia*. We also have identified 9 females, 10 males and 10 nymphs of *Truxalis fitzgeraldi*. All the specimens were collected in the duration of 5 months (January to May 2013).

5. CONFLICT OF INTEREST

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

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