# PRELIMINARY STUDIES ON THE OCCURRENCE OF ORTHOPTERA FROM DISTRICT JAMSHORO

**RIFFAT SULTANA, WASEEM ABBAS, BARKAT ALI BUGHIO, WAHEED ALI PANHWAR AND SANTOISH KUMAR**

*Department of Zoology, University of Sindh-Jamshoro-Pakistan*
*Corresponding author e-mail: riffatumer@hotmail.com*

**Abstract**

A survey of Orthoptera occurring in the district Jamshoro was carried out during the months of May to November 2012. The study sites included agricultural lands, semi mountainous areas with various vegetation types *i.e.* crops, grasses, herbs and shrubs. A total of 183 specimens of grasshopper were collected and sorted out into 5 species. Of these 2 species viz: *Locusta migratoria* (Linnaeus, 1758) and *Oedaleus senegalensis* (Krauss, 1877) belonged to oedipodinae, *Truxalis eximia eximia* Eichwald, 1830 to Acridinae, *Oxya velox* (Fabricius, 1787) to Oxyinae and *Poekilocerus pictus* (Fabricius, 1775) of Pyromorphinae. The distribution of many of the previously recorded species has been extended. In addition to this, a simplified taxonomic key based on easily recognizable morphological characters is also presented.

## Introduction

Grasshoppers are polyphagous insects that cause considerable damage to the valuable crops (Riffat *et al.*, 2012). Amongst insect, the grasshoppers are known to be an important group for their contribution to diversity abundance and biomass. Basically they are divided into two major groups; Califera short horned grasshoppers and Ensifera long horned grasshoppers but the review of literature showed that short horned grasshopper are responsible for most of the reported crop losses ( Riffat & Wagan, 2012).

The grasshopper's fauna is found in very large number and have great ability to move from one crop to the other. They are noted to be epidemic to the valuable crops. Work on the Orthopterean fauna of Sindh has been carried out by Kirby (1914), Bei-Bienko and Mishchenko (1951), Dirsh and Uvarov (1953); Jago (1967, 1977); Baloch (1966); Moeed (1966,1971,1976); Ahmed (1975 - 1980); Wagan (1980); Riffat and Wagan (2012). Grass hoppers cause severe damage to agricultural crops, herbs, shrubs, fruits, vegetables and trees (Irshad *et al.*, 1977). In the present studies the pest status of grass hoppers is evaluated at district Jamshoro. Hopefully, this work will be instrumental for the pest management strategies.

## Materials and Methods

***Study sites*****:** The study sites included agricultural lands, semi mountainous areas with vegetation composed of crops, grasses, herbs, shrubs, fodder crops and few rice fields. Specimens were captured with the help of traditional insect hand-net (8.89 cms in diameter and 50.8 cms in length) as well as by hand picking. The collection was made during the months of May –November, 2012 from various localities (Aamri proper, Bhan Saeed abad Manjhand Sehwan Road Kotri proper Petaro of Jamshoro.

***Preservation of Samples:*** All collected material was transferred into polythene bags and transferred to the laboratory. They were preserved by standard entomology methods described by Vickery & Kevan (1983) and Riffat & Wagan (2012).

***Identification of the specimens:*** Identification of specimen was carried out under the Stereoscopic Dissecting Binocular Microscope with the help of keys and description available in literature. The photographs were all taken with digital camera Nikon- D5100 DLSR 17. MP. All the measurements are given in millimeter and were made with scale, divider, and ocular square graph.

## Results and Discussion

### Key to the various species of orthoptera occurring in district Jamshoro

1. Pronotum tectiform, slightly narrow in prozona…….. ***Locusta migratoria***
----- Not as above……...2
***2.*** Tegmina narrow strip like with blakish spots…….. ***Truxalis exmia exmia***
----- Not as above…….……..***Oedaleus senegalensis***

**3.** Pronotum rounded in front…… ***Oxya velox***
----- Not as above…….. ***Poekilocerus pictus***

***1. Locusta migratoria*** **(Linnaeus, 1758)**
Fig.1 a & b

**Diagnostic Features:** Size large. Antenna thin filiform, slender, Head globular, shorter than the pronotum; fastigium of vertex wide, rounded, with flat lateral and median carinulae. Pronotum tectiform, slightly narrow in prozona, with well developed median carina, sharp, forming crest, Mesosternal interspace open, square shaped, slightly wider than its greatest length, shorter than its lobes. Tegmina and wings fully developed, acutely rounded at apex. Hind femur broad at base but narrowing gradually towards knee, dorsal carina serrated. Hind tibia slender. Cerci small, conical, hairy with slightly rounded apices. Ovipositor short, with curved valves, lower valve at base with lateral tooth like projection.

**General Coloration:** Body dark brown to paler brown. Head and pronotum with yellow median and lateral oblique bands. Tegmina semi transparent, paler brown with irregular light or dark brown spots. Wings hyaline, light paler at base. Hind femur paler brown, with dark bands on outer side, inner surface with two dark bands. Hind tibia light reddish.

**Table .1 .Measurement of body parts of *L. migratoria.***

| Parameter (mm) | Male (n = 10) | | Female (n = 10) | |
|---|---|---|---|---|
| | Mean± SD | Range | Mean± SD | Range |
| Length of Antenna | 10.12 ± 0.12 | 10-10.3 | 12.16 ± 0.11 | 12-12.3 |
| Length of Head | 4.92 ± 0.07 | 4.8-5 | 6.18 ± 0.10 | 6-6.3 |
| Length of Pronotum | 11.02 ± 0.14 | 10.8-11.3 | 12.28 ± 0.12 | 12-12.4 |
| Length of Tegmen | 53.22 ± 0.17 | 53-53.5 | 55.53 ± 0.30 | 55-55.9 |
| Length of Wing | 51.11 ± 0.08 | 51-51.2 | 52.29 ± 0.17 | 52-52.5 |
| Length of Femur | 28.15 ± 0.10 | 28-28.3 | 29.14 ± 0.10 | 29-29.3 |
| Length of Tibia | 26.14 ± 0.09 | 26-26.3 | 27.18 ± 0.10 | 27-27.3 |
| Total body Length | 43.13 ± 0.11 | 43-43.3 | 45.25 ± 0.14 | 45-45.5 |

**Distribution:** Asia, South Africa, Australia and Europe.

**Remarks:** This species is very closely related to *L. danica* Uvarov in general appearance but can easily be separated from the same in having hind femur rather long and slender. This species has been collected from the agricultural and non-agricultural fields. Ahmed (1975-80) and Yousuf (1996) reported this species from the various districts of the Punjab while Wagan (1990) reported it from Hyderabad (Sindh).

***2. Oedaleus senegalensis*** **(Krauss 1877)**
Fig.1. c & d

**Diagnostic Features:** Medium in size. Pronotum tectiform and strongly constricted, sides of metazona distinctly projecting in the form of roundly convex shoulders. Tegmina well developed; wings hyaline towards base. Hind femur with three indistinct oblique transverse dark bands on outer upper marginal and medial areas extending onto inner surface. Hind tibia with dark basal ring, slender, slightly shorter than hind femur, Cerci in male conical, short, erective, with obtuse rounded apices. Cerci in female short, conical, slightly compressed with angular apex. Ovipositor short, robust, valves stout and curved.

**General Coloration:** Greenish brown. Pronotum with X-shaped marking of white and brownish stripes. Tegmina with two brown bands at base and scattered tetragonal spots. Wings transparent, Hind femur yellow on inside and without dark bands. Hind tibia light reddish on inner aspect and yellowish on outer aspect, with distinct apical yellowish band.

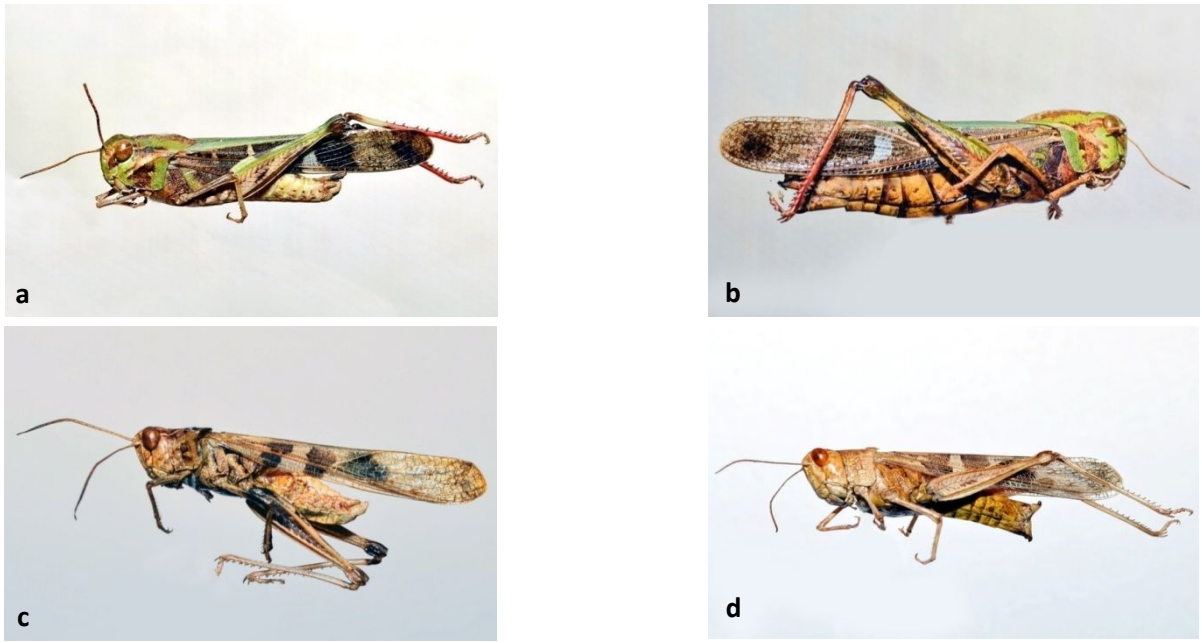


**Fig. 1. a) *L. migratoria* (Linnaeus, 1758) ♂, b) *L. migratoria* ♀, c) *O. senegalensis* (Krauss 1877) ♂ d) *O. senegaleuris* but ♀.**


**Fig.2. a) *T.eximia eximia* Eichwald, 1830 ♂, b) *T. eximia* ♀, c) *Oxya velox* (Fabricius, 1787) ♂ d) *O. relox* ♀, e) *Poekilocerus pictus* (Fabricius, 1775) ♂, f) *P. pictus* ♀.**

**Table 2. Measurement of body parts of *O. senegalensis.***

| Parameter (mm) | Male (n = 10) | | Female (n = 10) | |
|---|---|---|---|---|
| | Mean ± SD | Range | Mean ±SD | Range |
| Length of Antenna | 11.87 ± 0.11 | 11.7-12 | 13.32 ± 0.13 | 13.1-13.5 |
| Length of Head | 3.94 ± 0.15 | 37-4.2 | 5.22 ± 0.18 | 5-5.6 |
| Length of Pronotum | 7.15 ± 0.10 | 7-7.3 | 9.9 ± 0.15 | 9.6-10.1 |
| Length of Tegmen | 24.2 ± 0.14 | 24-24.4 | 29.58 ± 0.13 | 29.4-29.8 |
| Length of Wing | 23.27 ± 0.17 | 23-23.5 | 28.14 ± 0.08 | 28.3-28.5 |
| Length of Femur | 15.15 ± 0.10 | 15-15.3 | 20.28 ± 0.17 | 20-20.5 |
| Length of Tibia | 13.06 ± 0.13 | 12.8-13.2 | 19.4 ± 0.20 | 19-19.7 |
| Total body Length | 25.47 ± 0.13 | 25.3-25.7 | 39.34 ± 0.28 | 38.9-39.7 |

**Distribution:** Pakistan, Hither Asia, Africa and Senegal.

**Remarks:** This species is very closely related to *O. nigrofasciatus* (Degeer) in having general shape but there is slight difference in the pronotal shape. It is rounded and sub acute in *O. senegalensis* where as in *O. nigrofasciatus* it is oval in shaped. This species has previously been collected from the fields of maize and fodder crop. Earlier, Ahmed (1975-80), Mazhar *et al*. (1993) and Yousuf (1996) recorded this species from the Punjab and Wagan (1990) reported it from Hyderabad, Sindh.

***3. Truxalis exmia exmia*** **Eichwald, 1830**
Fig.2. a & b

**Diagnostic Features:** Size medium, elongated, stick like. Head elongated conical. Tegmen narrow strip like with blackish spots towards pointed apex. Wings hyaline bright greenish colour. Hind femur elongated. Hind tibia long narrow brownish have 24 black tipped spines and hairy

**General Coloration:** Body green throughout, Antennae and eyes reddish brown. Wings smooth transparent, light-greenish throughout. Hind femur dusty-brownish with angular apex. Tibia brown with black tipped spines on either side

**Table 3. Measurement of body parts of *T. exmia exmia.***

| Body parameters | Male (n = 15) | | Female (n = 15) | |
|---|---|---|---|---|
| | Mean ± SD | Range | Mean± SD | Range |
| Length of head | 0.83 ± .07 | 0.7 - 0.9 | 10.72 ± 0.91 | 10.5 - 10.3 |
| Dist: b/w two eye | 0.22 ± .45 | 0.2 - 0.3 | 0.25 ± 0.05 | 0.2 - 0.3 |
| Length of antenna | 10.14 ± .13 | 9.9 - 10.3 | 21.52 ± 0.90 | 20 – 23 |
| Segments of antenna | 18.06 ± .96 | 17 – 20 | 17.53 ± 0.91 | 16 – 19 |
| Length of pronotum | 0.57 ± .07 | 0.5 - 0.7 | 10.22 ± 0.14 | 9.9 - 10.4 |
| Length of tegmen | 20.61 ± .25 | 20 - 20.9 | 60.24 ± 0.27 | 59.9 - 61.1 |
| Length of wing | 20.24 ± .24 | 19.8 - 20.6 | 50.42 ± 0.34 | 49.9 – 51 |
| Length of femur | 20.50 ± .18 | 20 - 20.7 | 40.42 ± 0.35 | 39.8 - 40.9 |
| Length of tibia | 20.20 ± .12 | 20 - 20.4 | 40.35 ± 0.18 | 40 - 40.6 |
| Total body length | 30.22 ± .15 | 30 - 30.5 | 70.34 ± 0.29 | 69.9 - 70.9 |

**Distribution:** Pakistan, India, Iran, China and Afghanistan

**Remarks:** The morphological characters of this sub-species mostly resembles with published description of Wagan (1990) except there is slight variation in the general body coloration. This species occur in the tall and lush vegetation of grasses along small ditches and near the roadsides. Earlier Wagan (1990) reported this species from Dadu, Thatta, Hyderabad, Khairpur and Larkana districts of Sindh and Yousuf (1996) reported this species from Faisalabad, Rawalpindi, Hyderabad and Badin. We have collected large number of specimens from district Jamshoro.

***4. Oxya velox*** **(Fabricius, 1787)**
Fig.2. c & d

**Diagnostic Features:** Size medium. Head sub-conical, shorter than pronotum; fastigium of vertex short, wide, slightly depressed in middle, widely rounded. Pronotum rounded in front, obtusely rounded posteriorly, dorsum crossed by three sulci. Tegmina and wings fully developed, anterior margin without spines, expanded at base, with obtusely rounded apex. Hind tibia slender, slightly shorter than femur, flat at distal end. Cerci in male conical with sub-acute apices while in female moderate, conical, with sub-acute apices. Ovipositor short and stout, with pointed tooth like spines.

**General Coloration:** Paler greenish in color. Tegmina semi transparent, brownish green at base. Wings hyaline and colorless. Hind tibia paler on inside and paler brown on outer sued with a black elongated band. Hind tibia paler brown.

**Table 4. Showing measurement of body parameters of *Oxya velox.***

| Parameter (mm) | Male (n=10) | | Female(n=10) | |
|---|---|---|---|---|
| | Mean ± SD | Range | Mean ±SD | Range |
| Length of Antenna | 11.87±0.11 | 11.7-12 | 13.32±0.13 | 13.1-13.5 |
| Length of Head | 3.94±0.15 | 3.7-4.2 | 5.22±0.18 | 5-5.6 |
| Length of Pronotum | 7.15±0.10 | 7-7.3 | 9.9±0.15 | 9.6-10.1 |
| Length of Tegmen | 24.2±0.14 | 24-24.4 | 29.58±0.13 | 29.4-29.8 |
| Length of Wing | 23.27±0.17 | 23-23.5 | 28.41±0.08 | 28.3-28.5 |
| Length of Femur | 15.15±0.10 | 15-15.3 | 20.28±0.17 | 20-20.5 |
| Length of Tibia | 13.06±0.13 | 12.8-13.2 | 19.4±0.20 | 19-19.7 |
| Total body Length | 25.47±0.13 | 25.3-25.7 | 39.34±0.28 | 38.9-39.7 |

**Distribution:** Pakistan, Iran, Kashimir, Malaya, Singapur and Java.

***Remarks:*** The species is has been collected from the rice producing areas of the Jamshoro. Earlier Hollis (1971), Ahmed (1975-80) Irshad *et al.,* (1977), and Mazher *et al.* (1993) and Yousuf (1996) recorded it from the various districts of the Punjab not from Sindh. Wagan (1990) and Riffat *et al.,* (2012) reported it from Sindh. We have confirm the presence of this species at district Jamshoro.

***5. Poekilocerus pictus*** **(Fabricius, 1775)**
Fig.2. e & f

**Diagnostic Features:** Medium size, Pronotum more or less selliform, the whole dise of hind wing including the tip uniformly colored; Size usually proportionately large. Integument. Tegmen relatively broad, parallel-sided with truncated rounded tip. Hind femur slender in both sexes. Sub-genital plate of female with an acute point.

**General coloration:** Male having bolder striped pattern of bright yellow and dark blueish coloration. Six blue longitudinal bands diverge from the apex, a faint on down the frontal ridge on to the clypeus. Abdominal terga with vertical stripes blue capital, yellow caudad sterna with less pronounced blue marks. Tegminal vein tinged yellow, creating a fine reticulated pattern against a bluish or purplish background.

**Table 5. Measurements of body parts of *P. pictus.***

| Parameter (mm) | Male (n = 10) | | Female(n=10) | |
|---|---|---|---|---|
| | Mean ± SD | Range | Mean ± SD | Range |
| Length of Antenna | 8.26 ± 0.18 | 8-8.5 | 10.24 ± 0,14 | 10-10.5 |
| Length of Head | 8.32 ± 0.19 | 8-8.6 | 10.28 ± 0.16 | 10-10.5 |
| Length of Pronotum | 12.12 ± 0.13 | 11.9-12.3 | 13.18 ± 0.07 | 13.1-13.3 |
| Length of Tegmen | 33.74 ± 0.23 | 33.4-34.1 | 34.3 ± 0.14 | 34.1-34.5 |
| Length of Wing | 31.2 ± 0.11 | 31-31.4 | 32.93 ± 0.08 | 32.8-33 |
| Length of Femur | 23.28 ± 0.12 | 23-23.5 | 24.12 ± 0.07 | 24-24.2 |
| Length of Tibia | 21.09 ± 0.08 | 21-21.2 | 22.2 ± 0.08 | 22.1-22.3 |
| Total body Length | 50.12 ± 0.10 | 50-50.3 | 51.91 ± 0.08 | 51.8-52 |

**Distribution:** Pakistan, India, Egypt, Nigeria, Yemen and Ethiopia

**Remarks:** *Calotropis procera* are natural food-plants of *P. pictus*. Earlier, Ghouri (1975) recorded an extraordinary outbreak of this pest in Pakistan. He reported that a part from *C. procera* this insect also causes heavy damage to cotton, chilli, cucurbits and sugarcane.

**References**

Ahmad, F.U. (1975-1980). Survey of grasshoppers in arid and semi-arid regions of Pakistan.Pl.480 No.PK-ARM-20 (FG- Pa-212). 500. pp.

Baloch, H.A. (1966). Taxonomy of Pyrgomorphidae and subfamilies Hamiacridinae, Oxyinae, Cyrthacanthacridinae, Tropidopolinae, Eyprepocnemidinae and catantopinae of Acrididae of Hyderabad and its adjoining areas. M.Sc. Thesis, Univ. Sindh, Jamshoro, Pakistan.

Bei-Bienko, G.Y. and Mishchenko, L.L. (1951). Locusts and Grasshoppers of USSR and adjacent countries. Pt I & II, Monston, *Jerusalam* 400 pp.

Dirsh, V.M. and Uvarov, B.P. (1953). Tree Locust of the genus *Anacridium* (Orthoptera: Acrididae) EOS., 29: 7-69.

Ghouri, A.S.K. (1975). Peokilocerus (Sic) pictus in the Punjab. Pl. Prot. Bull.F.A.O. 23: 52-53

Hollis, D. (1971). A revision of the genus *Oxya* Audinet- Serville (Orthoptera: Acridoidea). *Ibid* 26: 269-343.

Irshad, M., Mazhar, R.A. and Ghani, M.A. (1977). Grasshoppers associated with paddy and their natural enemies in Pakistan. *Agri. Pakistan* 28(1): 55-64.

Jago, N.D. (1967). A key check list and Synonymy to the species formerly included in the genera *Caloptenopsis* I.Bolivar 1889 and *Acorypha* Krauss 1877 (Orthoptera, Calliptaminae). *EOS* 52: 397-462.

Jago, N.D. (1977). Revision of the genus *Ochrilidia* Stal with comments on the genera *Sporobolus* Uvarov, *Platypternodes*1.Bolivar(orthoptera,Acrididae,Gomphocerinae). *Acrida* 6: 163-217

Kirby, W.F. (1914). Orthoptera (Acrididae). Fauna of British India Including Burma and Ceylon.Taylor and Francis, Lond 276 pp.

Mazhar, N., Suhail, A. and Yousuf, M. (1993). Check list of the Acrididae of the Punjab Province. *Pak. Entomol.* 15(1): 9-12.

Moeed, A. (1966). Taxonomy of Tetrigidae (Orthoptera; Tetrigoidea) and Acridinae & Oedipodinae (Acridoidea) of Hyderabad region. M.Sc. Thesis Univ. Sindh, Pakistan

Moeed, A. (1971). Key to the identification of grasshoppers belonging to family Tetrigidae and subfamilies Acridinae and oedipodinae of Hyderabad and adjoining areas. *Sindh Univ., Res. J.* 5: 79-92.

Moeed, A. (1976). A new species of Oxypterna Ramme (Orhtoptera:Acrididae) from Pakistan. *Pak. J. Zool.* 8: 155-157.

Riffat, S. and Wagan, M.S. (2012). Review of genus *Hieroglyphus* Krauss 1877 (Hamiacridinae: Acrididae: Orthoptera) with description of one new species from Pakistan. *Pak. J. Zool.* 44(1): 43-51.

Riffat, S., Bughio, A.B., Waheed, A.P. and Haji, K. (2012). Studies on the Immature Stages of *Oxya velox* (Fabricius) a rice grasshopper from district Jamshoro. *FUUAST J.BIOL.*, 2(1): 57-62.

Vickery, V.R. and Kevan, D.K. McE. (1983). A monograph of the Orthopteroid Insects of the Canada and adjacent regions. Lyman. Ent. Mus.And Res. Lab. Memior 13(I and II)2: 681-1462.

Wagan , M.S. (1980). A comparative study of female reproductive organs of Orthoptera from Sindh. *Ibid*., 12(1) :17-25.

Wagan, M.S. (1990). Grasshoppers (Acrididae) of Sindh. (PSF), Islamabad, Pakistan. 110 pp.

Yousuf, M. (1996). Taxonomic Studies on Grasshoppers and Locusts of Pakistan PSF Final Technical Report. 158 pp.