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Occurrence of *Oxya* Species (Oxyinae: Acrididae: Orthoptera) from Sindh

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Abstract: An extensive survey on grasshoppers was carried out during the year of 2012-2013. A total of 933 specimens were collected from various localities of Sindh. *Oxya* species are considered as major pest of rice causing severe damage to crop and cause economic loss to country. Richest species was reported *Oxya hyla hyla* forming 35.58% of total number of the entire grasshopper population followed by *O.velox* 30.55%, *O.fuscovittata* 19.83% and *O.bidentata* 14.04%. During the present study significant high ratio for *Oxya* species was noted during the month of August i.e. 24.65% followed by 20.79% in September and low percentage i-e 5.57% and 3.97% was noted in coldest months of the year i.e. November and December respectively.

Keywords: *Oxya,* .rice, survey, grasshoppers, population

1. INTRODUCTION

Grasshoppers belonging to subfamily Oxyinae are the major pest of rice. Rice is the world most important food crop second to wheat (Karim and Riazuddin 1999). The rice plant is susceptible to majority of insect pest from its sowing to harvest stage. Amongst the pests *Oxya* species mostly called small grasshoppers are reported as sporadic pest of rice in all developmental stages i.e. seeding, tillering and stem elongation etc. particularly they caused damage to the rice crop in its milky grain stage (Uvarov, 1926). Many grasshoppers' species are occasionally found in shady fields but rarely cause significant damage other than along field borders (Irshad, 1977, Zafar, 1986). They chew and make angular holes in leaves causing a serious injury, only few workers, Bei-Bienko and Mishchenko (1951), Hollis (1971 and 1975), Chitra *et al.,* (2000), Khalid *et al.* (2001) and Humayoon *et al.,* (2012) highlighted it taxonomic aspects but still now there is no work has been done on the incidence of this pest from this region. Therefore, present attempt is being made for first time.

2. MATERIAL AND METHOD

2.1 Field investigation

For the purpose, studed material has been collected from rice field surrounded by different vegetations, maize and grasses. All the samples captured from insect net and some by hand picking. However, for killing and preservation of specimens' standard entomological method described by Riffat and Wagan (2012) was adopted. Identification of specimens was done by following the scheme of Hollis (1971). All the measurements are taken in millimeter (mm).

3. RESULT

3.1 Diagnostic features of *Oxya* species

***Oxya hyla hyla* (Serville, 1831)**

Body moderate, green to pale green in color. Antenna filiform as long as or slightly shorter than head and pronotum together. Head shorter than pronotum. Pronotum with slightly flattened dorsum and slightly narrowing forwards, metazoan shorter than prozona. Tegmina fully developed. Male circus conical or compressed with sub-acute or truncate at apex.

Table I. Showing the measurements of various body parts of *Oxya hyla hyla*

Body parameters	Male (n=15)		Female (n=15)	
	Mean ±SD	Range	Mean ±SD	Range
Length of antenna	6.80± 0.34	6.3 -7.1	6.37 ± 0.52	5.6-7.3
Distance between eyes	0.49 ± 0.09	0.4-0.7	0.76 ±0.07	0.7-0.9
Length of head	2.73 ± 0.27	2.1-3.3	3.38 ±0.32	2.8-3.8
Length of pronotum	3.96 ± 0.29	3.5-4.5	5.02 ±0.60	4.2-5.0
Length of tegmina	19.73± 0.79	19-22	24.26 ±2.15	20-29
Max: width of tegmina	3.39 ± 0.79	3-5	4.33 ±0.61	3-5
Length of wings	18.2± 0.96	17-21	22.06 ±2.05	19-26
Max: width of wings	8.53± 0.74	7-9	9.93 ±0.88	9-11
Length of femur	12.4 ± 0.73	11-14	15.06 ±1.38	13-17
Max: width of femur	3.33 ± 0.48	3-4	3.73 ±0.45	3-4
Length of tibia	10.73 ± 0.59	10-12	12.73 ±1.38	11-15
Total body length	20.93 ±1.27	19-23	26.66 ±3.03	23-32

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Remarks:

Khalid *et al;* (2001) has collected this species from rice,, tomato, water melon, sorghum, maize and grasses. At the present we have reported such large number from rice and maize field and we are in opening that beside rice this is the pest of many cultivated fields as described by Khalid *et al* (2001) Usmani & Nayeem (2012) carried work on the distribution of Acridoidea from India they reported 10 females of *O.hyla hyla* from grasses but majority were collected from paddy fields but they failed to report any single male specimen of *O.hyla hyla* from this region. At the present we have record both sex and confirm its presence in district level.

***Oxya velox* (Fabricius, 1787)**

Body moderate, green to pale green in color. Antenna filiform longer than head and pronotum together. Head shorter than pronotum. Pronotum rounded in front and obtusely rounded behind. Tegmina fully developed. Male cercus more conical with subacuate at apex.

Table 2. Showing the measurements of various body parts of *Oxya velox*

Body parameters	Male (n=15)		Female (n=15)	
	Mean ±SD	Range	Mean ±SD	Range
Length of antenna	6.70 ± 0.46	6.6-7.3	6.34 ±0.69	5.6-7.3
Distance between eyes	0.46 ±0.05	0.4-0.5	0.70 ±0.05	0.6-0.8
Length of head	2.64 ±0.19	2.4-2.9	3.27 ±0.16	3.1-3.5
Length of pronotum	3.72 ±0.19	3.5-4.2	4.72 ±0.39	3.8-5.2
Length of tegmina	19.06 ±0.88	18-21	23.86 ±1.12	21-25
Max: width of tegmina	4.13 ±0.63	3-5	4.33 ±0.48	4-5
Length of wings	17.40 ±1.40	16-21	22.13 ±1.40	20-24
Max: width of wings	8.86 ±0.79	8-10	10.13 ±0.83	9-11
Length of femur	11.06 ±0.79	10-12	13.86 ±1.64	10-16
Max: width of femur	3.46 ±0.51	3-4	3.73 ±0.70	3-5
Length of tibia	10.33 ±0.48	10-11	13.06 ±1.33	11-15
Total body length	20.40 ±0.83	20-22	26.13 ±1.92	23-30

Remarks:

This species was collected from the rice fields from Sindh. Earlier, this was reported by Baloch (1966) and Ahmed (1975-1980) from Thatta, Jacobabad and Larkana districts of Sindh. Usmani and Nayeem (2012) stated that this species commonly spotted in paddy sapling rather than the crop, presenting we have observed it's incidence on all development stage of paddy. Usmani *et al.,* (2012) reported that male cercus conical with sub-acute apex at the present we have observed this is more acute. Besides this, Humayoon *et al.,* (2012) while studying richness of subfamilies Oxyinae particular in rice field stated that *O. velox* having dominant status in field as compared to other insects were available in flanking areas.

***Oxya fuscovittata* (Marschall, 1836)**

Body, green to pale green in color. Antenna filiform slightly longer than head and pronotum together. Head shorter than pronotum. Pronotum with flattened dorsum. Tegmina fully developed. Male cercus strongly compressed and bifid apically.

Table 3. Showing the measurement of various body parts of *Oxya fuscovittata*

Body parameters	Male (n=15)		Female (n=15)	
	Mean ±SD	Range	Mean ±SD	Range
Length of antenna	6.22±0.35	5.6-6.6	6.95±0.24	6.6-7.7
Distance between eyes	0.47±0.10	0.4-0.7	0.63±0.07	0.5-0.7
Length of head	2.84±0.27	2.4-2.8	3.16-0.46	2.5-3.8
Length of pronotum	3.88±0.41	3.5-3.8	4.61±0.97	3.2-5.9
Length of tegmina	19.66±1.11	18-22	24.26±1.27	23-26
Max: width of tegmina	3.53±0.51	3-4	4.53±0.51	4-5
Length of wings	18.33±0.72	17-19	23.33±1.17	22-25
Max: width of wings	8.46±0.51	8-9	10.53±0.51	10-11
Length of femur	12.53±0.99	11-15	13.13±1.35	11-15
Max: width of femur	3.46±0.51	3-4	4.46±0.51	4-5
Length of tibia	10.86±0.74	10-12	12.13±1.06	11-14
Total body length	21.26±1.43	20-25	24.73±0.79	24-26

Remarks:

At present this species was collected from the rice and maize field. Ahmed (1975-1980) did not report this species from Sindh. Usmani & Nayeem (2012) reported its single female from India. However, it is interesting to note correlation of oxya associated with the presence of rice crop but collection of large numbers from grassland also proved it presences in grassland as well. Beside this, most of our results are in conformity to Chitra *et al.,* (2000) who explored 28 species of grasshopper from paddy fields. We have observed a large numbers of *O. hyla hyla followed by O.fuscovittata* in field.

***Oxya bidentata* (Willemse,1925)**

Body moderate, green to pale green in color. Antenna filiform as long as or slightly shorter than head and pronotum together. Head shorter than pronotum. Pronotum with flattened dorsum and posteriorly. rounded. Tegmina fully developed. Male cercus conical, bilobed apically

Table 4. Showing the measurement of various body parts of *Oxya bidentata*

Body parameters	Male (n=15)		Female (n=15)	
	Mean ±SD	Range	Mean ±SD	Range
Length of antenna	6.91±0.83	5.9-8.7	6.58±0.86	5.8-8.7
Distance between eyes	0.40±0.09	0.3-0.6	0.68±0.07	0.6-0.8
Length of head	2.80±0.21	2.4-3.1	3.06±0.14	2.8-3.2
Length of pronotum	3.87±0.22	3.5-4.2	4.55±0.63	3.8-5.9
Length of tegmina	18.73±0.79	17-20	22.73±1.38	21-25
Max: width of tegmina	3.53±0.54	3-4	4.06±0.88	3-5
Length of wings	17.66±0.97	16-19	20.46±1.30	19-23
Max: width of wings	8.26±0.79	7-9	9.53±0.74	9-11
Length of femur	11.66±0.72	10-13	12.26±1.33	11-15
Max: width of femur	2.99±0.07	2.9-3.1	3.73±0.70	3-5
Length of tibia	9.53±0.51	9-10	12.33±0.89	11-14
Total body length	20.33±0.72	19-21	23.66±0.89	22-25

Remarks:

Ahmed (1975-1980) reported this species from Khyber Paktunkhwa (KPK) and Punjab province of Pakistan but he was unable to report it from Sindh province. More recent Nayeem and Usmani (2012) carried work on the interaction of concerned samples with their natural habitat. They enlisted many Oxyinae species excluding *O.bidentata.* Presently, we have collected large numbers of this species from Sindh.

3.2 Occurrence of *Oxya* species

Table 5 showed that maximum population of *Oxya* has been reported in the month of August i-e 24.65% followed by 20.79% and 15.54% in the month of September and July respectively possibly it might be due to rapping season of rice crop and extreme temperature in field. Beside this, their minimum numbers have been seen in field during the coldest month of the year it might be due to low temperature which considered unfavorable for their growth. Further, incidence of *Oxya* species in various months along with their dominant, moderate and less dominant status has been shown in **(Table 6)** This table suggests that all *Oxya* species with dominant status are found in Jacobabad, Larkana and Dadu districts of Sindh followed by Shikarpur. However, no any single specimen of *Oxya* has been reported from Thar it might be due to absence of rice field in this region.

Table 5. Showing the month wise distribution of *Oxya* species from various districts of Sindh

Months	Species				Total No.	% of total sampling
	O. hyla hyla	*O. velox*	*O.fuscovittata*	*O. bidentata*		
May	22	22	11	7	62	6.65
June	28	32	18	11	89	9.54
July	58	41	28	18	145	15.54
August	78	63	51	38	230	24.65
September	65	57	41	31	194	20.79
October	45	38	23	18	124	13.29
November	21	18	8	5	52	5.57
December	15	14	5	3	37	3.97
Total	332 (35.58%)	285(30.55%)	185(19.83%)	131(14.04%)	933	100

Table 6. Showing the incidence of *Oxya species* in various districts of Sindh

Species	Localities of collection															
	JKB	SHK	LAR	SK	GH	KHP	NF Z	S.BD	SGR	MPS	HYD	THR	BDN	THA	DDU	KH
Oxya hyla hyla	+ + +	+ + +	+ + +	+ +	+	+ +	+ +	+	-	+	+ + +	-	+ + +	+ + +	+ + +	-
O. velox	+ + +	+ +	+ + +	+	+	+ + +	+ + +	+	-	+	+ + +	-	+ + +	+ +	+ + +	+
O.fuscovittata	+ + +	+ +	+ + +	+	+	+ +	+ +	+ +	+	+	+ +	-	+ + +	+ + +	+ + +	-
O.bidentata	+ + +	+ +	+ + +	+	+	+ +	+ +	+	+	+	+ +	-	+ + +	+ + +	+ + +	+

Note:
+ + + = More dominant
+ + = Moderate dominant
+ = Less dominant
- = Absent

LAR = Larkana **SHK = Shikarpur**
JKB = Jacobabad **SK = Sukkur**
GH = Ghotki **KHP = Khairpur**
NFZ = Naushero Feroze **KH = Karachi**
S.BD = Shaheed Benazirabad
SGR = Sanghar
MPS = Mirpur khas
HYD= Hyderabad
THR = Tharparkar

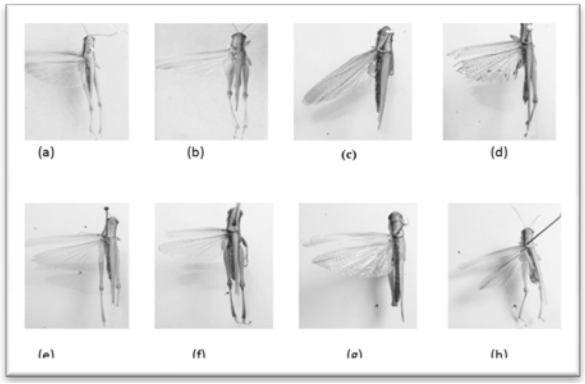

Fig. I (a) *Oxya hyla hyla* ♀ DV (b) Same but ♂ (c) *O. velox* ♀ DV (d) Same but ♂
(e) *O. fuscovittata* ♀ DV (f) same but ♂ (g) *O. bidentata* ♀ DV (b) same but ♂.

REFERENCES:

Ahmed F. U. (1975-1980). Survey of Grasshopper in Arid and semi Arid Region of Pakistan. Final.Rep. PI-480 No. *P.K-ARS-20 (FG-Pa-21*), 500Pp.

Baloach H. A, (1966).Taxonomy of Pyrgomorphidae And Subfamilies Hemiacridinae, Oxyinae, Crytacantha-cridianae, Eyprepocnemidinae & Catantopinae of Acrididae of Hyderabad and its adjoining areas. *M.Sc. Thesis University of Sindh*.1-66.

Bie Beinko G. Y and L. L. Mishchenko (1951). Locust and grasshoppers of U.S.S.R and adjacent countries. *1&2 Academy of Sciences Moscow Leningrad* 381-667

Chitra N., R. P. Soundararajan and K. Gunathilagaraj (2000). Zoo print journal. 15(8): 308-311.

Hollis, D. (1971). A revision of the genus *Oxya* audient Serville (Orthoptera: Acridoidea) Bull. Brit. Mus. Nat. Hist (Ent) Lond . 26:269-343.

Hollis, D. (1975). A review of Subfamily Oxyinae (Orthoptera: Acridoidea) Bull. Brit.Mus. Nat.Hist (Ent) 31: 189-234.

Humayoon M., M. K.. Usmani, M. R Nayeem and H. Kumar (2012). Species Diversity and abundance of Grasshopper fauna (Orthoptera) in rice ecosystem. *Ann. Biol. Res.* 3(5):2190-2193

Irshad, M. (1977). A note on occurrence of nematodes as internal parasites of grasshoppers in Pakistan. *Agric. Pakistan*, 28: 285-87.

Karim S and S. Riazduddin (1999). Rice insect pest of Pakistan and this control a lesson from pest for suitable integrated pest management. *Pak. J.Botny*. 12 261-276.

Khalid M., A. Suhail N. Parveen and N.A. Shah (2001). Description of morphological variation in three species of the genus *Oxya* (Serville). *J.Bio. Sci* 1(9) 859-865.

Nayeem M., R and M. K Usmani. (2012). Taxonomy and field Observation of Grasshoppers and Locust Fauna (Orthoptera: Acridoidea) *Munis Entom. Zool*. 7(1):391-471.

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

Usmani M. K and M. R. Nayeem (2012 a). Studies on taxonomy and distribution of Acridoidea(Orthoptera) of Bihar India. *J. Threatened Taxa*.4 (13):3190-3204

Usmani M. K., H Akhtar and R. Nayeem (2012 b). Diversity and taxonomic studies of Acridoid pests(Acridoidea: Orthoptera) of pulses from Uttar Pradesh, India. *J. Mun. Ent.& Zoo.* 7(2): 837-846.

Uvarov B. P. (1926). Notes on the *Oxya* Serville (Orthoptera: Acridoidea) *Bull.Ento.Res*, 17:45-48.

Zafar M. A, (1986). Chemical control of grasshoppers in Pakistan. *Rice Abstract*. 9:20.