

# Taxonomic Studies on Hemiacridinae (Acrididae : Orthoptera) of Pakistan

ANJUM SUHAIL, M. JALAL ARIF AND GHAZALA SUHAIL†

Department of Agricultural Entomology, University of Agriculture, Faisalabad-38040, Pakistan

†Government. Degree College for Women, Madina Town, Faisalabad, Pakistan

## ABSTRACT

Six species viz., *Spathosternum prasiniferum* Walker, *S. venulosum* Stal, *Hieroglyphus perpolita* Uvarov, *H. nigrerepletus* Bolivar, *H. banian* (Fabricius), *H. concolor* Walker of the subfamily Hemiacridinae were collected from various localities of Pakistan and subjected to taxonomic studies.

**Key Words:** Taxonomy; Hemiacridinae; Pakistan

## INTRODUCTION

The grasshoppers belonging to the subfamily Hemiacridinae are polyphagous insects, cause heavy damage to our cash crops and play havoc with almost every type of vegetation. Fifteen species of grasshoppers were found damaging sugarcane (Box, 1953), of which *Hieroglyphus banian* always proved to be the major and most destructive pest (Gupta, 1957). Out of six species of grasshoppers reported to be pests of paddy in Pakistan (Irshad *et al.*, 1977), three species, viz., *Hieroglyphus banian*, *H. nigrerepletus* and *H. oryzivorus* are the most serious in the Punjab and cause a loss up to 20% (Anonymous, 1956).

The subfamily Hemiacridinae from Sub-Continent has been studied by Kirby (1914) and Bei-Bienko and Mischenko (1951); whereas, Mohyuddin (1955), Ahmad (1958), Perwin *et al.* (1983), Wagan (1990) and Malik *et al.* (1993) studied and described many species from Pakistan. This paper describes the taxonomic characteristic of six species representing two genera of grasshoppers viz., *Spathosternum prasiniferum* Walker, *S. venulosum* Stal, *Hieroglyphus perpolita* Uvarov, *H. nigrerepletus* Bolivar, *H. banian* (Fabricius), *H. concolor* (Walker) of the subfamily Hemiacridinae.

## MATERIALS AND METHODS

The specimens were killed in a cyanide bottle, pinned and their body parts set on appropriate setting boards. On drying, these were labelled and mounted in collection boxes. Naphthalene balls were kept in the boxes for the safety of the specimens. A revolving stage and a wild M 3 B binocular microscope (10X x 1.6X) were used for identifying the specimens up to the

specific level. Deviating characters of these species, if any, from published descriptions by Kirby (1914), Bei-Bienko and Mischenko (1951), Mohyuddin (1955), Ahmad (1958), Wagan (1990), measurements {maximum length (L) and width (W)} and their collection data are given in this paper.

### Subfamily Hemiacridinae

#### Genus *Spathosternum* Krauss

##### Type: *Spathosternum nigrotaeniatum* (Stal).

Two species have been recorded under this genus, which exactly tally with the published description (Kirby, 1914; Bei-Bienko & Mischenko, 1951; Dirsh, 1965) of this genus.

##### 1. *Spathosternum prasiniferum* (Walker)

1871. *Heteracris prasinifera* Walker, Cat. Derm. Salt. Brit. Mus. (A.H.) Suppl., 5: 65.

1951. *Spathosternum prasiniferum prasiniferum* Bei-Bienko & Mischenko, Keys Faun. USSR., 38: 160.

The collected specimens totally conform to the published description (Kirby, 1914; Bei-Bienko & Mischenko, 1951; Ahmad, 1958; Latif *et al.*, 1959) of this species.

##### Measurements (mm): (28 ♂ 35 ♀)

	Male	Female	Mean ± SD
Body (L)	13.50–14.50	18.00–21.00	16.61 ± 3.01
Pronotum (L)	2.00–2.75	3.25–4.50	2.82 ± 1.42
Pronotum (W)	1.50–2.00	2.50–3.00	2.28 ± 0.58
Tegmen (L)	12.00–13.75	13.50–15.25	13.53 ± 1.06
Tegmen (W)	1.75–2.00	2.50–2.75	2.21 ± 0.36
Hind femur (L)	7.50–8.50	9.50–11.50	8.90 ± 1.11
Hind femur (W)	2.00–2.25	2.50–2.75	2.30 ± 0.22

**Material examined.** Chhanga Manga 2 ♂ 3 ♀, 30-VIII-94; 2 ♂, 10-VI-95; Rawalpindi 1 ♀, 5-IV-95; Faisalabad 1 ♂ 1 ♀, 10-VIII-94; 2 ♂ 1 ♀, 4-VII-95; Lahore 1 ♂ 2 ♀, 5-IX-94; 3 ♂ 4 ♀, 10-IX-95; Abbottabad 1 ♂ 2 ♀, 13-

VII-96; Mansehra 3 ♀, 14-VII-96; Mingora (Swat) 3 ♂ 4 ♀, 15-VII-96; Mardan 2 ♂, 17-VII-96; Peshawar 1 ♂ 2 ♀, 16-VII-96; Chakwal 1 ♂ 1 ♀, 20-VII-96; Loral 2 ♂ 1 ♀, 17-VIII-96; Quetta 2 ♂ 3 ♀, 14-VIII-96; Lasbela 2 ♂, 9-X-96; Karachi 3 ♀, 10-VIII-95; Hyderabad 1 ♂ 2 ♀, 12-VII-95; Makran coast 1 ♂, 8-IX-95; Zhob 1 ♂ 2 ♀, 18-VII-96.

**Habitat.** This species is very common throughout Pakistan and found in grasses, valley and upland grasslands on river banks, along water courses, near tomato, watermelon and rice fields.

This species has been recorded for the first time from Loral and Zhob. Earlier, Perwin *et al.* (1983,1985) and Wagan (1984) reported this species throughout Sindh, Ahmad (1958), Latif *et al.* (1959) and Malik *et al.* (1993) from the Punjab, and Irshad *et al.* (1977, 1978) from rice producing areas and grass lands of Pakistan.

## 2. *Spathosternum venulosum* Stal

1878. *Spathosternum venulosum* Stal, K. Sven. Akad. Handl., 5(4): 97.

It tallies with the published description (Kirby, 1914) of this species except that whitish veins before and behind the brown stripe on tegminal disc are obsolete.

**Measurement (mm): (7 ♂ 11 ♀)**

	Male	Female	Mean ± SD
Body (L)	14.00–16.50	20.00–22.50	18.66 ± 2.82
Pronotum (L)	4.00–4.25	4.00–4.50	4.16 ± 0.18
Pronotum (W)	2.00–2.50	3.00–3.50	2.80 ± 0.47
Tegmen (L)	13.00–14.00	16.00–17.50	16.40 ± 1.51
Tegmen (W)	2.00–2.50	3.00–3.25	2.77 ± 0.43
Hind femur (L)	7.50–8.50	11.00–12.00	10.05 ± 1.64
Hind femur (W)	2.00–2.25	2.50–3.00	2.47 ± 0.28

**Material examined.** Jhang 2 ♀, 25-VII-94; Lahore 1 ♂ 2 ♀, 5-IX-94; Sialkot 1 ♂ 3 ♀, 11-VII-94; Sheikhpura 1 ♂, 6-VIII-95; Mingora 2 ♂ 1 ♀, 15-VII-96; Mansehra 1 ♂ 1 ♀, 14-VII-96; Khuzdar 1 ♂ 2 ♀, 13-VIII-96.

**Habitat.** This species has been collected from long grasses along the river banks and water courses.

It has been recorded for the first time from Baluchistan and N.W.F.P. Earlier, it was reported from Jhang, Sahiwal, Kamalia and Lahore (Punjab) by Malik *et al.* (1993).

## Genus *Hieroglyphus* Krauss

**Type:** *Hieroglyphus daganensis* Krauss,

Four species have been collected under this genus, which exactly tally with the published description (Kirby, 1914; Bei-Bienko & Mishchenko, 1951; Dirsh, 1965) of this genus.

## 3. *Hieroglyphus perpolita* Uvarov

1933. *Miramia perpolita* Uvarov, Trudy zool. Inst. USSR., 1: 224.

The collected material exactly tallies with the published description (Bei-Bienko & Mishchenko, 1951; Mason, 1973) of this species.

**Measurement (mm): (5 ♂ 8 ♀)**

	Male	Female	Mean ± SD
Body (L)	37.50–45.25	49.25–55.00	47.75 ± 4.60
Pronotum (L)	9.50–10.00	11.00–12.00	10.26 ± 1.29
Pronotum (W)	6.00–6.50	8.00–8.50	7.19 ± 1.14
Tegmen (L)	31.00–39.50	37.50–43.00	39.15 ± 2.80
Tegmen (W)	6.5–7.00	8.50–9.00	7.64 ± 1.19
Hind femur (L)	20.00–21.00	25.00–26.00	23.17 ± 2.40
Hind femur (W)	4.75–5.00	5.5–6.00	5.32 ± 0.38

**Material examined.** Sialkot 2 ♂ 5 ♀, 25-X-95; Khuzdar 2 ♂ 1 ♀, 17-VIII-96; Lahore 1 ♂ 1 ♀, 11-X-91; Faisalabad 1 ♀, 25-VIII-96.

**Habitat.** The specimens of this species have been found in long grasses along the banks of rivers and canals.

The above localities, except Sialkot. Earlier, Mason (1973) and Malik *et al.* (1993) reported this species from the Punjab, while Irshad *et al.* (1978) from the rice producing areas of Pakistan.

## 4. *Hieroglyphus nigrorepletus* Bolivar

1912. *Hieroglyphus nigrorepletus* Bolivar, Trab. Mus. Nac. Cienc. Nat. Madr., 6 : 56.

The collected specimens exactly conform to the published description of Mason (1973) of this species.

**Measurements(mm): (2 ♂ 4 ♀)**

	Male	Female	Mean ± SD
Body (L)	36.00–39.00	44.50–48.00	42.83 ± 4.43
Pronotum (L)	10.00–10.25	10.00–11.0	10.20 ± 0.40
Pronotum (W)	6.50–7.00	7.00–7.50	7.04 ± 0.33
Tegmen (L)	17.00–18.00	36.00–39.00	30.33 ± 10.00
Tegmen (W)	6.50–7.00	8.50–9.50	8.12 ± 1.13
Hind femur (L)	21.00–22.00	24.00–25.00	23.33 ± 1.50
Hind femur (W)	5.00–5.50	5.00–5.50	5.20 ± 0.24

**Material examined.** Sialkot 2 ♀, 25-X-94; Mingora (Swat) 1 ♀, 17-VII-96; Loral 1 ♂, 17-VII-96; Lasbela 1 ♂ 1 ♀, 11-X-96.

**Habitat.** The specimens of this species has been collected from long grasses near rice and tomato fields.

It has been recorded for the first time from Baluchistan, while Mason (1973) reported this species from Karachi (Sindh) and Malik *et al.* (1993) from Sialkot (Punjab).

## 5. *Hieroglyphus banian* (Fabricius)

1798. *Gryllus banian* Fabricius, Ent. Syst. Supp., p. 194.

1839. *Acridium furcifer* Serville, Ins. Orth., p. 677. p. 14.

1914. *Hieroglyphus banian* Kirby, Faun. Brit. Ind. Acrid., p. 204.  
 1922. *Hieroglyphus banian* var. *elongata* Uvarove, Bull. Ent. Res., 13 : 238.

The collected specimens exactly tally with the published description of Kirby (1914) and Mason (1973).

**Measurements(mm): ( 3 ♂ 6 ♀ )**

	Male	Female	Mean ± SD
Body (L)	39.00–40.50	48.00–50.00	45.55 ± 4.29
Pronotum (L)	6.25–7.00	9.00–10.00	8.41 ± 1.30
Pronotum (W)	4.50–6.00	6.50–7.00	6.00 ± 0.90
Tegmen (L)	33.00–34.50	40.00–42.00	38.38 ± 3.37
Tegmen (W)	4.50–5.00	7.50–8.50	6.83 ± 1.54
Hind femur (L)	19.00–20.00	25.00–26.00	23.36 ± 2.36
Hind femur (W)	3.00–3.50	4.00–6.00	3.97 ± 0.59

**Material examined.** Kala Shah Kaku (Lahore) 1 ♂ 1 ♀, 20-XI-95; Chakwal 2 ♂ 3 ♀, 20-VII-96; Sialkot 1 ♀, 11-VII-95; Sheikhpura 1 ♀, 11-VI-96.

**Habitat.** It has been collected from the long grasses near rice fields.

The above localities, except Kala Shah Kaku. Earlier, this species has been recorded by Ahmad (1958) and Latif *et al.* (1959) from Faisalabad and by Irshad *et al.* (1977) and Malik *et al.* (1993) from rice producing areas of Pakistan.

**6. Hieroglyphus concolor (Walker)**

1870. *Oxya concolor* Walker, Cat. Derm. Salt. Brit. Mus. (N.H.), 4: 646.  
 1878. *Hieroglyphus tarsalis* Stal, Bih. Seven. Akad. Handl., 5(4): 48,93.  
 1893. *Hieroglyphus citrinolombatus* Brunner, Ann. Mus. Stor. Nat. Genova, (2): 13: 154.  
 1912. *Hieroglyphus concolor* I. Bolivar, Trab. Mus. Cienc. Nat. Madr., 6(4): 54.

The collected females exactly agree with the published description (Kirby, 1914; Bei-Bienko & Mishchenko, 1951; Mason, 1973) of this species.

**Measurements(mm): ( 2 ♀ )**

	Female	Mean ± SD
Body (L)	49.00–49.50	49.25 ± 0.35
Pronotum (L)	9.50–10.00	9.75 ± 0.35
Pronotum (W)	7.00–7.50	7.25 ± 0.35
Tegmen (L)	43.00–43.50	43.26 ± 0.35
Tegmen (W)	7.00–8.00	7.50 ± 0.70
Hind femur (L)	26.00–28.00	27.00 ± 1.41
Hind femur (W)	4.50–5.00	4.75 ± 0.35

**Material examined.** Sialkot 1 ♀, 25-X-95; Gujranwala 1 ♀, 5-IX-96.

**Habitat.** It has been collected from long grasses near paddy fields.

It has been only recorded from the Punjab. Earlier, Malik *et al.* (1993) recorded this species only from Sialkot.

**REFERENCES**

- Ahmad, M.M., 1958. The Acarididae of Lyallpur, *M.Sc. Thesis*, Punjab University, Lahore, Pakistan.  
 Anonymous, 1956. *Rice in India*. pp: 150. Published by Australian Centre for International Agriculture Research.  
 Bei-Bienko, G.Y. and L.L. Mishchenko. 1951. *Locusts and Grasshoppers of USSR and Adjacent Countries*. Part I & II. pp: 400. Monston, Jerusalem.  
 Box, H.E., 1953. *Pests of Sugarcane*. Commonwealth Inst. Ent., London, pp: 100.  
 Dirsh, V.M., 1965. *The African genera of Acridoidea*. pp: 579. Cambridge University Press, London.  
 Gupta, B.D., 1957. Sugarcane in India. *Indian J. Sugarc. Res. Dev.*, 2: 9–14.  
 Irshad, M., R.A. Mazhar and M.A. Ghani, 1977. Grasshoppers associated with paddy and their natural enemies in Pakistan. *Agri. Pakistan*, 28: 55–64.  
 Irshad, M., M.A. Ghani and R.Ali., 1978. Parasites of grasshoppers (Acridoidea: Orthoptera) egg, distribution and life history of *Scelio* spp. (Hymenoptera: Sclionidae) in Pakistan. *Can. Ent.*, 110: 449–454.  
 Kirby, W.F., 1914. Orthoptera (Acrididae). *Fauna of British India Including Burma and Ceylon*. Taylor and Francis, London.  
 Latif, A., A. Haq and M. Ahmad, 1959. Acrididae of Lyallpur. *Proc. 11th Pakistan Sci. Conf.*, p. 21.  
 Malik, N.M., A. Suhail and M. Yousuf, 1993. Check list of the acrididae of the Punjab Province. *Pakistan Entomol.*, 15: 9–12.  
 Mason, J.B., 1973. A revision of the genera *Hieroglyphus* Krauss, *Parahieroglyphus* Carl and *Hieroglyphodes* Uvarov (Orthoptera : Acridoidea). *Bull. Brit. Mus. (N.H.)*, 28: 509–60.  
 Mohyuddin, A.I., 1955. The Acrididae of Lahore. *M.Sc. Thesis*, Punjab University, Lahore, Pakistan.  
 Perwin, R., H. Ahmad and M. Ahmad, 1983. Seasonal incidence of grasshoppers in Karachi (Pakistan). *Bull. Zool.*, 1: 67–77.  
 Perwin, R., M.A.A. Baig and M. Ahmad, 1985. Host and food plants of some acridid grasshoppers in Pakistan. *Rec. Zool. Surv. Pakistan*, 10: 101–9.  
 Wagan, M.S., 1984. A comparative study of structural adaptation of Mouthparts in Orthoptera from Sindh. *Pakistan J. Zool.*, 16: 101–2.  
 Wagan, M.S., 1990. Grasshoppers (Acrididae) of Sindh. pp: 110. Pakistan Science Foundation, Islamabad, Pakistan.

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