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Notes on Subfamily Calliptaminae (Acrididae: Acridoidea: Orthoptera) of Pakistan, with the Description of one New Species

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Abstract.- Nine species and subspecies namely, *Acorypha glaucopsis* (Walker 1870), *Sphodromerus undulatus undulatus* (Kirby 1914), *S.un. afghanus* Bei-Bienko 1949, *S. lutipes rubripes* Uvarov 1943, *Calliptamus balucha balucha*, Uvarov 1938, *C.italicus italicus*, Rme 1930, *C.barbarus barbarus* (Costa 1836), and *C.tenuicerics* Tarb. 1930 of subfamily Calliptaminae are collected from Pakistan. *Sphodromerus indus* is described as a new species.

Key Words: Calliptaminae, Acrididae, Orthoptera, grass hoppers, Pakistan.

INTRODUCTION

Grasshoppers are the only insects challenging man for his supremacy and they pose constant threat to pastures and variety of crops in both irrigated and rain-fed areas of Pakistan. Geographical conditions of Pakistan provide ideal breeding ground for grasshoppers. The subfamily Calliptaminae shows very different dispersal behaviour. *Calliptamus italicus italicus* and *Calliptamus barbarus barbarus* are characterized by their divergent adaptations (Termier, 1991). *Calliptamus barbarus barbarus* shows very marked colour polymorphism, especially in South and South East of its geographical distribution (Jago, 1963). The grasshoppers and locusts, belonging to subfamily Calliptaminae, are regarded as a minor to considerably economic important pest of various agricultural crops; besides, the range lands. At times, they destroy the vegetation and cause economic loss. It is, therefore, essential to identify them accurately so that diagnosis of an economic problem could be properly made. The systematic work reported in the literature (e.g. Kirby, 1914; Uvarov, 1943; Bei-Beinko and Mishchenko, 1951; Jago, 1963, 1967; Ahmed, 1975-80; Wagan, 1990; Wagan and Solangi, 1990; Wagan and Naheed, 1997; Tokhai, 1996; Yousuf, 1996) show that subfamily Calliptaminae has not been subject to any recent study. It is, therefore, imperative to make a critical study on taxonomy and distribution of the species and subspecies in order to bring the knowledge of subfamily Calliptaminae of Pakistan up to date.

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MATERIALS AND METHODS

The present study is mainly based on the material collected during the expeditions of the second author from various provinces of Pakistan. For this, the first author is very grateful to him for offering his own collection for comparisons and identifications. Efforts were made to collect grasshoppers randomly, wherever and whenever they occurred in abundance. Their breeding season as observed was from May to September. Mostly the grasshoppers were picked with the hands, and at times collected through ordinary net, sweep net (8 in diameter and 20 in lengths) and through the light trap. After collection, specimens were brought to the laboratory for further processing. After killing, specimens were pinned out and preserved by conventional method.

Measurements

Measurements used in this study were generally followed after Dirsh (1953); except that the total length of grasshopper is defined as the distance from the frons to the apices of the folded tegmina, as used by Jago (1963), not to the end of the abdomen as used by Dirsh and several other

authors. All the measurements are given in mm and were made with scale and protector directly. Seven parameters were used, which are as below.

1. Antennal Length = AL: The distance from base of antennae to the tip of antennae.
2. Pronotal Length = PL: The median length of the pronotum from anterior to posterior margin.
3. Tegminal Length =TL: The distance from posterior edge of pronotum to apex of tegmen.
4. Hind Femur Length = HFL: The distance from proximal end of femur to tip of outer apical lobe at joint with tibia.
5. Hind Femur Depth = HFD: Maximum width from upper to the lower side of femur.
6. Hind Tibial Length = HTL: The distance from proximal end of tibia to tip at joint with tarsi.
7. Total Length = T: The distance from frons to apices of folded tegmina.

SYSTEMATIC ACCOUNT

Acorypha glaucopsis (Walker, 1870)

Diagnosis

Paler brown. Male cerci long, flat slightly inclined inwards, apex of cercus bilobed and pointed apically, inner aspect of hind femur yellowish, hind tibia with a second inner spur which bears a distinct tuft of hairs on the apex.

Measurements (mm) Males

Parameters	n	Mean	Range	S.D.
AL	3	8.33	7.5-9.0	0.76
PL	10	5.11	4.0-6.0	0.76
TL	10	14.43	11.5-18.0	2.31
HFL	8	12.5	10.5-15.0	1.60
HFD	8	5	4.5-5.5	0.46
HTL	8	11.37	9.0-14.5	2.03
T	10	25.58	18.5-38.5	8.99

Measurements (mm) Females

Parameters	n	Mean	Range	S.D.
AL	21	10.97	8.0-12.5	1.26
PL	28	6.96	6.0-8.0	0.65
TL	36	22.75	16.0-33.0	6.17
HFL	36	23.24	15.2-29.2	5.33
HFD	36	6.2	5.5-7.0	0.52
HTL	36	21.47	11.0-26.0	5.73
T	36	34.62	25.0-43.0	6.90

Material examined

Sindh

Dadu, 10 males, 14 females, Dadu proper, 10-v-85 (S.M. Solangi), Jamshoro, 1 male, 14-viii-2004, (M.S. Wagan and S. Soomro).Thatta, 3 males, 6 females, 14-viii-2004 (M.S. Wagan and S. Soomro). Jacobabad, 3 males, 2 females, 10-vii-2000 (M.S. Wagan, Bughio, Channa). Karachi, 12 males, 8 females, 8-viii-2003, (M.S. Wagan and S. Soomro).

Punjab

Chakwal, 10 males, 14 females, Kallar Kahar, 6-vii-2004 (M.S.Wagan, Bughio, Channa), 1 male, 1 female, 17-x-97, (Wagan and Naheed).

N.W.F.P.

Sawat: Kalam. 10 males, 14 females, 15-vii-2004, (Wagan, Bughio, Channa). Mansehra, 5 males, 8 females, 15-viii-2004, (Riffat Sultana). Mardan. 1 male, 1 female, 10-vii-2002, (M.S. Wagan). Abotabad. 2 males, 6 females, 5-vii-2004, (Wagan, Bughio, Channa).

Baluchistan

Quetta. 1 female, 10-iv-2004, (M.S. Wagan). Barkhan: Rarkan, 2 females, 25-viii-94. Loralai: 1 male, Saggar, 10-x-93, 2 females, Shabozai, 11-x-93, 3 females, Burnemi, 3-viii-94, 3 females, Surghuand, 29-ix-94, 1 female, Sinjawi, 18-x-93, 1 female, Poi, 4-v-93. Zhob: 2 males, Shinghar, 6-vii-93, 8 females, Manikhwa, 16-viii-94. Musakhail, 1 female, Chum, 25-viii-94, (S. Tokhai).

Remarks

This species have been collected from the rocky areas and open fields having the scattered mixed vegetation of herbs, shrubs and grasses. This

species is widely distributed in all provinces of Pakistan. Jago (1967) reported this species from Pakistan, whereas Wagan and Solangi (1990) from Sindh, Wagan and Naheed from Punjab (1997), Tokhai (1996) from Baluchistan, while Ahmed (1980) and Yousuf (1996) did not record it from Pakistan.

Sphodromerus undulatus undulatus (Kirby, 1914)

Diagnosis

Grayish brown. Tegmina semitransparent. Wings light rose coloured at base. Hind femur with large black spots on inner side. Hind tibia red.

Measurements (mm) Females

Parameters	n	Mean	Range	S.D.
AL	1	--------	12	-------
PL	15	7.49	7.0-8.0	0.41
TL	15	24.24	21.5-29.0	2.85
HFL	15	17.88	17.8-18.0	0.09
HFD	15	6.72	6.5-7.0	0.20
HTL	15	12.92	12.5-13.5	0.34
T	15	34.48	32.0-36.5	1.60

Male

Not in collection.

Material examined

Sindh

Dadu, 14 females, Rocky areas of Jamshoro. 5-iv-2005 (S. Soomro). Dadu proper, 10 females, 1-vii-85, (S.M. Solangi).Thatta, 2 females, 14-viii-2004 (M.S. Wagan and S. Soomro). Jacobabad, 7 females, 10-vii-2000 (M.S. Wagan, Bughio, Channa). Karachi, 13 females, 8-viii-2003, (M.S. Wagan and S. Soomro).

Punjab

Chakwal, 13 females, Kallar Kahar, 17-x-97, Attock, 2 females, 17-x-97, Jhelum, 3 females, 10-x-97, (Wagan and Naheed). Islamabad, 2-iv-2004 (M.S. Wagan and S. Soomro).

N.W.F.P.

Sawat: Kalam. 4 females, 15-vii-2004, (Wagan, Bughio, Channa). Mansehra, 2 females, 15-viii-2004, (Riffat Sultana). Dassu, 2 females, 12-v-1992, (M.S. Wagan). Mardan. 2 females, 10-vii-2002, (M.S. Wagan). Abotabad. 1 female, 5-vii-2004, (Wagan, Bughio, Channa).

Baluchistan

Quetta. 1 female, 10-iv-2004, (M.S. Wagan).

Remarks

Kirby (1914) established this species on the basis of single female from Cambell pur(now Attock). This species occurs in the rocky areas, having the mixed vegetation of herbs, shrubs and grasses. This species has been collected in greater numbers as compare to the other species of *Sphodromerus* from all provinces of Pakistan. Uvarov (1943) reported this species from Punjab, Sindh and Baluchistan. Ahmed (1980) recorded from Baluchistan, while Yousuf(1996) did not reported this species from Pakistan.

Sphodromerus undulatus afghanus Bei Bienko, 1949

Diagnosis

Dusty brown. Hind femur short and stout, dorsal carina dentate, dorsal genicular lobes rounded. Dorsal aspect of hind femur dusty in color and inner ventral aspect with large black shinny spot mixed with reddish brown colour. Hind tibia ventrally reddish pink and outer aspect whitish.

Measurements (mm) Female

Parameters	n=1
AL	16
PL	9
TL	24
HFL	19
HFD	7.5
HTL	14
T	34.5

Male

Not in collection.

Material examined

Baluchistan

Quetta, 1 female, Urrak valley, 10-iv-2004, (M.S.Wagan).

Remarks

This species has been collected from the rocky areas, having the scattered vegetation of herbs and shrubs. Tokhai (1996) reported this species from Loralai. Presently, we have collected it from Quetta. We confirm the presence of this species and its distribution has been extended.

Sphodromerus luteipes rubripes Uvarov, 1943

Diagnosis

Dusty brown. Hind femur dark brown with reddish color mixed on inner ventral side.

Measurements (mm) Females

Parameters	n	Range
AL	2	12,12.5,
PL	2	9.0
TL	2	25.0,27.0
HFL	2	18.0, 20.0
HFD	2	7.0
HTL	2	13.5,15.5
T	2	35.0,37.0

Male

Not in collection.

Material examined

Baluchistan

Quetta, 2 females, Henna Lake, 10-iv-2004, (M.S. Wagan).

Remarks

Our specimens generally agree with the description of Uvarov (1943) except that they are 3-5mm shorter in size. Tokhai (1996) reported from Zhob division, whereas Ahmed (1980) and Yousuf (1996) did not report it from Pakistan. This species have been collected from the rocky areas having the scattered vegetation of herbs and shrubs.

Sphodromerus indus, new species

Diagnosis

One of the smallest known species of *Sphodromerus.* Closely related to *Sphodromerus undulatus pedestris* Uvarov but 8 mm smaller. In this new species prosternal process is slightly inclined. Mesosternal interspace almost square. Hind femur without large black spot from the inner side and the hind tibia is red in colour, whereas in *S.undulatus pedestris* the prosternal process is straight, mesosternal interspace is not square, hind femur with large black spot from the inner side and the hind tibia is honey yellow.

Description of female holotype

Size small, moderately robust, antenna filiform, shorter than head and pronotum together. frontal ridge smooth, weakly narrowed under fastigium. Fastigium of vertex shallow, moderately broad and oval in shape, pronotal disc tectiform, median carina well raised; lateral carinae in prozona practically straight, very obtuse but distinct, metazona somewhat punctured, especially laterally, prozona slightly longer than metazona. Prosternal process short, thick and broad at apex, slightly inclined towards mesothorax. Mesosternal interspace almost square. Tegmina short, tapering apically, wings slightly shorter than tegmina. Femur normal, hind tibia with 8 inner and 9 outer spines.

General colouration

Dark brown in colour. Wings orange red. Hind femur from inner side without large black spot. Hind tibia red colored.

Measurements (mm)

Parameters	Female n=1
AL	7.7
PL	5.8
TL	9.3
HFL	15
HFD	5.5
HTL	11
T	22

Male

Not in collection.

Material examined

N.W.F.P.

Dassu, nr. Kamalia Bazar, 1 Female holotype, 12-5-1992 (M.S. Wagan).

Depository

The type material has been deposited in the Entomological Museum, Department of Zoology, University of Sindh, Jamshoro.

Etymology

This new species is named after the River Indus.

Fig. 1. *Sphodromerus indus*, new species.

Habitat

This species has been collected from bank of River Indus at the height of approximately 250 feet.

Calliptamus balucha balucha Uvarov, 1938

Diagnosis

Dark brown. Inner aspect of hind femur reddish with two incomplete black bands, dorsal aspect at the junction of ventroexternal carinae with a large black spot. Hind tibia red.

Measurements (mm) Male

Parameters	n=1
AL	8
PL	4
TL	9
HFL	10
HFD	5
HTL	8
T	16

Females

Not in collection.

Material examined

Baluchistan

Loralai, 1 male, Loralai proper, 10-iv-2004, (M.S. Wagan).

Remarks

This species occurs in the rocky areas, having the scattered vegetation of herb and shrubs. Earlier, Jago (1963) and Yousuf (1996) reported this species from Baluchistan, while Ahmed(1980) did not record this species.

Calliptamus italicus italicus (Italian Locust) Rme, 1930

Diagnosis

Paler brown. Inner aspect of hind femur rosy, with two incomplete black bands. Hind tibia on inner and dorsal side rosy, at distal end with yellowish band. Apices of tegmina touch to the tip of bilobed □ircus.

Measurements (mm) Males

Parameters	n	Mean	Range	S.D.
AL	2	6.25	6.0,6.5	0.35
PL	10	4.3	3.0-5.5	0.85
TL	10	12.55	10.0-15.0	1.73
HFL	10	11.5	9.0-13.0	1.37
HFD	10	4.15	2.5-5.5	1.02
HTL	10	9.15	7.5-11.0	1.37
T	10	18.05	15.0-21.0	2.06

Measurements (mm) Females

Parameters	N	Mean	Range	S.D.
AL	2	7.25	6.5,8.0	1.06
PL	10	5.5	4.0-7.0	1
TL	10	14.95	12.0-18.0	2.08
HFL	10	13.65	12.0-15.0	1.10
HFD	10	4.4	3.0-5.5	0.87
HTL	10	10	9.0-11.0	0.74
T	10	19.7	15.0-25.0	3.77

Material examined

Sindh

Dadu, 3 males, 2 females, Dadu prop. 10-v-85(S.M. Solangi), Jamshoro, 1 male, 14-viii-2004, (M.S. Wagan and S. Soomro).Thatta, 3 males, 14-viii-2004 (M.S. Wagan and S. Soomro). Jacobabad, 1 male, 10-vii-2000 (M.S. Wagan, Bughio, Channa). Karachi, 4 females, 8-viii-2003, (M.S. Wagan and S. Soomro).

Punjab

Islamabad. 2 males, 5 females, 5-vii-2004. Chakwal, 2 males, 4 females, Kallar Kahar, 6-vii-2004, Attock 3 males, 2 females, 5-vii-2004, Jhelum, 1 male, 7 females, 6-vii-2004 (M.S.Wagan, Bughio, Channa).

N.W.F.P.

Sawat: Kalam. 10 males, 6 females, 15-vii-2004, (Wagan, Bughio, Channa).

Baluchistan

Zhob, 2 females, Kapip, 11.vii.93, 2 males, Qamaruddin Karez, 16.viii.93, (S. Tokhai).

Remarks

This species have been collected from the rocky areas, having the mixed vegetation of herbs, shrubs and grasses. One of the principal pests of many cultivated and wild plants represented by two phases- Gregarious and Solitary phases. This species is recorded for the first time from Pakistan. It occurs in all provinces of Pakistan and is widely distributed.

Calliptamus barbarus barbarus (Desert Feelered Locust) (Costa, 1836)

Diagnosis

Paler brown. Hind femur on inner surface for the most part black painted red, with 3 light incomplete bands. Hind tibia orange red on inner aspect.

Measurements (mm) Males

Parameters	n	Mean	Range	S.D.
AL	11	6.70	5.5-8.0	1.07
PL	14	4.48	3.0-6.0	0.98
TL	14	15.5	13.0-22.5	2.46
HFL	14	11.12	10.0-14.0	1.06
HFD	14	4.55	3.5-6.0	0.61
HTL	14	10.4	7.0-13.0	1.79
T	14	22.5	15.0-33.0	6.45

Females

Not in collection.

Material examined

Sindh

Dadu, 1 male, Dadu prop. 14-viii-2004, Jamshoro, 1 male, 14-viii-2004, (M.S. Wagan and S. Soomro). Thatta, 1 male, 14-viii-2004 (M.S. Wagan and S. Soomro). Jacobabad, 1 male, 10-vii-2000 (M.S. Wagan, Bughio, Channa). Karachi, 2 males, 8-viii-2003, (M.S. Wagan and S. Soomro).

Punjab

Islamabad. 1 male, 5-vii-2004. Chakwal, 2 males, Kallar Kahar, 6-vii-2004, Attock 1 male, 5-vii-2004, Jhelum, 3 males, 6-vii-2004 (M.S. Wagan, Bughio, Channa).

N.W.F.P

Sawat: Kalam. 16 males, 15-vii-2004, (Wagan, Bughio, Channa).

Baluchistan

Zhob, 2 males, Shinghari, 16.vii.93; Loralai, 1 male, Duki, 17-viii-94; Qila Saifullah, 1 male, Kamchoghai, 11.ix.94, 1 male, Kanmahtharzai, 2.ix.94, (S. Tokhai).

Remarks

This species have been collected from the rocky areas, having the mixed vegetation of herbs, shrubs and grasses. This species is recorded from all provinces of Pakistan. This species show very marked color polymorphism, especially in South and South East of geographical distribution. Jago (1963) recorded this species from Baluchistan, whereas Yousuf (1996) recorded this species from N.W.F.P. (Murree and Kalam) and Baluchistan, while Ahmed (1980) did not record this species from Pakistan. Yousuf (1996) misidentify *C. barbarus manus* and *C. cephalotes* as a separate species but according to Jago (1963) these species are synonymy of *C. barbarus barbarus.*

Calliptamus tenuicerics Tarb., 1930

Diagnosis

Dusty brown. Hind femur on inner aspect with large oval black spot and a light band on apex. Hind tibia lemon yellow.

Measurements (mm) Males

Parameters	n	Mean	Range	S.D.
AL	8	9.05	9.0-10.0	0.83
PL	10	7.25	4.5-8.5	1.45
TL	10	15.41	14.0-16.5	1.04
HFL	10	12.6	12.0-13.5	0.51
HFD	10	6.21	3.0-6.5	0.21
HTL	10	9.61	9.0-10.0	0.38
T	10	23.85	20.0-27.5	2.56

Females

Not in collection.

Material examined

Punjab

Islamabad. 3 males, 5-vii-2004. Chakwal, 1 male, Kallar Kahar, 6-vii-2004, Attock 2 males, 5-vii-2004, (M.S. Wagan, Bughio, Channa).

N.W.F.P.

Sawat: Kalam. 16 males, 15-vii-2004, (Wagan, Bughio, Channa).

Baluchistan

Qila Saifullah, 1 male, Muslim Bagh, 20.vii.93, (S. Tokhai).

Remarks

This species occurs in the rocky areas, having the mixed vegetation of herbs, shrubs and grasses. This species is recorded from Punjab, N.W.F.P. and Baluchistan province. Earlier, Yousuf (1996) recorded this species from N.W.F.P.; while Jago (1963) and Ahmed (1980) did not reported this species from Pakistan.

CONCLUSIONS

Ahmed (1980) recorded 2 species while Yousuf (1996) reported 4 species whereas Tokhai (1996) recorded 7 species of subfamily Calliptaminae. Presently we have recorded 9 species from all provinces of Pakistan.

It may be concluded that some species are abundant, while others are from sporadic to very rare. Their status could be altered if more extensive and frequent surveys are made in the surveyed localities. The rare species may come up to the status of abundance and vice versa. Therefore, greater the diversity of collection techniques employed and habitats explored, greater would be the diversity of grasshoppers that will be collected.

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