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Full Length Research Paper

A new species of the genus *Hilethera* Uvarov (Oedipodinae: Acrididae: Orthoptera) from Pakistan

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The subfamily Oedipodinae has considerable economic importance in Pakistan. It poses constant threat to pastures, orchards and variety of crops in both irrigated and rain-fed areas. Amongst its members, the genus *Hilethera* has not been studied extensively and it was described by Uvarov in 1925. It comprised two species: *Hilethera hierichonica* Uvarov and *Hilethera aeolopoides* Uvarov, but at present, we have added one new species, *Hilethera balucha* to this genus. This new species is closely related to *Trilophidia annulata* Thunberg because it has a refined body form but can easily be separated from the same on the following bases: it has the structure of pronotum; its anterior projections are conical, extending outwardly. It has lateral plates with convex median process, has shorter ancorae placed angularly, and has hyaline wings that are transparent with a smoky marginal band, and slightly greenish at the base. This insect has been collected from rocky areas with scattered vegetation that consists of grasses and herbs. *H. balocha* new species is described from Balochistan Province of Pakistan.

Key words: Oedipodinae, new species, *Hilethera Balocha*, Balochistan.

INTRODUCTION

The fauna of grasshopper insects belonging to the subfamily Oedipodinae are of considerable economic importance in Pakistan. Their representatives pose constant threat to pastures and variety of crops in both irrigated and rain-fed areas. Some species of Oedipodinae can reach high densities, concentrate their feeding on valued plants, and thus damage the agriculture value of both range and crop land and cause economic loss to mankind. They are commonly known as band-winged grasshoppers. Oedipodinae is distributed in wide range throughout the world; it contains185 genera throughout the world. Amongst the members of Oedipodinae, *Locusta migratoria* Linnaeus causes devastating swarm all over the old world (Vickery and Kevan, 1983). Members of Oedipodinae occur throughout Pakistan due to their diversity of habitats such as agricultural crops, hilly areas and desert like plain. Mostly, they are known as geophiles (living in open grounds) and phytophyles (found at vegetation, grasses, herbs and shrubs). Literature review showed that the band- winged grasshoppers are being reported as important pests of agriculture.

Earlier, Cotes (1893) recorded a serious damage of *Aiolopus* species in upper Sindh. Mooed (1966) reported the damaging status of *Locusta migratoria* at agricultural fields of Larkana District. Ahmed (1980) surveyed the fauna of grasshoppers of Pakistan and reported that some of the Oedipodinae grasshoppers are severe pests of orchards. Wagan and Solangi (1990) recorded heavy damage of some Oedipodinae species on cultivated crops in different areas of Sindh Province. But their work was restricted to specific region and did not provide sufficient information about its current status. It is therefore essential to identify them accurately; so that diagnosis of an economic problem could be properly made. In this present study, observation has been made of the genus *Hilethera*, that contains three species; and one new species has been described as well.

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Figure 1. *Hilethera balucha* Male n sp.

***Hilethera balocha* n.sp.**

Diagnostic characters

Its body is medium size; antennae, filiform with about 20 to 21 segments, and slightly longer than the head and pronotum together. Its head is sub-globular, thickly constricted with light brown spots; having sparse hairs, smaller than the pronotum. It has round prominent eyes.

Description of holotype ♂

Its body is medium size; antennae, filiform with about 20 to 21 segments, and slightly longer than the head and pronotum together. Its head is sub-globular, thickly constricted with light brown spots; having sparse hairs, smaller than the pronotum. It has round prominent eyes (Figure 1). Fastigium of vertex is raised at the anterior; is pentagonal, sub-angular, and concave with undulated lateral carinulae; fastigial foveolae is somewhat larger and triangular; frontal ridge is flat and slopes down. Pronotum has saddled shape, and densely punctured; anterior margin is obtusely round, while posterior is rectangular. Pronotum is highly constricted in prozona; median carina, visible, sharp, and slightly deep in prozona. Tegmina and wings well developed with obtuse rounded apices. Tegmina have a v- shape mark at the base. Hind femur is stout, smaller but wide a little; finally, dorsal carina is entire, and dorsal genicular lobes are smoothly round. Hind tibia is slender, with 9 inner and 8 black tipped spines. Claws are shorter and arolium, smaller.

General coloration

Generally, it is light yellowish brown in color. Antennae is dark brownish with white spots near the base. Fastigium of vertex has smaller black spots. Tegmina are semi-transparent with two smoky dark bands; apex has light brown speckles. Hyaline wings are transparent, have a slightly smoky marginal band and greenish a little at the base. Hind femur is internally black except for a pale pre-apical band. Hind tibia is dirty whitish at the base; and has a pre-median and pre-apical ring.

Description of allotype ♀

It is similar to that of the male but larger in size. Antennae is filiform with about 23 to 24 segments, slightly longer than the head and pronotum together. Head is sub-globular, thickly constricted with light brown spots; having sparse hairs, smaller than the pronotum. It has round prominent eyes. Fastigium of vertex is raised at the anterior; is pentagonal, sub-angular, concave with undulated lateral carinulae; fastigial foveolae is slightly larger, and triangular; frontal ridge is flat and slopes down. Pronotum has saddled shape, densely punctured; anterior margin is obtusely round, while posterior is rectangular. Pronotum is highly constricted in prozona; median carina, visible, sharp, and slightly deep in prozona. Tegmina and wings well developed with obtuse rounded apices. Tegmina have v- shape mark at the base. Hind femur is stout, and smaller but wide a little; dorsal carina is entire, and dorsal genicular lobes are smoothly round. Hind tibia is slender, with 10 inner and 9 black tipped spines. Claws are shorter and arolium, smaller. Supra-anal plate is long, flat, with marked but narrow transverse carina; margin is obtusely round. Cerci is short and conical; and has sub acute rounded apices. Ovipositor has curved valves, and pads of ventral valves in tubercles. Sub-genital plate is long, conical, with margin obtusely round.

General coloration

Generally, it is light yellowish brown in color. Antennae is dark brownish. Fastigium of vertex has smaller black spots. Tegmina are semi-transparent with two dark bands; apex has smoky brown speckles. Hyaline wings are transparent with a smoky marginal band; and slightly greenish at the base. Hind femur is internally black except for a pale pre –apical band. Hind tibia is dirty whitish at the base, and has a pre-median and pre- apical black ring.

Phallic complex

Apical valve of penis is like vertical plough at the dorsal part and shorter than the valve of cingulum; valve of penis tapers towards the apex with rounded sub acute apices (Figure 2a to d). Valve of cingulum is finger like form, straight upwardly, and larger than that of penis valve; has rounded acute apices at apex, and slightly deep at the base. Arch of cingulum is flat, curved inwardly and well developed. Basal bridges are folded slightly thin. Apodemes are smaller, narrower, straight; anterior has rounded acute apices. Zygoma is remarkable, smaller and is up ward. Rami is irregular, dorsally extending like lobe and denticulate at margins. Gonopore is like a straight, thin rod, having angular apices. Ejaculatory duct is shorter and broad, directed anteriorly. The epiphallus is attached to the ninth sternite and to the zygoma by muscular tissues; epiphallus has bridge shape; bridge is straight, narrow and thick a little. Anterior projections are conical, protruding outwardly with obtuse rounded apices; lateral plates emarginate marginally, and have incurved processes. Posterior projections have externo–lateral expansions at the base. Ancorae is shorter and placed angularly, is sub acute round at the apex, with lightly wider median processes, and round at the base. Lophi is moderate with acute apices, curves upwardly; is convex; anteriorly directed with slightly wide apical

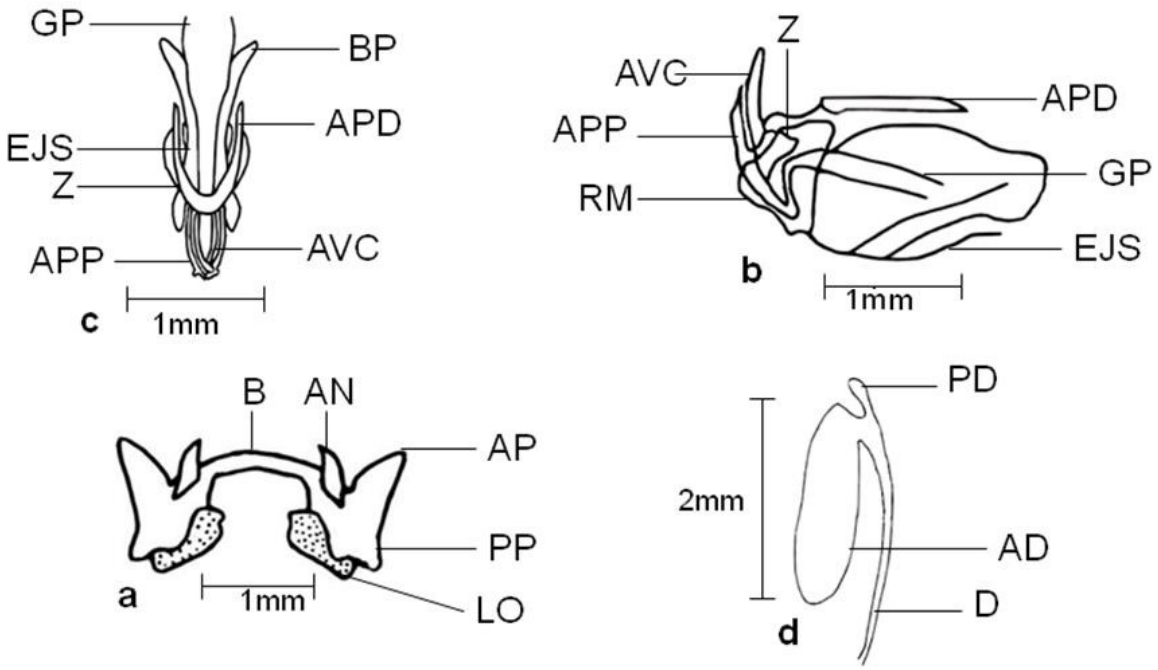

Figure 2. *Hilethera balucha,* a) Epiphallus, b) Endophallus and Cingulum lateral view, c) same dorsal view, d) Spermatheca.

lobes, ending into small rounded terminal apices. Lophi is set with enormous smaller spines, besides the lateral plates, with oval circular sclerites.

Female: Cerci is short, conical and hairy. Ovipositor has medium length, valves are curved and robust. The spermatheca usually resembles a long tube and opens on the dorsal wall of the genital cavity, opposite the genital opening. Pre – apical diverticulum is laterally placed, broad at apex with sub acute rounded apices. Apical diverticulum has tube like shape, elongated with rounded processes at the base. Measurement of various body parts is shown in Tables 1 and 2

Materials examined

Balochistan: Loralai: Shabozai Holotype (2♂♂) 15.x.2001, Allotype (3♀♀ Female), 15.x.2001, Paratype (16♂♂, 18 ♀♀) 22.x.2001 (Wagan, Barkat and Riffat)

Etymology

This species has been named after the locality.

Repository

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

DISCUSSION

Walker (1870) first raised the status of Oedipodinae family level. Since then it has been considered as a family or subfamily. Kirby (1914) and Bei-Bienko and Mishchenko (1951) considered it as a subfamily. Dirsh (1956) included it in subfamily Acridinae.

However, Uvarov (1966) clearly separated this subfamily from Acridinae since it has been regarded as subfamily by Dirsh (1975), Vickery and Kevan (1983) and Otte (1995). This subfamily differs from all other subfamilies because it has the presence of strong and serrated intercalary vein of median area of tegmen and the mesosternal interspace is about twice wider than long. Uvarov, in his series of publications (1921, 1929, 1942a, b), gave the comprehensive description of various species of Oedipodinae and in 1925 he also revised the genera *Hilethera* with addition of two new species *Hilethera hierichonica* and *Hilethera aeolopoides*. In the present, we added one new species *Hilethera balucha*, making it now catalogued as three species.

Tokhai (1997) recorded 17 species of band-winged grasshoppers from Balochistan Province of Pakistan. Baloch (2000) described 20 species including 2 new species Oedipodine grasshoppers from Punjab Province of Pakistan. Garai (2001) studies the grasshoppers of Pakistan and listed 19 species of Oedipodine grasshoppers mostly from N.W.F.P. (now Khyber Punkhton Khawa). Now the status of Oedipodinae (= locustinae) as a subfamily is accepted by Roberts (1940), Kevan and Knipper (1961), Uvarov (1966), Dirsh (1975), Vickery and Kevan (1983), Eades (2000) and Eades and Otte (2010). As the present study is based on a small number of species, we strongly recommend that if more

Table 1. The measurement of various body parts of *Hilethera balocha* (holotype).

Parameter	Holotype ♂	Allotype♀
Length of body	15.0	18.0
Length of antennae	6.5	7.0
Length of pronotum	4.0	4.2
Length of tegmina	17.2	19.0
Maximum width of tegmina	2.5	4.1
Length of hind femur	9.1	10.0
Maximum width of hind femur	3.6	4.0
Length of hind tibia	8.0	9.0

Table 2. The measurement of various body parts of *Hilethera balocha* (paratype).

Parameter	Paratype ♂♂		Paratype ♀♀	
	(Mean ± Sd)	(Range)	(Mean ± Sd)	(Range)
Length of body	15.33±0.89	15-16	18.8±3.60	17-21
Length of antennae	6.66±1.62	6-8	6.2 ±1.49	6-7
Length of pronotum	3.33±3.69	3-4	4.0±00	4-4
Length of tegmina	14.66±1.63	14-16	18.22 ±3.5	17-21
Max. width of tegmina	2.66±0.38	2.5-3	4.0±00	4-4
Length of hind femur	8.33±0.81	8-9	10.0±1.41	9-11
Max. width of hind femur	3.66±0.80	3-4	3.84±0.69	3.2-4
Length of hind tibia	7.33± 0.81	7-8	8.22±1.59	7.1-9

extensive survey is carried out throughout the country it would be helpful to find out new diversity in the collection of genus *Hilethera* from this region.

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