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RESEARCH ARTICLE

Study on the *Eupholidoptera* species (Orthoptera: Tettigonioidea: Tettigoniinae) from Pakistan

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Abstract

Eupholidoptera nr. karatolosi species of bush-crickets (Orthoptera: Tettigoniidae: Platycleidini) is very rare in seen at present single ♀ was describe from Mansehra Pakistan. This species is distinguished from its closely related species on the basis of morphological characteristics exclusively presences of prominent black band, extends from the eyes upto end of pronotum. A simplified taxonomic key for identification of *Eupholidoptera* species along with measurement of different parameters is also provided for first time.

INTRODUCTION

Eupholidoptera was established by Ramme (1951) including 20 species previously assigned to *Pholidoptera* Wesmael, 1836 under the *Locusta, Thamnotrizon* or *Olynthocelis* , while; he omitted to designate the type species and the generic name was made available by Mařan (1953) by suggestion and type species description (Kocak 1981). Ramme (1951) carried detail work on this group and increased its numbers from 20 to 50. (La Greca 1959; Harz 1969; Kaltenbach 1969; Willemse and Kruseman 1976, Salman 1983; Massa 1999; Ayal *et al*., 1999; Çıplak 1999; Çıplak *et al.* 1999, Willemse and Heller 2001; Ünal and Naskrecki 2002 and Willemse and Willemse 2004). Due to the fact that as there is no complete consent among orthopterologists about the ranking of some taxa, i-e. *E. chabrieri* group (Massa 1999 and Çıplak *et al.*, 2007, 2009). Beside this, *Eupholidoptera* of Greece and Turkey have been reviewed by Willemse (1980) and Salman (1983). *Eupholidoptera* is typically Mediterranean in its distribution with approximately 50 species mainly allied with maquis foliage. Its range extends from Southern France in the west through the northern Mediterranean basin to Israel in the east and south. Most species (nearly 22) are found in Greece (Ramme 1951; Harz 1969; Willemse and Kruseman 1976; Salman 1983; Heller 1988; Heller *et al.*, 1998; Ragge and Reynolds 1998a,b; Willemse and Heller 2001). Out of these 22 described species 18 Greek species were endemic to the Aegean and Ionic islands and 10 of which were restricted to Crete. Similarly, (about 21) species were recorded from Turkey including Pakistan by Ramme (1951); Karabağ (1958); Çıplak *et al*., (1993); Çıplak *et al.*, (1999); Unal and Naskrecki (2002); Panhwar *et al.*, (2014) and Riffat *et al.*, (2014) amongst these 19 were endemic to Aegean and Mediterranean coastal regions in Turkey. Additionally, one more female of *Eupholidoptera nr. karatolosi* is being recorded as new record of Pakistan.

Material and Methods

A single ♀ was captured by large forceps from agricultural fields near bushes of a tall pine trees from Mansehra (34.333°N 73.200°E) than specimen was brought into the laboratory and was killed and preserved by standard entomological methods .The material was deposited in Sindh Entomological Museum (SEM) at Department of Zoology, University of Sindh Jamshoro Pakistan. Identification of specimen was carried out under the Stereoscopic Dissecting Binocular Microscope with the help of keys and description available in literature and on the web site (http://www.orthoptera.org) Orthoptera Species File Online. The diagrams were all drawn with the help of "Ocular Square Reticule Graph" fitted in Binocular dissecting microscope.

Result and Discussion

Checklist of *Eupholidoptera* species after (Mofid and Quicke 2007 and Ciplak *et al.*, 2009)

1- *E. peneri* Kaltenbach, 1969
2- *E. pallipes* Willemse & Kruseman, 1976
3- *E. gemellata* Willemse & Kruseman, 1976
4- *E. annulipes* (Brunner von Wattenwyl, 1882)
5- E. marashensis Salman, 1983
6- *E. akdeniz* Ünal & Naskrecki, 2002
7- *E. uvarovi* Karabağ, 1952
8- *E. palaestinensis* (Ramme, 1939)
9- *E. lyra* (Uvarov, 1942)
10- E. ledereri (Fieber, 1861)
11- *E. helina* Çıplak 2009
12- *E. cypria* Ramme, 1951
13- *E. werneri* Ramme, 1951
14- *E. smyrnensis* (Brunner von Wattenwyl, 1882)
15- *E. chabrieri* (Charpentier, 1825)
16- *E. megastyla* (Ramme, 1939)
17-*E.karatolosi* Mofid & Quicke 2007
18- *E. nr. karatolosi**
19- *E. leucasi* Willemse, 1980
20- *E. hesperica* La Greca, 1959
21- *E. epirotica* (Ramme, 1927)
22- *E. cephalonica* Willemse & Willemse, 2004
23- *E. mariannae* Willemse & Heller, 2001
24- E. rammei Willemse & Heller, 2001
25- *E. astyla* (Ramme, 1927)
26- *E. annamariae* Nadig, 1985
27- *E. latens* Willemse & Kruseman, 1976
28- *E. giuliae* Massa, 1999
29- *E. anatolica* (Ramme, 1930)
30- *E. tahtalica* (Uvarov, 1949)
31- *E. cretica* Ramme, 1951
32- *E. tasheliensis* Çıplak, 1999
33- *E. sevketi* (Ramme, 1933)
34- *E. excisa* (Karabağ, 1952)
35- *E. demirsoyi* Salman, 1983
36- *E. forcipata* Willemse & Kruseman, 1976
37- *E. jacquelinae* Tilmans, 2002
38- *E. krueperi* (Ramme, 1930)

39- *E. tauricola* (Ramme, 1930)
40- *E. mersinensis* Salman, 1983
41- *E. kykladica* Heller & Fer Willemse & Luc Willemse 1998
42- *E. prasina* (Brunner von Wattenwyl, 1882)
43- *E. spinigera* (Ramme, 1930)
44- *E. tucherti* Harz, 1988
45- *E. karabagi* Salman, 1983
46- *E. unimacula* Karabağ, 1956
47- *E. femorata* Çıplak, 1999
48- *E. icariensis* Willemse, 198
**Note: ***Showed that this species occur in Pakistan.

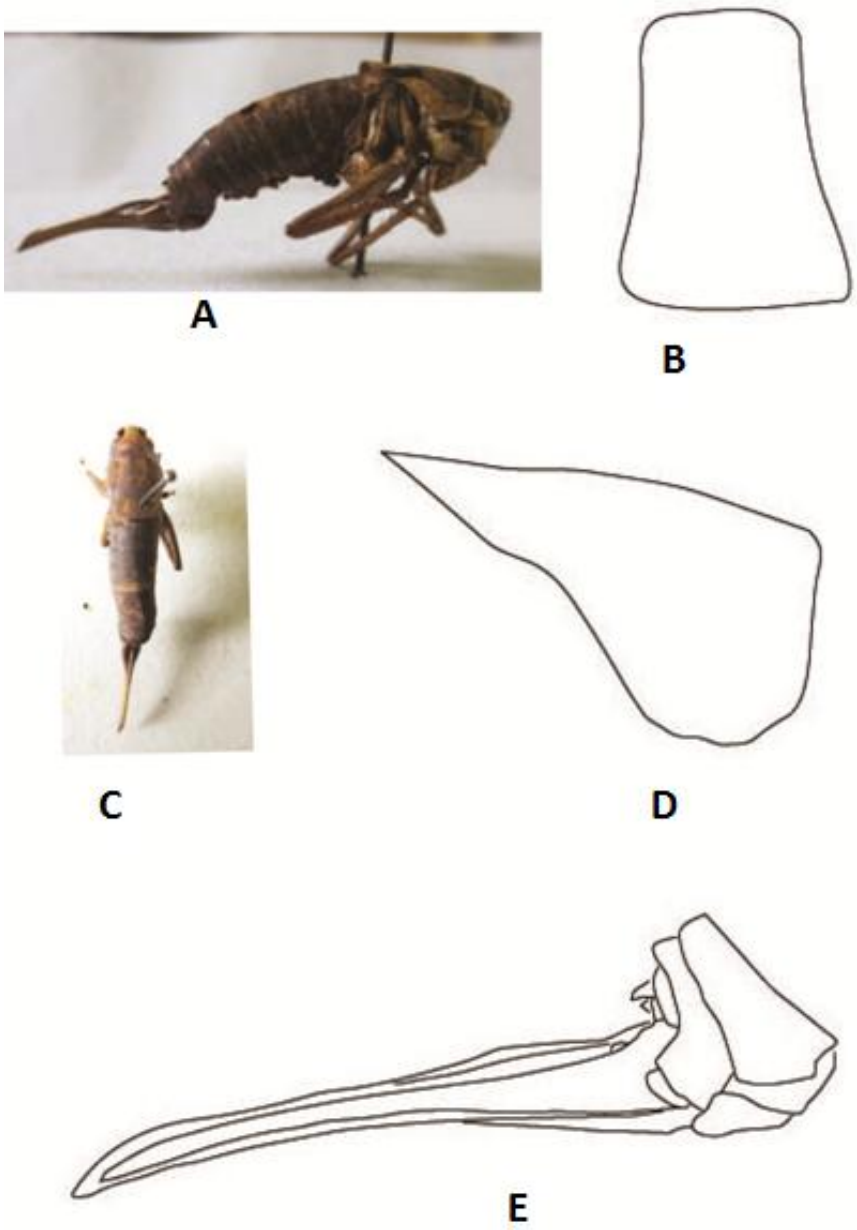

Fig: 1. *Eupholidoptera nr. karatolosi* (**Female A-E)**: **A** LV, **C** same but DV, **B** Pronotum DV, **D** same but LV, **E** Ovipositor LV

Simplified taxonomic key to enable reorganization of four female species of *Eupholidoptera* species

1. Ovipositor dark brown and much wider (Fig:1 E)……..……**2**
--Ovipositor pale brown and not wider…….……..**3**
2. Subgenital plate reduce and much wider (2.97, 3.15mm)(Fig:1E)…… ……..……...***E.nr.kartolosi***
--Subgenital plate elongated less wider ……..……..……***E.anatolica***
3. Subgenital plate elongated and much wider (8.8mm, 6.6mm)…….……***E.karatolosi***
--Subgenital plate short…….……..……***E.latens***

Tribe Pholidopterini

Diagnosis:

Pronotum with rudimentary lateral carinae. Pronotum not wrinkled dorsally or wrinkled, roughly as long as fore-femur .Last abdominal tergite partly black in female; ovipositor narrow, strongly compressed laterally and comparatively long slightly tipped wide at base.

Genus *Eupholidoptera* Maran, 1953

Eupholidoptera Ramme, 1951
Pachytrachelurus Giglio-Tos, 1914
Karabagia Harz, 1969

Diagnosis:

Pronotum with rudimentary lateral carinae. Pronotum not wrinkled dorsally or wrinkled, roughly as long as fore-femur .Last abdominal tergite partly black in female; ovipositor narrow, strongly compressed laterally and comparatively long slightly tipped wide at base.

Type species: *Locusta chabrieri* Charpentier (= *Eupholidoptera chabrieri chabrieri*); authority: Maran. 1953

Eupholidoptera nr. karatolosi

(Fig: 1, A-E)

Morphological description:

Body of large size, rusty brown in color (Fig:1, A, C); fastigium broad distally slightly narrowed to the anterior; vertex creamy brown usually in macropterous form. Pronotum larger than the head; pronotum broader distally, compressed ventrally (Fig:1, B, D); fastigium with horizontal elongated dark marks on lateral side; Tegmen slightly visible fully covered with pronotum. Fore tibiae with several spines. Cerci small; subgenital plate in the present species is less longer and wider (2.97mm,3.15mm). Ovipositor dark brown and much wider straight and slightly tipped wider basally (Fig:1, E).

Morphometrics: Length of head 4.2mm; Length of pronotum 10.15mm; Length of femur 10.85mm;Length of tibia 8.75mm;Length of subgenital plate 2.97mm;Width of subgenital plate 3.15mm; Length of ovipositor 15.05mm; Total body length 34mm.

Material Examined: PAKISTAN: Khyber Pakhtunkhwa, Mansehra, 15.xi.2013 1♀ (Riffat. S. & Waheed A.P) (SEM).

Remarks: This species is very closely related to *E.karatolosi* but it is 2mm smaller in size. Mostly females of genus *Eupholidoptera* are very alike and almost impossible to distinguish. Our species differ to *E.karatolosi* on following basis: **1.**Ovipositor is dark brown whilst it was pale in *E.karatolosi*. **2**. There is prominent black band on the lateral side of pronotum which is not present in *E.karatolosi.* **3**. Subgenital plate in the present species is less long and

wider (2.97mm, 3.15mm) whilst in *E.karatolosi* sub-genital plate is elongated and much wider (8.8mm, 6.6mm). But on the availability of limited number of specimens we are hesitate to describe this as new species or subspecies. If male will be collected in the result of later survey it might be confirmed its exact status. Willemse (1980) stated that *Eupholidoptera* might be an unnatural group of species since a great deal of accent has been placed on morphology. The description of specimen in our hand generally agreed on this account.

Ecological account: Mofidi & Quicke (2007) stated that *Eupholidoptera* species are large in size and flies over large distances and sampled at elevation of 600-750 m from Greece and Iran respectively. At the present we have encountered single ♀ at the elevation of 1,088m (3,570ft) from Mansehra (KPK) among the bushes of tall pine trees. Infact, the flora of district Mansehra (KPK) consists on climax forest associated with shrubs and herbs along with tall pine trees. It might be reason that diversified geographical condition of this region provide ideal habitat for breeding of many grasshopper species. Present study strongly recommends that it is very essential to carry out frequent visits in this area in order to know the new species and new record.

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