New record of *Conocephalus (Anisoptera) fuscus* (Fabricius, 1793) (*Conocephalinae*: *Tettigoniidae*: *Orthoptera*) from Pakistan

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Abstract

The adults of *Conocephalus* species were collected from the agricultural fields having Wheat, shrubs, herbs and grasses. The collected material was sorted out into single genus *Conocephalus* Thunberg, 1815 with single species i.e.: *Conocephalus (Anisoptera) fuscus* (Fabricius, 1793). *Conocephalus (Anisoptera) fuscus* (Fabricius, 1793) is reported for the first time from Pakistan. Additionally, distribution, habitat, description of species along with photographs and synonymy is documented.

Keywords: New record, *Conocephalus*, Synonymy, Distribution, Pakistan

1. Introduction

Genus *Conocephalus* was established by Thunberg, *Gryllus, Tettigonia* and *Conocephalus* as type species [1]. The Genus can be diagnosed body small. Vertex more or less laterally flat. Apex of vertex rounded, not surpass the frontal fastigium, and usually higher than head by lateral view. The lateral lobes of pronotum oblique triangular shaped, with a translucent gibbons’ area near the hind margin above the auditory organ. Tegmina and hind wings developed or shortened. Fore and mid femora usually lack of spines at their ventral side. Hind femora with two spines on knees. Fore and mid tibiae lack of dorsal spurs, and with short ventral spurs. Tympanum on fore tibiae closed. Prosternum with or without two spines. Male cercus with inside teeth. Ovipositor sword-shaped, brim smooth or with tiny teeth [2]. *Conocephalinae* comprises 156 species worldwide [3]. *Conocephalus* of the Pacific species was reviewed and reported 18 species and subspecies. Besides this, she identified as *C. redtenbacheri* (Bol.), together with *C. semivittatus vittatus* (Redt.), as an important predator of *Leptocorisa oratorius* (F.). Additionally, she included several species of this genus as important predators of insect pests but also included herbivores that can themselves be regarded as pests [4].

The genus *Conocephalus* from Korea revealed 05 species with new record of *Conocephalus bambusanus* Ingrisch species. Beside this, they provided taxonomic key to species along with distributional data [5]. The genus *Conocephalus* from China and reported single new combination *Conocephalus brevivalva* (Shi et al., 2005), in addition to single new record *Conocephalus oceanicus* (Le Guillou, 1841) and a new species *Conocephalus shanghaiensis* sp. nov. to this genus from China [2, 6].

Recently, [20] carried out a detail survey for the collection of *Conocephalus* species during the year 2011-2013 in various provinces of Pakistan. Single gnus with single species i.e. *Conocephalus maculates* (Le Guillo) was recorded in large numbers. Beside this, they provided important taxonomic character along with drawing line, measurement of various body parts was also documented. But, they did not report *Conocephalus (Anisoptera) fuscus* (Fabricius, 1793). It was also observed that *Conocephalus* species damage the wide range of cultivated plants when these are established in area from where the forest has been cleared [20].

Several studies have been conducted on Katydid fauna of Pakistan by [7–24] but none of the authors have reported *Conocephalus (Anisoptera) fuscus* (Fabricius, 1793). The aim of present study was to explore the *Conocephalus* fauna of this region. Finding of present species have constructed new record for Pakistan.
2. Materials and Methods

2.1 Study sites
The adults of Conocephalus species were collected from the Wheat, shrubs, herbs, and grasses with the help of traditional insect hand-net (8.89 cms in diameter and 50.8cmc in length) as well as by hand picking through large forces. The collection was made during the year 2016-2017 in the month of October to March.

2.2 Killing and preservation of grasshoppers
Field collected specimens were brought into the laboratory and were killed and preserved by adopting method of\[9, 25\].

2.3 Material Examined

2.4 Identification of Samples
Identification of specimen was carried out under the Stereoscopic Dissecting Binocular Microscope with the help of keys \[3,11\] and description available in literature and on the “Web site (http://www.orthoptera.org) Orthoptera Species file Online”.

2.5 Depository
All the collected material has been deposited in the Insect Systematic Laboratory, Hazara University Mansehra.

3. Results
3.1 Genus Conocephalus Thunberg, 1815
urn:lsid:Orthoptera.speciesfile.org:TaxonName:16619
Type species: Gryllus and Tettigonia and Conocephalus Linnaeus, 1767.

3.2 Genus Diagnosis
Body is small to medium. Vertex flat from lateral side. Apex of vertex rounded, not surpassing the anterior margin of fastigium, usually higher than head from lateral view. The lateral lobes of pronotum slanting wedge-shaped, shaped, with a shining gibbons’ part near the hind margin overlaid the tympanal organ. Tegmina and hind wings well-developed sometime reduced. Fore and mid femora generally without spines. Hind femur with two spines on knees. Fore and mid tibiae without dorsal spurs, short spurs present at ventral side. Tympanum closed from fore-tibiae. Prosternum with sometime lack 2 spines. Male cerci having inner teeth. Ovipositor sword-shaped, brim smooth, with minute teeth.

3.3. Conocephalus (Anisoptera) fuscus (Fabricius, 1793)
urn:lsid:Orthoptera.speciesfile.org:TaxonName:16769
Synonym.
Conocephalus dilatatus Ramme, 1951
Conocephalus discolor Thunberg, 1815
Conocephalus ponticus (Nedelkow, 1907)
Conocephalus thoracicus (Fischer von Waldheim, 1846)
Conocephalus turanicum Semenov, 1915

3.4 Description of species
Body small measuring (13-18 mm), usually green with brown wings and a brown dorsal stripe on the head and pronotum. Pronotum with a broad dark band extending from the fastigium to the posterior rim of the pronotum. Head cone-shaped from lateral view. Wings fully developed (Fig. 1 and 2) Forewing 12-14 mm; hindwing extending 1 mm beyond forewing. Ovipositor sword-shaped, long, straight almost measuring (14-15mm) in length (Fig. 1). Supra-anal plate without distinct protrusion, striudulatory file with 35-40 fasteners.

3.5 Measurement (in mm). Total body length ♂ 13-18, ♀ 14-19; Tegmina/Forewings, ♂ 11-12, ♀ 12-14; Tibia, ♂ 13-14, ♀ 13-17, Ovipositor, ♂ 14-15

3.6 Habitat
This species is found in a wide variety of open habitats, with dense vegetation, meadows grasses, saltmarsh places, in dry and wet heathland, on road sides with tall grasses, riverbanks.

3.7 Comparative note.
Data base collection shows that the holotype of this species is lost. Finding of this species constructed new record for Pakistan.

3.8 Distribution.
This species has been distributed in Europe, Sweden, Mongolia, Middle Asia, Kazakhstan, Northern Africa, Algeria, Germany, Switzerland, Spain, Bulgaria, Romania, Iran and Pakistan.

4. Discussion
During the present study Conocephalus species were collected from the agricultural fields having Wheat, shrubs, herbs and grasses. The collected material was sorted out into single genus Conocephalus Thunberg, 1815 with single species is studied. Furthermore, finding of Conocephalus (Anisoptera) fuscus (Fabricius, 1793) made a new record for this region.

The genus Conocephalus from Korea resulted in discovery of five species with a single record of Conocephalus bambusanus Ingrisch. Further, they gave taxonomic key of species with distributional data \[5\]. Conocephalus from China resulted in finding of one new combination Conocephalus brevivalva, in addition to one new record i-e: Conocephalus oceanicus (Le Guillou, 1841) and one species i-e: Conocephalus shanghaiensis sp. nov. to this genus \[6\]. More recent, Genus Conocephalus from Pakistan resulted in collection of Conocephalus maculates (Le Guillo) in larger numbers. Additionally, they gave significant taxonomic character along with drawing line \[20\]. Mate selection by female katydids Conocephalus nigropleurum resulted that these insects obtain a bulky spermatophore during mating that they later eat as food. Further, existing suggestion shows that spermatophore nutrients are significant to female for the purpose of reproduction. Weightier males produce more spermatophores during the mating. As soon as they are given the choice between two sound producing males with different weights, females at all times mated with the bigger individual \[20\]. Conocephalus emeiensis species was described as new to science from Sichuan Province \[27\]. Distributional data and dispersal of Conocephalus dorsalis was carried out from the British Isles \[28\]. But, they were unable to find Conocephalus (Anisoptera) fuscus (Fabricius, 1793). Present study resulted in constructing a new record of this species from this region. Hopefully, this study will be beneficial for the future researchers related to biodiversity of this genus from Pakistan.
5. Conclusion
Conocephalus (Anisoptera) fuscus (Fabricius, 1793) is recorded for the first time from Pakistan. Further, distribution, habitat, description of species of Conocephalus along with photographs and synonymy is documented.

6. Recommendation
Conocephalus species are found in a wide variety of open habitats, with dense vegetation, meadows grasses and different crops. So, studies on their pest status should be carried. Further surveys may result in finding of new species to the biodiversity of this region.

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8. References


