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REDESCRIPTION OF TWO SPECIES OF GENUS *EUPEODES* OTEN SACKEN FROM QUETTA BALOCHISTAN, PAKISTAN

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ABSTRACT

Eupeodes corollae Fabricius and *Eupeodes latifasciatus* Macquart are the members of aphidophagus genus *Eupeodes* Osten Sacken belongs to order Diptera. These species of hoverflies economically very important, adults are very good pollinators and their larvae are predators, which feed on the aphids, which cause serious damage to our cash crops and vegetables. In present study, two species of hoverflies are recorded from Quetta Balochistan, Pakistan. These species are redescribed on the basis of the morphological characters, male and female external and internal genitalia.

Key words: *Eupeodes corollae*, *Eupeodes latiasciatus*, Quetta, Balochistan, Pakistan.

INTRODUCTION

The genus *Eupeodes* Osten Sacken, 1877 belongs to tribe Syrphini (Syrphidae: Diptera). The species of this genus play very important role in our ecosystem as adults move from flower to flower help in cross-pollination and larvae are biological control agents for reducing pest insects because their larvae feed on aphids of different crops, (Stubbs and Falk, 2002). About forty species of genus *Eupeodes* found all over the world, which are described with diagnostic characters and keys of identification also given (Vockeroth, 1992). The genus *Eupeodes* has been revised with a key of twelve European species (Mazanek et. al., 1998, 1999). The fauna of *Eupeodes* has reported from Afghanistan and Kirghizia (Duske and Laska, 1980). The genus *Eupeodes* studied by Dusek and Laska (1960), they have also described the feeding behaviour of the larvae of *Eupeodes latifasciatus* Macquart. Nielsen (2003) described the external diagnostic characters of *Eupeodes corollae* Fabricius but did not describe the female genitalia. The *Eupeodes corollae* Fabricius and *Eupeodes latifasciatus* Macquart have been described from different localities of Pakistan. Alam *et al*. (1969) recorded from Dir and Hangu; Aslam Khan *et al*. (1997) reported from Peshawar; Sajjad and Saeed (2010) reported from Southern Punjab; Sajjad *et al*. (2010) recorded from Bahauddin Zakarya University Campus, Multan.

Scholars of Balochistan have been working on the different insect fauna since long time but these beneficial species of hoverflies are ignored. Therefore, it was great need to document the species of the hoverflies from Quetta as in future we can use their larvae as biological control agent. Presently, we have revised two species i.e. *Eupeodes corollae* Fabriciucs and *Eupeodes latifasciatus* Macquart of genus *Eupeodes* from Quetta Balochistan, Pakistan. This is a first time record from Quetta. The description of these two species is based on morphological characters; measurement of different body parts and illustration of male and female genitalia was also given.

MATERIALS AND METHODS

A total of 205 specimens of genus *Eupeodes* Osten Sacken were collected from various crops such as wheat, barley, flowers and as well as weeds of Quetta Balochistan, Pakistan during May 2012 to April 2013. The two species of genus *Eupeodes (Eupeodes corollae* Fabricius and *Eupeodes latifasciatus* Maquart) were identified by using standard keys Coe (1953), Stubb and Falk (2002) and Steight & Sarthow (2011). The terminology followed of Duseka and Laska (1976). For the observation of male and female genitalia, tip of abdomen boiled in 10% potassium hydroxide (KOH) solution for 5-7 minutes then removed the genital capsule by using needle and forceps and dissected the genital capsule under dissecting binocular microscope. Dissected materials were preserved in micro vial with a drop of glycerin. Measurement of different body parts taken by micro millimeter and illustration drawn by using the ocular graph. The terminology of the external and internal morphology of female genitalia of flies followed of Heikki Hippa (1988) and the method of exposing male genitalia followed of Stubb and Falk (2002).

RESULTS

Genus *Eupeodes* Osten and Sacken, 1877

Head: Face weak stripe extend upward knob, mouth margin with black belt

Thorax: Dorsum thorax shiny black; scutellum yellow, hairs yellow

Wings: Wing vein R4+5 slightly dipped; second basal cell microtrichose; alula covered by microtrichia

Legs: basal half of front femur hairy

Abdomen: Abdomen oval, yellow lunules, spots and bands black with hairs along lateral margin of tergites 3 and 4; black central spots present on sternites, bands across entire width

***Eupeoes corollae* Fabricius, 1794. (figure 1. A-B)**

Vujic and Glumac, 1994: Metasyrphus corollae

Head: Head broader than thorax; frons yellow covered with black hairs; black stripe present on front; antennae dark brown, three segments, 3rd segment longe, aristae thin unsegmented and dark brown; eyes bare, dark brown; occiput gray color, pale hairs on margin; vertex black , narrow and triangular, three occili shiny brown

Thorax: Thoracic dorsum shiny black with yellow hairs, marginal hairs long and pale colored, forming yellow side line; bunch of yellow hairs on pleura; scutellum raised golden color with yellow hairs

Wings: Second basal cell 50% micrptrichose; costal cells yellowish color; squama white with long hairs on margins

Legs: Front coxa, trochanter and femur partially black; apical part of femur and metatarsus orange color; black pubescence on dorsal side legs and ventral side pale hairs; tarsus dark brown, black hairs; claws curve black

Abdomen: abdomen oval shape, black and yellow markings**;** male square commas on tergite 3and 4; 50% lateral margin of tergites 3and 4 yellow; female has narrower commas on tergites 3and 4, posterior margin tergites 2, 3and 4 gray-shining bands; oval black patch on centre of sternites, black stripes extended entire width

Male genitalia of *Eupeodes corollae* Faricius **(figure 1.C- E):** Male genitalia of *Eupeodes corollae* Faricius much larger than other species of *Eupeades*. Epandrium skull shaped, cerci fused, surstylus thumb like shape, anterior end covered by bristles; aedegus look like funnel shaped between surstylus, pair of teeth attached on posterior end

Female genitalia: Segment 10 transparent membranous; cerci well developed, long cactus shape, hairy; postgenital (subanal) plate broad and clear, bristles present

***Eupeodes latifasciatus* Macquart, 1829 (figure 2. A-B):** *Syrphus latifasciatus* Macquart, 1829: 242, *Syrphus affinis* Loew, 1840: 35, *Scaeva abbreviata* Zetterstedt, 1849: 3136, *Syrphus affinis* Palma, 1864: 52, *Syrphus submaculatus* Frey, 1918: 13, *Syrphus pallifrons* Curran, 1925: 172, *Metasyrphus depressus* Fluke, 1933: 97, *Metasyrphus chillcotti* Fluke, 1952: 20, Vujic and Glumac,1994; as *Metasyrphus latifasciatus.*

Head: front convex and posteriorly concave; face slightly inflated, dull yellow; antennae segmented, 3rd segment long club shape, 1 and 2 segments short, black hairs on base; frons dull yellow with black bristles; eyes bare, brown; vertex black, three occilli, shiny brown; occiput broad gray color, pale hairs on margin

Thorax: Thoracic dorsum shiny black, yellow hairs; pleural thorax covered by dense yellow hairs, yellow bristles look like stripe; scutellum inflated yellow, golden hairs

Wings: M. second basal cell extensively microtrechose; allula microtrichose; squama pale and covered by microtrichia; cell c microtrechose

Legs: legs yellow, coxa and trochanter black; tarsi brown; basal part of pro and mesofemora dark brown; claws curve black

Abdomen: Male broad bands,black bars straight fronton edge of tergites 3and 4; 25% of lateral margins yellow; sternites reduced

Female: Frons half yellow; face without medial stripe; mouth margin anteriorly half yellow; wings usually less microtrechose than male; pro and mesofemora narrow, base black, metafemur complete yellow; sterrite 5 bright yellow

Male genitalia of *Eupeodes latifasciatus* Macquart **(figure 2. C-E):** Genital capsule smaller than *E. corollae* Faricius, epandrium small, pair of cerci bean shape attached with epandrium, pair surstyli short triangular, hypandrium apically slightly narrowed; aedeagus tubular shape, two short rounded teeth attach on posterior end

Female genitalia: segment 10 narrow; cersi small covered by bristles; postgenital (subanal) plate small and hairy

DISCUSSION

Genus *Eupeodes* Osten Sacken is most common hoverflies found all over the world except Antarctica. The species of *Eupeodes* Osten Sacken found in the month of March to December in Quetta, Balochistan, Pakistan. Description of morphological characters of this genus was given by (Osten Sacken, 1877, Daniel and Drew, 1976, Deske and Laska, 1976, 1980, Vockeroth, 1969, 1992, and Mazanek and *et al*., 1998, 1999), but they did not describe the male and female genitalia of both species *E. corllae* Faricius and *E. latifasciatus* Macquart. We described both species for the first time not only on the base of morphological characters but also explained the illustrations of male and female external and internal genitalia. It is observed that the both species have oval abdomen and variation in occiput in head, microtrechia on wings, having black marks on abdomen,

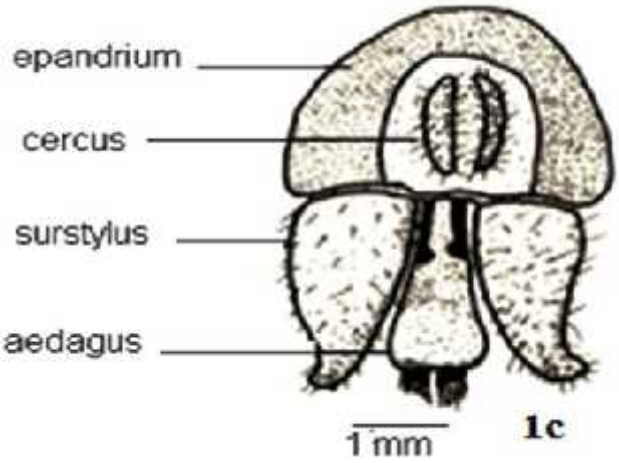
lateral marginal color and genitalia. Male genitalia of *E. corollae* Fabricius is larger than *E. latifasciatus* Macquart.

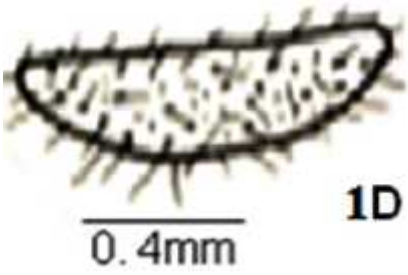
Recently (Ghorpade and Shehzad, 2013) published the checklist of Hover flies of Pkistan, Indian and subcontinent. They did not reporte the *E. corollae* Fabricius and *E. latifasciatus* Macquart from Quetta, Balochistan, Pakistan.

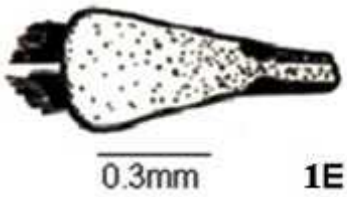
We have reported the two species of genus *Eupeodes* Osten Sacken first time from localities of Quetta hence, it is a new record of species in Quetta, Balochistan, Pakistan.

1A

1B







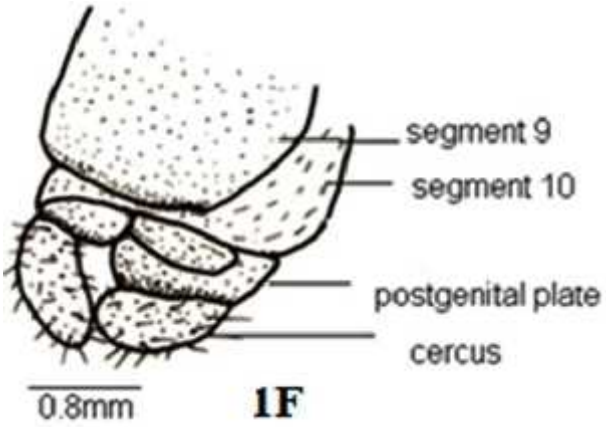


Figure 1. *Eupeodes corollae* Faricius, 1A. Male (dorsal view), 1B. Female (dorsal view) 1C. Male genitalia (dorsal view), 1D. Aedagus , 1E. Circus, 1F. Female genitalia (dorsal view)

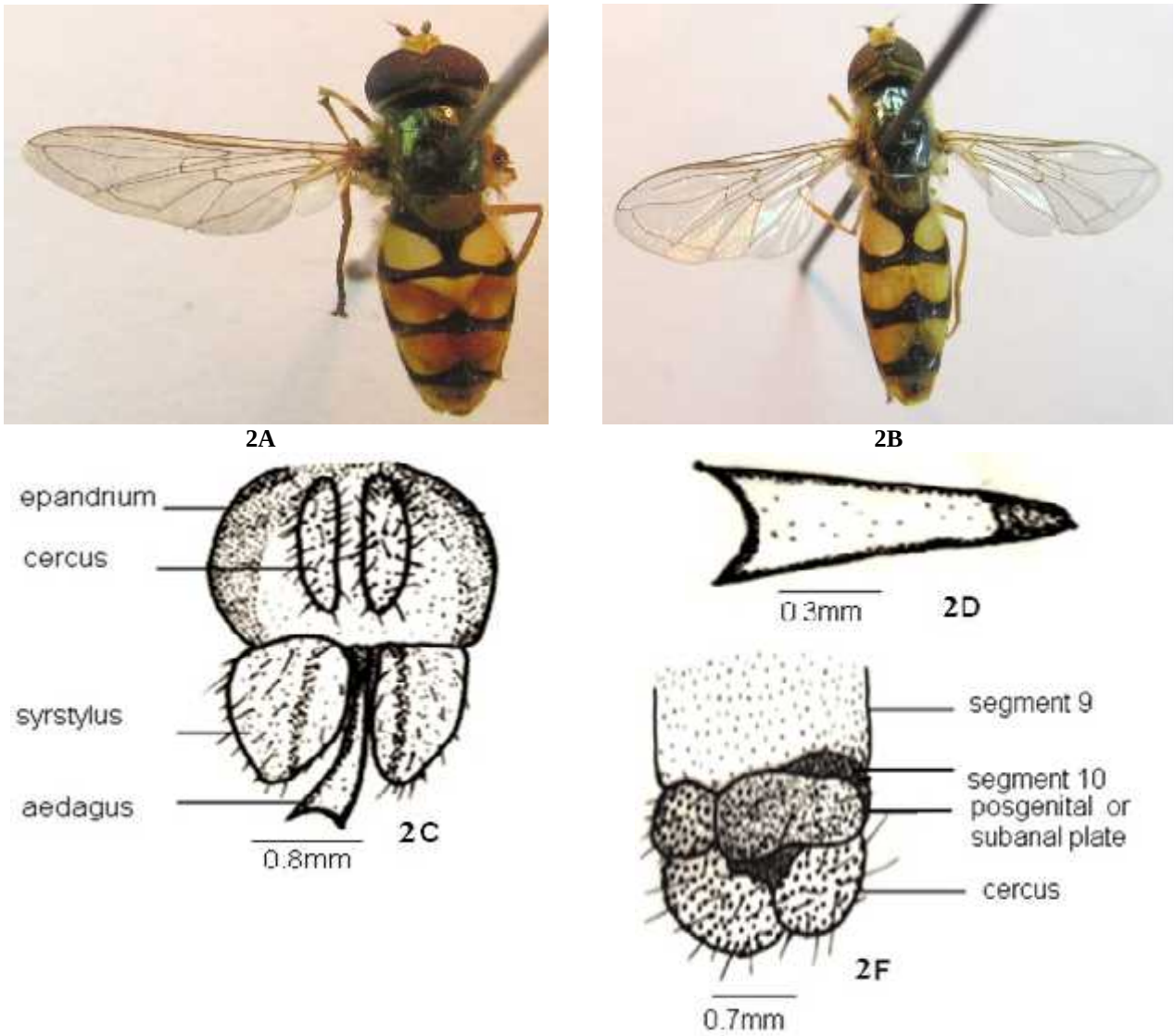


Figure 2. *Eupeodes latifasciatus* Maquart 2A. Male (dorsal view), 2B. Female (dorsal view), 2C. Male genitalia (dorsal view), 2D. Aedagus, 2E. Circus, 2F. Female genitalia (dorsal view).

Table 1. Measurement of *Eupeoes corollae* Faricius, 1794

	Male ♂			**Female ♀**		
Body parts	**Average mm**	**Range Mm**	**Stdev mm**	**Average mm**	**Range mm**	**Stdev mm**
Head Length	1.32	1.2- 1.4	0.083	1.2	1.1- 1.3	0.0707
Antenna Length	0.66	0.6- 0.7	0.054	0.64	0.6- 0.7	0.054
Arista Length	0.56	0.5- 0.6	0.054	0.54	0.5- 0.6	0.054
Thorax Length	2.2	2- 2.3	0.122	2.16	2- 2.4	0.151
Scutellum Length	0.74	0.6- 0.8	0.089	0.72	0.6- 0.8	0.083
Wing Length	6.58	5.8- 7.1	0.626	7.34	7- 7.8	0.313
Abdomen Length	4.28	4- 4.6	0.258	4.24	4- 4.6	0.288
Hind leg Length	6.08	5.6- 6.6	0.454	6.6	5.9- 7.1	0.595
Boy Length	8.64	8.5- 9	0.219	8.66	8- 9.2	0.466

Table 2. Measurement of *Eupeodes latifasciatus* Maquart, 1829

	Male♂			**Female♀**		
Body parts	**Average mm**	**Range Mm**	**Stdev mm**	**Average mm**	**Range mm**	**Stdev mm**
Head Length	1.4	1.3- 1.5	0.070	1.42	1.3- 1.5	0.083
Antenna Length	0.66	0.5- 0.7	0.054	0.66	0.6- 0.7	0.054
Arista Length	0.56	0.5- 0.6	0.054	0.54	0.5- 0.6	0.059
Thorax Length	2.2	2- 2.3	0.122	2.32	2.2- 2.5	0.130
Scutellum Length	0.74	0.7- 0.8	0.054	0.82	0.8- 0.9	0.044
Wing Length	7.14	7- 7.5	0.207	7.66	7.3- 8.5	0.482
Abdomen Length	4.22	4- 4.4	0.148	4.52	4.4- 4.6	0.083
Hind leg Length	6.06	6- 6.2	0.089	6.14	5.8- 6.5	0.304
Body Length	8.8	8.5- 9.2	0.291	9.8	8.8- 9.5	0.286

Table 3. Showing the collection of moths, number of specimens and host plants from Quetta, Balochistan, Pakistan

Eupeodes latifasciatus			***Eupeodes corollae***		
Date of collection	Male	Female	Male	Female	Host plants
May 2012	08	06	08	07	Wheat
June 2012	07	05	09	05	Wheat/ barley
July 2012	05	04	07	04	Wheat/ barley
August 2012	07	06	12	05	Vegetables
September 2012	02	02	08	06	Weeds
October 2012	01	01	09	02	Flowers
November 2012	01	01	04	01	Weeds
December 2012	01	01	02	01	Flowers
January 2013	00	00	00	00	---------
February 2013	00	00	00	00	----------
March 2013	06	03	10	04	Wheat
April 2013	08	07	11	08	Wheat
Total	46	36	80	43	

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