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## First record and redescription of *Paragus haemorrhous* Meigen (Diptera: Syrphidae) from Balochistan, Pakistan

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### Abstract

*Paragus haemorrhous* Meigen is a species of Hover fly belonging to family Syrphidae of order Diptera. This is a small sized hover fly commonly called syrphid fly. This species is beneficial because adults play very important role in pollination and its larvae are predators used in biological control. The specimens were collected from different localities of Quetta, Balochistan and identification was done with the help of available literature. This species is redescribed here on the basis of morphological characters, male terminalia, male and female external genitalia. This syrphid fly has been reported for the first time from Balochistan, Pakistan.

**Keywords:** First record, Redescription, *Paragus haemorrhous* meigen, Balochistan, Pakistan

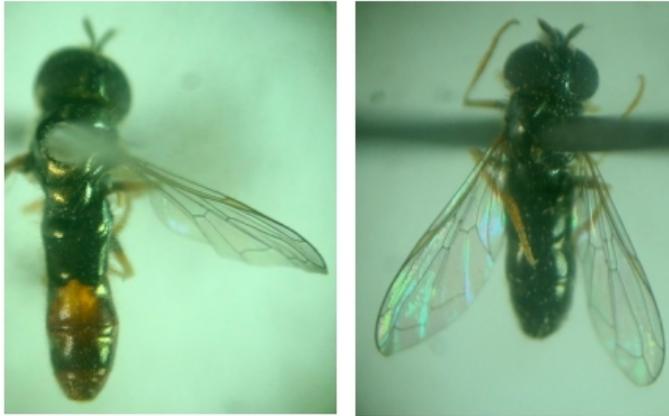
### 1. Introduction

*Paragus haemorrhous* (Meigen, 1822) belongs to subfamily Syrphinae and tribe Paragini. This genus is divided into two subgenera (*Paragus* Lat. and *Pandasyopthalmus* Stu.). The subgenera have been distinguished on the basis of hair on eyes and structure of male genitalia. *Paragus* Latreille is a member of subgenus *Pandasyopthalmus*. The species belonging to this subgenus are small sized with black and orange abdomen and black scutellum. Many researchers described and reported *P. haemorrhous* from different regions of the world. Meigen was the first to report and describe *P. haemorrhous* for the first time<sup>[10]</sup>. (Stubb and Falk, 2002)<sup>[17]</sup> described the diagnostic characters and provided the key for identification but did not explain male and female genitalia<sup>[17]</sup>. Goeldi<sup>[7]</sup>, Speight and Chandler<sup>[13]</sup>, Simic<sup>[12]</sup>, Vujic *et al*<sup>[23]</sup>, Clauben and Weipert<sup>[4]</sup> and Van de Weyer<sup>[20]</sup> described species on the basis of external characters and male genitalia and also separated related species.<sup>[15]</sup> Sorokin and Cheng described *P. haemorrhous* Meigen from China and made key for identification.<sup>[16]</sup> Sorokina reported *P. haemorrhous* Meigen, and other 28 species from Asia, gave the original figures of genitalia, head, abdomen and prepared key for identification. Khaghaninia and Hosseini first recorded *P. haemorrhous* and 8 other species from Azerbaijan and Kordestan, Iran<sup>[9]</sup>. Speight and Chandler also distinguished both sexes of *P. haemorrhous* Meigen<sup>[13]</sup>. Thompson and Ghorpade reported that larvae of *P. haemorrhous* are predators and can be used for biological control<sup>[18]</sup>. Dixon explained the larval stages of *P. haemorrhous* and separated from other species of genus *Paragus* Latreille<sup>[5]</sup>. Previously, description and identification were based on male genitalia and morphological characters but did not describe female genitalia. The main aim of present study is to inform about a new record of *P. haemorrhous* and traditional redescription in advance level.

### 2. Materials and Methods

The specimens of *P. haemorrhous* M. were collected with the help of insect net from different crop fields such as pepper, wheat and corn as well as weeds and flowers from various regions such Sariab, Huna lake and Sabzal of Quetta, Balochistan, Pakistan from January 2013 to December 2013. Hover flies were killed by putting them in cyanide bottle. The species was identified with the help of relevant literature and standard keys<sup>[17]</sup> for male genitalia, terminology followed of Vockeroth<sup>[22]</sup>. Technique of dissecting and drawing male genitalia was used as given by Heikki Hippa<sup>[8]</sup>.

The tip of abdomen was removed from specimen, boiled in 10% of Potassium Hydroxide (KOH) for 5- 6 minutes and genital capsule exposed with the help of needles and fine forceps. Dissected material was put into the micro vial with a drop of glycerin. Genital material was observed under binocular dissecting microscope, the diagram drawn by using ocular graph and measurement of different parts of *P. haemorrhous* were taken by micro millimeter. For distributional record the checklist of Hover flies of Pakistan, Indian Subcontinent [6] was followed.



A

B



C

**Fig 1:** *P. haemorrhous* Meiger, A. Male dorsal view, B. Female Dorsal view, C. Male terminaria

### 3. Results

*P. haemorrhous* Meigen are found in the month of April, May, June, September, October, November and early days of December in (Quetta) Balochistan.. Peak season was October and November. The species was identified on the basis of the following characters recorded in the present study.

#### 3.1 *Paragus haemorrhous* Meigen 1822

##### Synonyms

*Paragus haemorrhous* Meigen, 1822: 182; *Paragus sigillatus* Curtis, 1836: 593; *Paragus trianguliferus* Zetterstedt, 1838: 3; *Paragus substitutus* Loew, 1858: 376; *Paragus dimidiatus* Loew, 1863: 308; *Paragus auricaudatus* Bigot, 1884: 540; *Paragus ogasawarae* Matsumura, 1916: 13; *Paragus pallipes* Matsumura, 1916: 11; *Paragus tamagawanus* Matsumura, 1916: 9; *Paragus coreanus* Shiraki, 1930: 250.

### 3.2. Structure

#### 3.2.1 Head

Head broader than thorax; face inflated, central region shiny; mouth margin black; frons very short, white bristles, ground yellow; antennae black, 3<sup>rd</sup> segment long, 1<sup>st</sup> segment pilomose; eyes dark brown, covered by white small hairs; vertex triangular, shiny black, long; female black ground extended from vertex and arista small thin, bare brown; occiput grey with pale hairs

#### 3.2.2 Thorax

Thoracic dorsum black covered with bristles; Scutellum slightly raised, entire shiny ched base of antennae; black, marginal bristles long; halteres yellow hokey shape

Wings: Wings completely microtrichose; alula small; spurious vein transparent, brown, long; female spurious vein touch with M1; R4+5 about straight; squama small; halteres pale and cup shaped

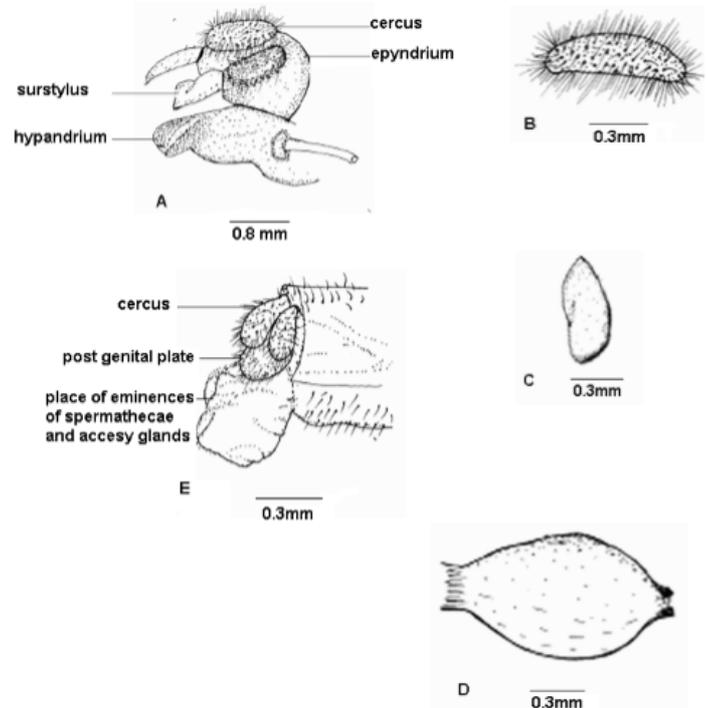
#### 3.2.3 Abdomen

Male and female abdomen slightly waisted, black; 3<sup>rd</sup> tergite orange color, entirely covered by pale hairs; female abdomen completely black; two sternites yellow

Legs: Legs covered by pale hairs; hind femur half black, coxa and trochanter black

#### A. Male genitalia (Fig. 2A-D)

Lateral view of epandrium sub-rounded or skull shape; cerci rod shape, placed on epandrium, more than half of length of epandrium, orange hairs, yellow color; surstyli ventral view apical pointed, basal end fix with epandrium, middle region broad; hypandrium bifurcated claws like structure, bare; dorsal view aedeagus posteriorly articulated, picture shape.



#### B. Female genitalia (Fig. 2E)

Dorsal view cerci small, thumb like, hung down ward, covered by black hairs; post genital or subanal plate broad and hairy; place of eminences of spermathecae and the accessory glands sponge like membrane.

#### 4. Discussion

Thompson and Ghorpade described that *P. haemorrhous* closely resembles *P. rufocinctus* [18]. Goeldin de Tiefenous distinguished these two species on the basis of shape of paramere [7]. Vockeroth [21], Sorokina and Cheng [15], Speight and Sarthou [14], identified and described *P. haemorrhous* Meigen and other species of genus *Paragus* on the basis of male terminalia, male genitalia and morphological features but they neglected the female genitalia. Vosughian *et al.* [19] provided explanation of terminalia and diagnostic morphological characters but did not stress on the male and female genitalia. In this paper, the species is redescribed on the basis of morphological characters, terminalia and male and female genitalia. The following researchers listed the first record of the species of genus *Paragus* from Pakistan, Bruinetti [3] recorded *P. bicolor* (Fabricius, 1794) from (Quetta) Balochistan, Alam *et al.* [1] listed *P. serratus* Fabricius from Dir and Butkhela (Khyber Pakhtunkhwa), Aslam *et al.* [2] first time reported *P. politus* (Wiedemann 1830) from (Quetta) Balochistan, Saleem *et al.* [11], listed the new record of *P. compeditus* Wiedemann (Peshawar) [11] and Ghorpade and Shehzad published the check list of Syrphidae (Diptera) of Pakistan [6], but they did not report the species *P. haemorrhous* Meigen from Pakistan. In our investigation, *P. haemorrhous* is redescribed here on the basis of morphological characters, male terminalia, male and female external genitalia. This syrphid fly has been reported for the first time from Balochistan, Pakistan.

#### 5. Checklist of genus *Paragus* (Latreille, 1804) of Pakistan

*Paragus (Pseudanophthalmus) plus* Wiedemann, 1830

*Paragus bicolor* Fabricius, 1794

*Paragus compeditus* Wiedemann, 1830

*Paragus serratus* Fabricius, 1805

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