Morpho-taxonomic Study of *Tabanus indrae* Hauser, 1939 (Diptera: Tabanidae). New Record for Iraq

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***Abstract*—**This work was included external morphological study of horse fly *Tabanus indrae* Hauser 1939 new record in Iraq, which belongs to family: Tabanidae order: Diptera. The study was involved the most important taxonomic external characters of the: head, thorax, abdomen and their appendages which are: antenna, maxillary palp, wings, legs, spotting in coloring pattern and female genitalia of abdomen.

***Keywords*—**Horse fly, Diptera, Tabanidae, Tabanus, Description.

I. Introduction

THE species *Tabanus indrae* Hauser 1939 is belongs to family Tabanidae Latreille 1802, subfamily Tabaninae Loew, 1860. This subfamily are comprises about 275 species belong to 72 genera that were worldwide distributed, from temperate to subtropical and tropical zones [1 and 2], it is known from many parts of the world from Asia including Saudi Arabia, Oman, Kuwait, Jordan, Syria, Turkey and Malaysia [3, 4 and 5] to African including Egypt [6] to Europe including Hungary, Italy, Croatia and United Kingdom [7 and 8] to North America including U. S. A. and Mexico [9] and to South America including Brazil, Chile and Colombia [10 and11].).

The Tabaninae are poorly known in the Middle East [12], yet a comprehensive generic description is not available [13].

In Iraq, subfamily Tabaninae was studied by [14] describing 24 horse flies species within four genera and studied by [15] describing 15 species within four genera.

The females of most species are feed regularly on nectar, which they are need for energy, while blood meals are mainly utilized for Oogenesis by pierce skin and suck blood, while the males have lost their mandibles and feed on nectar and pollen alone [16 and 17].

The blood – feeding behavior of the females of horse flies make their veterinary and medical important, and includes many species important to human and animal health, either by acting as a disease vector such as surra, anthrax and Loaloa, or by debilitating the host [18].

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Members of family Tabanidae are medium – sized to larger specimens, usually densely haired on thorax and abdomen. Predominant specimens are with brownish side markings on anterior abdominal segments, or mostly grayish-black to black, sometimes are with paler dusted and pubescent posterior margins of abdominal segments. Compound eyes in living specimens are mostly greenish with three purple bands, only very rarely unbanded or with one or two bands [14 and 19].

These eyes are always pubescent, usually rather long and very densely, or the hairs only indistinctly visible in the female sex. Males with longer and more densely haired eyes, facets on the upper parts of eyes either more or less enlarged or sharply separated from lower part with small facets, or all facets almost equal in size [20]. Ocellar tubercle is always present in both sexes, and vertex sometimes with three small vestigial ocelli. Frons usually narrower, frontal calli well developed; median callus usually liner and connected with a larger circular, square to rectangular shaped lower callus; only exceptionally calli reduced or missing. Wings are clear or slightly clouded especially interiorly, rarely with darker patches on cross veins and bifurcations; exceptionally a very short appendix to vein R4 [21 and 22].

II. Materials and Methods

Specimens of *Tabanus indrae* were collected at the first time from Al-Radwania 2014, west of the capital Baghdad, located at longitude 44.2680355 and latitude 33.1863567; and Al-Yousfia 2014, south of the capital Baghdad and away 25 km from Baghdad, located at longitude 44.251662 and latitude 33.07908 [23]. A total of two localities in the East of Iraq were visited during May, June, July and August 2014. Horse flies were trapped with chemical trap (Fig. 1) and a regular insect net. Samples collected by the above traps were fixed on thick paper and kept in insect box. Date and place of collection and hosts were recorded. A total of four female specimens were identified based on [19 and 22].

The study was made using a dissecting and compound microscopes (Olympus, Japan), using normal light. Image of insect by photomicroscope type **Ya Xun Microscope User Manual**, having enlargement power 200X max. Figures of different body insect have been improved with ocular micrometer [24]. The standard abbreviations of wing venation are applied: C, costa; Sc, subcosta; R1, first radius; R2+R3, second and third radius; R4+R5, fourth and fifth radius; Rs, radial section R2+3+4+5; dR4+5, distal section of R4+5;

bR4+5, basal section of R4+5; M1, first media; M2, second media; M3, third media; M4, fourth media; r-m, cross vein between radius and media; m-m, cross vein between media; bm, basal cell of media; br, basal cell of radius; CuA, cubitus anterior; CuP, cubitus posterior; m-cu, cross vein between media and cubitus; cu, cubital cell; d, discal cell; m1+m2+m3, median cells [25].

Female genitalia was removed and macerated in a solution of 10% KOH and subsequently mounted on slides in Canadian balsam [11].

The following table shows the solutions that used in the preparation of the attractive substance of chemical trip and concentrations [15]:

Seq.	Solution used	Concentration
1	Sec-butyl alcohol	11.4 ml
2	Iso-butyl alcohol	11.4 ml
3	n-butyric acid	11.4 ml
4	n-valeric acid	11.4 ml
5	Acetic acid	11.4 ml
6	Dimethyl disulphide	9.0 gm
7	Phenol	9.0 gm
8	P-cresol	9.0 gm
9	Indol	2.3 gm
10	Benzoic acid	2.3 gm
11	Acetone	11.4 ml

Fig 1. Chemical Trip

III. Results and Discussion

Describe of *Tabanus indrae* Hauser 1939.

Body of ♀: Length: 13.9 mm and width 7.3 mm. **(**Fig. 2).

Head capsule: Compound eyes are naked, unbanded. (Fig. 3).

Frons: Rather narrow, nearly parallel, but it is indistinctly widened above; yellowish-grey dusted, likewise subcallus. Lower frontal callus polished yellowish-brown to black, rather large, circular to slightly rectangular, narrowly joined with elongate black median frontal callus by narrow small line. Face and gena more whitish-grey dusted, clothed with long whitish hairs especially on lower part of face. Postocular margin on vertex densely but short, usually pale haired, the hairs are not visible when viewed from in front (Fig. 3).

Maxillary palp: Whitish-yellow, apical segment stouter on basal half, and mostly short black haired (palpal calli) (Fig. 3).

Antennae: It's reddish-brown, scape subquadrate but slightly broad wide than long it is with pale hairs beneath; pedicel very small not well distinct; flagellum sharply conical as long as scape and pedicel combined, basal segment of flagellum nearly rectangular with distinct dorsal tooth; the rest of flagellum segments acuminate, dark color with black extreme (Fig. 3).

Thorax (Dorsal view): It's blackish-grey on mesonotum, with rather distinct pale longitudinal stripes and short pale and black pubescence. Notopleural lobes are yellowish-brown to blackish. Pleura whitish-grey dusted and clothed with rather long, dense whitish pubescence. Scutellum has nearly oval, black in color. A halter has brown with dark knobs (Fig. 4 A).

Abdomen (Dorsal view): Entirely blackish-grey or distinctly reddish-brown on anterior tergites, dorsum with very distinct pale silvery-grey pattern, consisting of a row of large median triangles and oblique, and oval sublateral patches, which are large and distinct on tergites 2 and nearly 3, in the rest tergites this pattern are indistinct. Each tergite bears a narrow yellowish posterior margin at sides. Whole of dorsum densely clothed with short black pubescence, light colored hairs (Fig. 4 B).

Wing: The wing is broader and more blunt-tipped. Clear with dark veins, correspondingly long and wide. C vein base thickened. Sc single small vein ended nearly in the middle of anterior margin. R1 arched terminally. R2+R3 are shorter than R1, slightly sinuous and joining R1 at costa. R4 + R5 clearly longer than Rs and shorter than stem of R4 + R5 combined; dR five times longer than bR; R4 without appendix, attached to R5 almost at right angle, R4 terminated just before wing apex, and R5 terminated far behind wing apex. M1 shorter than M2 and both shorter than M1+M2 combined. M3 subequal in long with M4 and both longer than M3+M4 combined. Cross r-m vein short, divided R4+R5 combined two the bR and dR, meeting anterior margin of discal cell near of its midlenght. Cross m-m vein meeting basal of M2 and midlenght of M3. The basal cells (cells br and bm) tend to be elongate, br cell slightly longer, but narrower than bm cell. CuA+CuP contact with them before the wing margin. Cross m-cu vein longer than cross m-m and r-m veins, meeting basal of M4 and midlenght of CuA. The cu cell closed, with short petiole distally. The d cell wide except apical part is not widened, with anterior margin is arched. The m1+m2 cells are subrectangular, equal in size, while m3 cell is elongate, twice longer than m1+m2 (Fig. 5 A).

Leg: Grayish on coxa, trochanter and femur, tibia are brownish, tarsus black. Femur and tibia cylindrical shape, tarsus consist of five segments with pair of two long and hard claws at the end, arolium is median size between the claws (Fig. 5B).

Fore leg: Coxa is elongate with medium size and pale haired, trochanter small size and bare, femur with median size of separate hairs, tibia with short separate hairs, basitarsus bare (Fig. 5 B\1).

Mid leg: Coxa square shape and bare, trochanter median size with few short separate hairs, femur with tuft of long hairs on anterior part from ventral side, tibia with median size hairs on far half and has pair of black and long special spurs on far end near basitarsus, the last is bare (Fig. 5B\2).

Hind leg: Coxa nearly square with short pale hairs, trochanter with dense pale hairs, femur large size and inflate with long dense hairs along it, tibia with a long and median size hairs, basitarsus with short and median size hairs (Fig. 5 B\3).

Female genitalia: These are dorsoventrally compressed and are never rotated (Fig. 6).

Subgenital plate (sternite 8) (Ventral view):

- Wider than long with slightly straight base, posterior margin with a weak indentation and seta not represented; consist of hypogynium and with distinct hypogonal valve fused (gonapophysis), the last projected distally, slightly concave, with long and abundant bristles; both form a ventral shell.
- **Tergite 8 (Dorsal view):** Large size, wider than long, subrectangular, anterior margin clear, with V-shape in the middle with dark of dense and long calli. Posterior margin is dark in color, strait and without calli.
- **Tergite 9** (Dorsal view)**:** Divided, consisting of a pair of widely separated, subtriangular sclerites, tapered at outer margin with median size of calli and low dense.
- **Tergite 10 (Dorsal view) :**
  It's divided, smaller and broader than tergite 9, subrectangular sclerotized, inner margin rounded with few number of calli.
- **Circus (Dorsal view):** It's large size, subtriangular and rounded apex, with dark and dense long hairs.
- **Genital fork or Furca (Dorsal view):**
  Lies dorsally of tergite 9 and is usually large and irregular in shape, with narrow and convex base in anterior margin; two tufts of strong bristles at apex; central cavity inverted subtriangular with one bulge in each side. Three spermatheca are present, elongate with rounded apex; the spermathecal ducts are long, slender and lightly sclerotized and pigmented.

Fig 2. *Tabanus indrae* Hauser

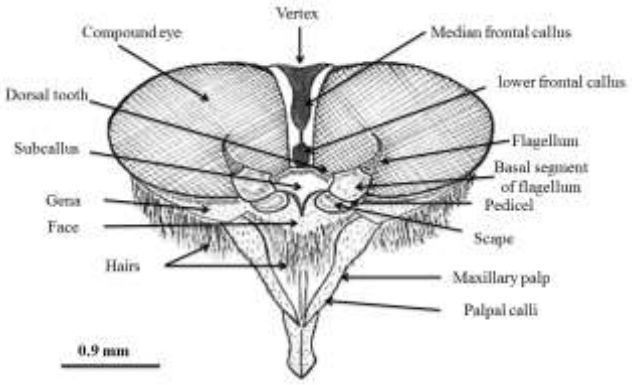


Fig 3. Head parts of *Tabanus indrae* Hauser.

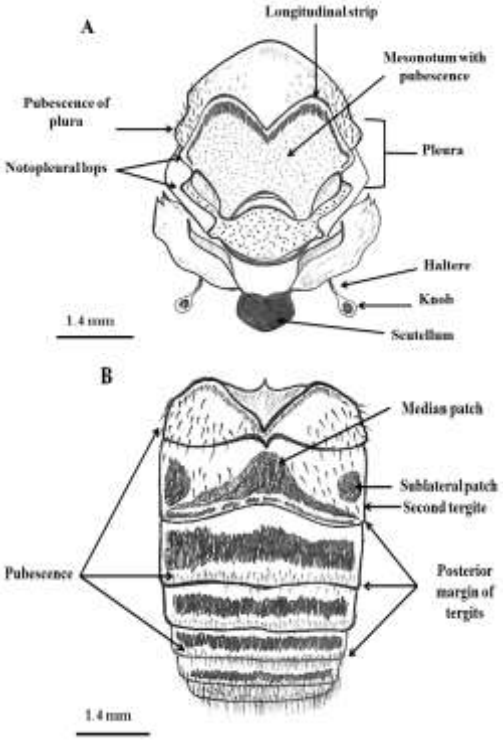
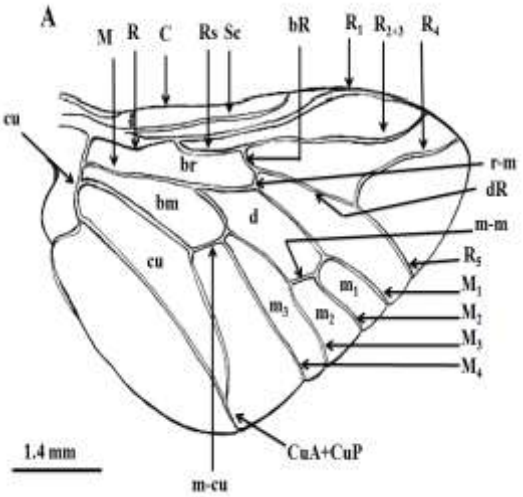


Fig 4. Body parts of *Tabanus indrae* Hauser A: Thorax, B: Abdomen.



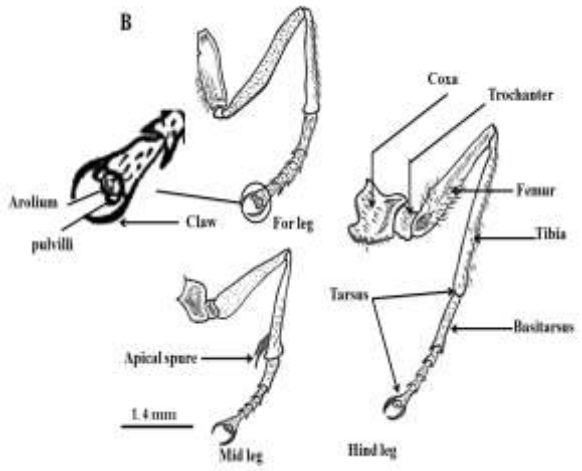


Fig 5: Body parts of *Tabanus indrae* Hauser A: Wing, B: Legs (1. Fore leg, 2. Mid leg, 3. Hind leg).

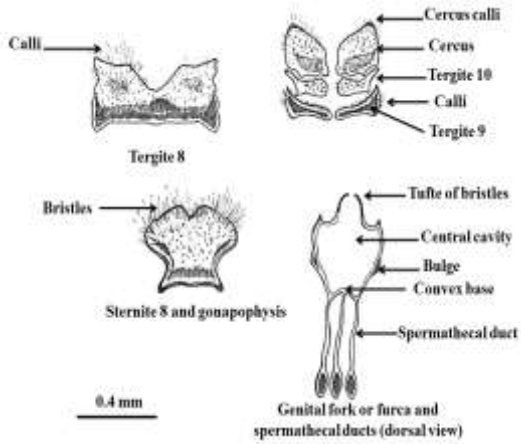


Fig. 6: Female

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