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A NEW SPECIES OF *TABANUS* (DIPTERA: TABANIDAE) FROM PAKISTAN

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A new species belonging to Tabanidae, *Tabanus skarduensis* sp. n. is described and illustrated based on the specimens collected from Skardu, Northern areas of Pakistan.

Key words: Tabanids, Pakistan, New species.

Introduction

In late monsoon period of 1988, a survey of dipterous insects as a member of "Zoogeographical studies on the flies of medically important Diptera in Pakistan" was conducted. Specimens of this undescribed species of Tabanidae were collected from relatively low altitude area (2000 m) of Skardu.

The species is named for Skardu district of the Northern Pakistan. All the drawings were made to the same scale using an ocular grid on Swift Instruments International dissecting microscope.

Experimental

Tabanus skarduensis sp. n. (Fig.1-4). Colouration yellowish gray tomentose at vertex; callosity glossy black, inverted U-shaped with a thin shallow longitudinal suture at middle, well separated from eye margin, dorsal extension linear and slender, separated from basal callosity, terminating near middle of frons. Subcallus yellowish grayish tomentose, cheeks light gray densely whitish pilose, upper corners brownish gray tomentose, blackish pilose; clypeus grayish densely white pilose. Antennae grayish blackish brown; scape as long as broad, widened apically, grayish with dense black hairs. Pedicel grayish with short blackish hairs apically, about 1/3 length of scape, dorsal projection conspicuous; basal plate of flagellum about 1.6 times as long as width, tapering apically with large blunt dorsal tooth, grayish brown to blackish tomentose; styles blackish brown, about 0.7 times as long as basal plate. (Fig. 3).

Palpus pale gray, basal segment densely whitish pilose; apical as long as maximal width, weakly curved, tapering apically with long hairs basally, dense short blackish hairs on apical 3-4. Eye bars blackish in dried specimens, darkish metallic green without pattern in rehydrated specimens (Fig. 2).

Thorax longer than broad; scutellum dark grayish with golden yellowish and few blackish hairs intermixed; median and sublateral stripes on scutum thin; pleura and sterna grayish tomentose with dense pale hairs; coxae grayish, densely yellowish or whitish pilose; fore femora blackish with

yellowish hairs; mid and hind femora dark gray with yellowish hairs; basal 2-3 of fore tibia ivory with pale hairs, apical 1/3 blackish with black hairs; mid and hind tibia mostly yellow with yellowish and black hairs but apically darkened with black hairs, tarsi blackish; wings subhyaline, entirely brownish tinged; halteres mostly yellow on basal part of knob.

Abdomen dark brownish dorsally, becoming black apically with distinct yellowish median triangle and hind margins on terga 2-6, large sublateral spots on tergum 2 small obscure sublateral spots on terga 1-4, black hairs predominant on all terga but golden yellowish on median triangles and hind margin of terga 2-5. Venter yellowish gray, golden yellowish pilose, with distinct broad median black stripe on sterna 2-6, sternum 7 entirely black with blackish setae (Fig. 4).

Body measurement. Female ♀ length 14.1 mm; wing length 13.2 mm.

Material examined. Holotype female ♀ Pakistan Skardu, dated: 22.8.1988, Coll. Liaquat Ali Abro deposited in Pakistan Museum of Natural History, Islamabad.

Paratype 2 females ♀ Pakistan: Skardu, dated 22.8.1988, Coll. Liaquat Ali Abro deposited in Pakistan Museum of

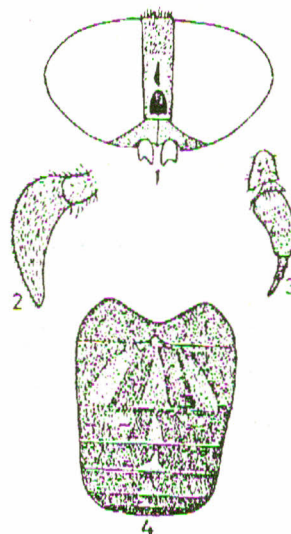


Fig. 1-4. *Tabanus skarduensis* sp. n. : 1. Frontal view of head, 2. Second segment of palpus, 3. Antenna, 4. Dorsal view of abdomen.

Natural History, Islamabad.

Comparative note. The new species *Tabanus skarduensis* n. sp. is clearly related with *Tabanus striatus* [1-3]. The combination of broad front, golden haired mesonotum, bright yellowish triangle, and conspicuous median ventral black area on abdomen clearly indicate its affinity with *T. striatus*. Austen [4] described *T. striatus* as having the midstripe on the second abdominal tegrum more or less obsolete, same is the case with *T. skarduensis*. On the other hand the relatively broad front and large basal callosity immediately distin-

guishes it from *T. striatus*.

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References

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Microorganisms. The antimicrobial activity of these oils was determined against following fungi:
Aspergillus niger, *A. fumigatus*, *Candida albicans*, *Trichophyton tonsurans* (isolated from patients), *A. carneus*, *Penicillium digitatum*, *Helminthosporium oryzae* (isolated from plants), *Monilia nigricans* (isolated from soil) and *Saccharomyces cerevisiae* (isolated from food).
 Antimicrobial activity determination. Oils were tested for their antifungal activity by two methods. Seven days old cultures of fungi and 48 hrs old cultures of yeast, were used to seed the media. Screening of the oils was first done by the diffusion method [18], using Sabouraud's dextrose agar (using 1% Tween 20 as media. Sterilized discs of Whatman No. 1 filter paper (6 mm diameter) were soaked in respective oils (approx. 4.5 µl oil/disc). A blank disc was used simultaneously. The zone of inhibition was obtained after 48 and 72 hrs of incubation at 30° were measured in millimeter (mm). Low fungicides (Table 2), already in use, were also tested under identical conditions for comparison. All the results were taken as the average of the triplicate.
 In second set of experiments the oils were tested for their effective concentration by flask culture method [19]. Seven days old cultures of fungi was taken and spores were suspended aseptically in 0.02% sterilized Tween 80. One ml of

Table 1

No.	Local cultivar	Distilled	Oil content (%)
A	Local	1982/87	80.01
B	Local	1987	71.01
C	Local	1989	80.09
D	Dist	1982/87	79.07
E	Dist	1987	77.82

Introduction
 Lemongrass has been used in medicine as a carminative, antispasmodic, antidiarrheal, analgesic, stomachic, tonic, diuretic and expectorant. Locally it is applied in rheumatism, lumbago, and sprains [1-3]. It is reported to have a depressant effect on the C.N.S. [4] and also insect repellent activity against human ectoparasites, when used as a shampoo ingredient [5]. The oil has been found an important source of citral used for the production of licochalcone and vitamin A [6].
 Lemongrass oil has been reported by many scientists to possess appreciable antibacterial activity [7-12]. Gnanamanickam [13] studied the effect of lemongrass oil on antibacterial activity of phenoxymethylol, and reported that a mixture of lemongrass oil with phenoxymethylol (0.03:99.97) appreciably increased phenoxymethylol activity against *E. coli* and *S. aureus*. The oil was also reported to be effective against phytopathogenic fungi [14-17]. Mirza et al. [18] found it effective against the species of *Aspergillus* (*A. flavus*, *A. fumigatus* and *A. parasiticus* at 3000 ppm, 2000 ppm and 800 ppm respectively).
 Keeping in view the increasing dermatological problems in Pakistan, studies on the antimicrobial effectiveness of lemongrass-essential oil, isolated from local and the cultivated, over three different seasons, were undertaken. These oils were tested against pathogenic fungi and yeast. The results are being reported in the communication.

Materials and Method

The essential oil of *Cymbopogon flexuosus* (commonly known as lemongrass) was obtained from local and other cultivars using Likens-Nickerson apparatus. Four oils were kept for a certain period, distilled and then studied. The following oils were used for the present studies shown in Table 1.