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Title	Examination of the validity of Hybomitra akiyamai Murdoch & Takahasi (Diptera: Tabanidae)
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Citation	Insecta matsumurana. New series : Journal of the Research Faculty of Agriculture Hokkaido University, series entomology., 76, 17-21
Issue Date	2020-10
Doc URL	https://hdl.handle.net/2115/81656
Type	departmental bulletin paper
File Information	02.Sasaki.pdf

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INSECTA MATSUMURANA

New Series 76: 17–21 October 2020

EXAMINATION OF THE VALIDITY OF HYBOMITRA AKIYAMAI MURDOCH & TAKAHASI (DIPTERA: TABANIDAE)

By Hitoshi Sasaki

Abstract

Sasaki, H., 2020. Examination of the validity of *Hybomitra akiyamai* Murdoch & Takahasi (Diptera: Tabanidae). *Ins. matsum. n. s.* 76: 17–21, 3 figs.

Hybomitra akiyamai Murdoch & Takahasi, 1969 was originally described on the basis of a single female specimen collected at Nikko, Tochigi Prefecture, Japan. However, *H. akiyamai* was synonymized with *Hybomitra hirticeps* (Loew, 1858) by H. Hayakawa with no explanation. I examined the holotype specimen of *H. akiyamai* and 11 specimens which had been collected in Japan and identified as *H. hirticeps*, and I found some distinct differences between the former specimen and the latter in diagnostically important features and the wing venation. I conclude that *H. akiyamai* holotype specimen is distinct at the species level from *H. hirticeps* specimens, and the name *H. akiyamai* is valid.

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Introduction

Tabanid flies are one of the most serious pest insects having blood sucking behavior causing transmission of many diseases to human and domestic animals in the world (Foil, 1989; Mullens, 2002). Taxonomic study on the pest insects is important for their control. Taxonomy of Japanese Tabanidae has been built up by senior scientists such as Shiraki, Kono, Takahasi and Hayakawa nearly completely. However, some agendas on the taxonomy of Japanese Tabanidae still remained. The substantiality and name validity of *Hybomitra akiyamai* has remained as one of such agenda. *H. akiyamai* was originally described on the basis of a single female specimen collected at Nikko, Tochigi Prefecture, Japan (Murdoch & Takahasi, 1969). However, Hayakawa (1985) synonymized *H. akiyamai* with *Hybomitra hirticeps* (Loew, 1858) without explanation. Since then, *H. akiyamai* has been treated as a synonym of *H. hirticeps* in Japan (Sasaki & Hayakawa, 1986; Watanabe, 2014; Sasaki & Watanabe, 2016; Watanabe, 2017; Yonetsu, 2018). On the other hand, Chvála (1988) included *H. akiyamai* in the valid species name list of his catalog. *H. hirticeps* was originally described by Loew based on a female specimen from Japan (Loew, 1858), but the exact locality or date of collection is unknown (Takahasi, 1962). The second specimen of *H. hirticeps* was collected from Niigata Prefecture in 1956, after then, some specimen had been collected but only 11 localities of seven prefectures of Japan are hitherto known as the distribution of this species (Sasaki & Hayakawa, 1986). In addition, *H. hirticeps* has been treated as a junior synonym of *H. lurida* by European scientists (e.g. Chvála, et al., 1972; Moucha, 1976; Olsufjef, 1977; Chvála, 1988) and recently by Japanese scientist (Yonetsu, 2018).

In order to confirm whether they are conspecific or not, I have recently examined the holotype specimen of *H. akiyamai* and the specimens which had been collected in Japan (Iwate and Hokkaido Prefectures) and identified as *H. hirticeps*. Consequently, I was able to clarify the morphological difference between the former specimen and the latter.

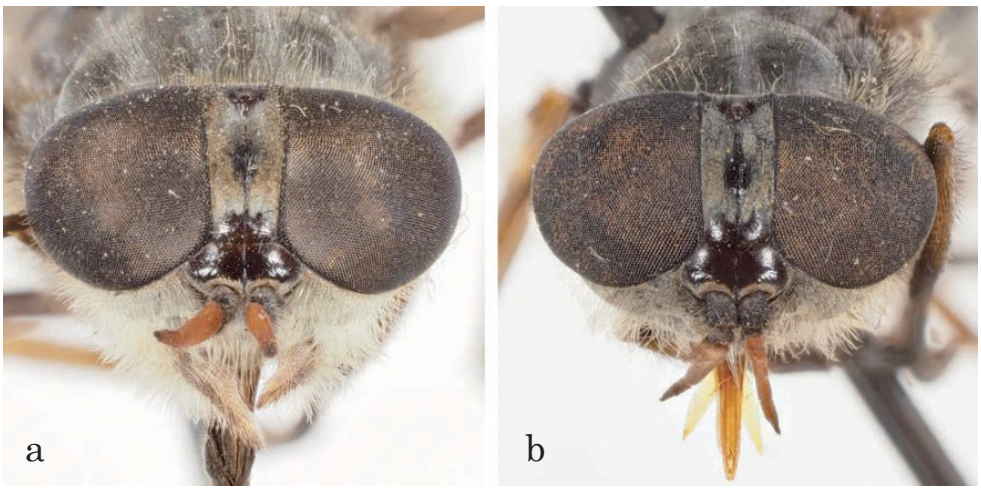


Fig. 1. Heads of *Hybomitra hirticeps* (a) and *H. akiyamai* (b).

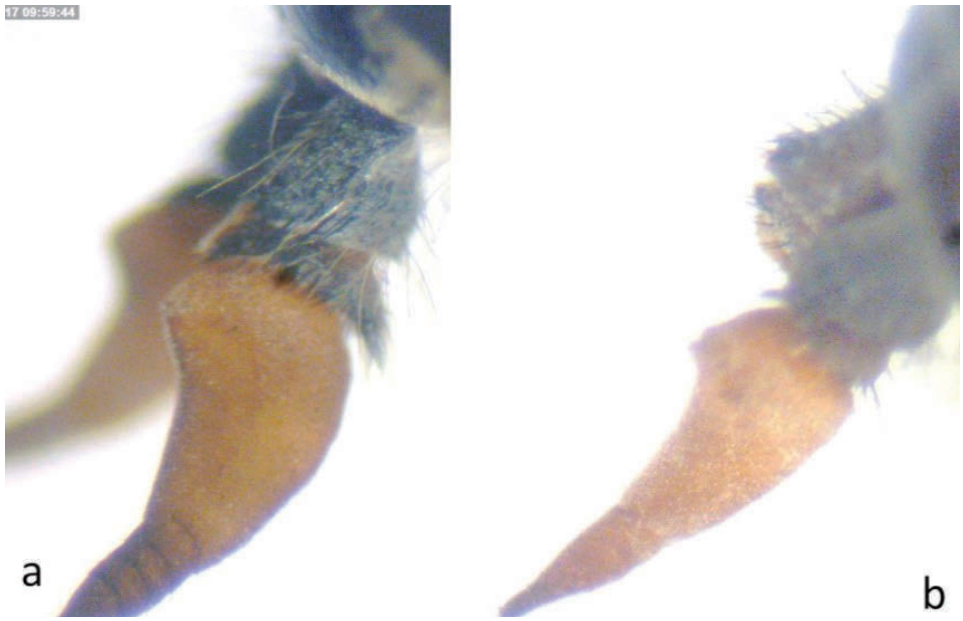


Fig. 2. Antennae of *Hybomitra hirticeps* (a) and *H. akiyamai* (b).

Materials and Methods

I examined the following specimens with a binocular microscope (Olympus SZ60) and took photos with a digital microscope (Dino-lite) and a digital camera (Nikon D2H) with a mounted Medical Nikkor lens.

Hybomitra akiyamai: holotype♀, Nikko, Tochigi; July 19, 1957; J. Akiyama leg (NIAES Insect Museum).

Hybomitra hirticeps: 1♀, Aoyama, Tohbetsu, Hokkaido; June 6, 1985; H. Sasaki leg; 7♀♀, Aoyama, Tohbetsu, Hokkaido; June 2, 2015; H. Sasaki leg; 2♀♀, Aoyama, Tohbetsu, Hokkaido; June 12, 2015; H. Sasaki leg; 1♀, Sawauchi, Iwate; June 5, 1970; H. Hayakawa leg. All examined *H. hirticeps* specimens were identified and confirmed to having same characteristics by the use of descriptions and keys written by Loew (1858), Murdoch & Takahasi (1969), Hayakawa (1985), Sasaki & Watanabe (2016) and Watanabe (2017).

Results

The examination showed that *H. akiyamai* holotype specimen was similar to *H. hirticeps* specimens (mentioned in the materials and methods) in general appearance, but distinct from the latter in the frons and the frontal calli (Fig. 1), antennae (Fig. 2) and the wing venation (Fig. 3). These features are important in distinguishing tabanid species. Table 1 shows their character states in detail. No significant difference was observed in the characteristics of the other body parts.

Table 1. Check list of distinct differences among Hy. hirticeps and Hy. akiyamai.

Body part	*Hy. hirticeps*	*Hy. akiyamai*
Frons	comparatively narrow: its height is 2.88 times (2.72-2.95) its basal width	broad: its height is 1.82 times its basal width
Basal callus	chestnut brown, twice as wide as high, touching the eye margins and the subcallus; the top margin is slightly depressed in the middle.	shiny dark brown, more than twice as wide as high, touching the eye margins and the subcallus; the top margin is deeply depressed in the middle (both sides are sharply elevated)
Median callus	shiny black, lanceolate and raised; reaching the basal callus with a fine line, while obviously separated from the ocellar tubercle	mat black, lanceolate and flat; connected with the basal callus and nearly reaching the ocellar tubercle
Antenna	The basal portion of the flagellum is broad and relatively short; its dorsal process is well developed	The basal portion of the flagellum is slender and long; its dorsal process is moderately developed
Basal section of M_4	as long as the vein r-m	shorter than the vein r-m
Vein R_4	sharply curved at the base	gently curved at the base

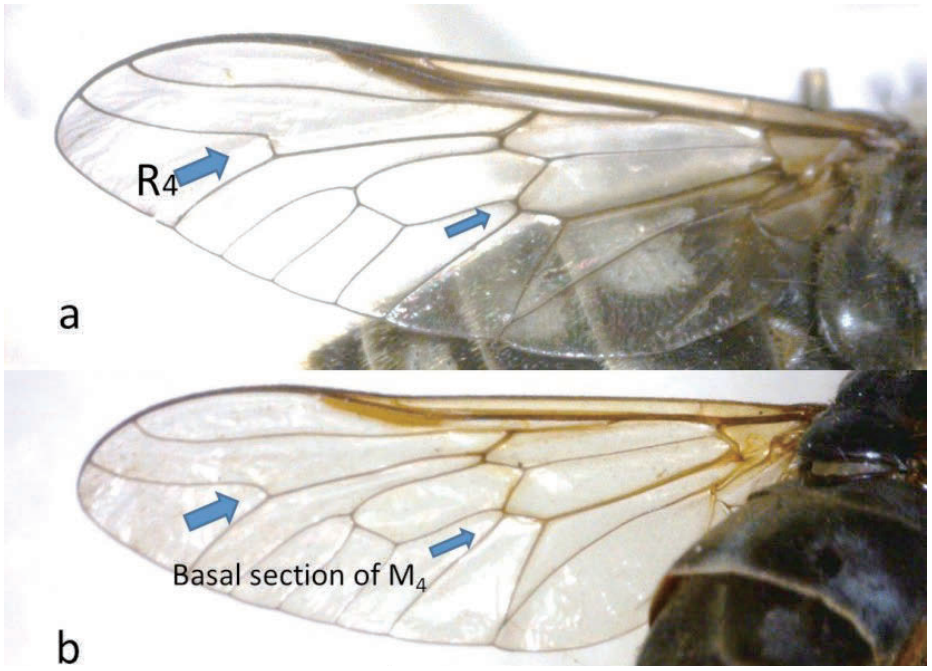


Fig. 3. Wings of *Hybomitra hirticeps* (a) and *H. akiyamai* (b).

Conclusion

On the basis of the results given above, I conclude that the holotype of *H. akiyamai* Murdoch et Takahasi is distinct at the species level from the specimens identified as *H. hirticeps* (Loew), and the name *H. akiyamai* is valid.

Acknowledgements

Many thanks are due to M. Suwa of Hokkaido University for his valuable suggestion and reading the manuscript. Thanks are also due to S. Shinonaga of Tokyo Medical and Dental University and M. Watanabe of National Institute of Infectious Diseases for their valuable information and cooperation.

References

Chvála, M. 1988. Family Tabanidae. In Catalogue of Palaearctic Diptera Vol. 5. (eds. Soos, Á and Papp, L.) pp. 97–171.

Chvála, M., Lyneborg, L. and Moucha, J. 1972. The horse flies of Europe (Diptera, Tabanidae). 500 pp., Entomological Society of Copenhagen, Copenhagen.

Foil, L.D. 1989. Tabanids as vectors of disease agents. Parasitology Today, 5: 88–96.

Hayakawa H. 1985. A key to the female of Japanese tabanid flies with a checklist of all species and subspecies (Diptera, Tabanidae). Jpn. J. Sanit. Zool., 36(1): 15–23.

Loew, H. 1858. Boschreibung einiger japanischen Dipteren. Wien. ent. Mschr., 2: 100–112.

Moucha, J. 1976. Horse-flies (Diptera: Tanbanidae) of the world. Synoptic catalogue. Acta Entomol. Mus. Natl. Pragae, 1-319.

Mullen, G. 2002. 13 Horse Flies and Deer Flies (Tabanidae). pp. 263–277. *In* Medical and Veterinary Entomology. eds. Mullen, G. and Durden, L. 597 pp. Elsevier Science, Orlando.

Murdoch, W.P. and Takahasi, H. 1969. The female Tabanidae of Japan, Korea and Manchuria. The life history, morphology, classification, systematics, distribution, evolution and geologic history of the family Tabanidae (Diptera). Mem. Ent. Soc. Wash., 6: 1–230.

Olsufjef, N.G. 1977. Horseflies (Family Tabanidae). In: Fauna of USSR, New Series No. 113, Insecta Diptera, Vol. VII, Part 2 (ed. Skarlamo, O. A.), pp. 1-435 (In Russian), Nauka, Leningrad.

Sasaki, H. and Hayakawa, H. 1986. Note on the geographical distribution of *Hybomitra hirticeps* (Loew, 1858) with a new record from Hokkaido (Diptera: Tabanidae). Jpn. J. Sanit. Zool., 37(4): 383–384.

Sasaki, H. and Watanabe, M. 2016. Tabanids of Japan–Species and Fauna, and Bionomics and control –. In Progress of Medical Entomology and Zoology. 2nd ed. (ed. Matsuoka, H.) pp. 155–171. (*in* Japanese)

Takahasi, H. 1962. Fauna Japonica. Tabanidae (Insecta).Biogeo. Soc. Japan, Nat. Sci. Mus. 143pp., 12 plates. Tokyo Electrical Engineering College Press. Tokyo.

Watanabe, M. 2014. Family Tabanidae. *In* Catalogue of the Insects of Japan Vol. 8. Diptera. pp. 380–390. (eds. Nakamura, T., Saigusa, T. & Suwa, M.) (in Japanese)

Watanabe, M. 2017. A list of Japanese tabanid flies (Diptera: Tabanidae). Proc. Res. Group Pestol. 14: 1–16. (in Japanese)

Yonetsu, A. 2018. List of Japanese *Hybomitra*-species, with notes on taxonomic and distributional problems (Diptera, Tabanidae). Hanaabu, 46: 19–28. (*in* Japanese with English summary)