

Scaptomyza (Parascaptomyza) *pallida* (Zetterstedt) and
two related new species, *S.*(P.) *elmoi* n.sp. and *S.*(P.)
himalayana n.sp. (Diptera: Drosophilidae)¹⁾²⁾

With 2 Text-figures

HARUO TAKADA

Department of General Education, Sapporo University, Sapporo 062, Japan

(Communicated by S. MAKINO)

ABSTRACT Descriptions are given for two new species of the subgenus *Parascaptomyza* (*Scaptomyza*, Drosophilidae): *Scaptomyza elmoi* n. sp. from Hawaii and Taiwan and *S. himalayana* n. sp. from Nepal. They differ from the closely related European species, *Scaptomyza pallida* (Zetterstedt), not only in their distributions but also in structural details of male genital organs.

Drosophila pallida was originally described based on European specimens by Zetterstedt in 1847. Recently Hackman (1959) revised this species and reported that Fallén's type of *Scaptomyza graminum* contained two species, one of them with two rows of acrostichal hairs (= *pallida* Zett. = *disticha* Duda) and the other one with four rows (*graminum* Fallén). Further, Basden (1961) stated that Zetterstedt's older name of *pallida* takes precedence over *disticha* Duda, and this has already been confirmed by Hackman (1959) using the same name.

Hackman (1959), Wheeler and Takada (1964), Hardy (1965) and some others reported that *Scaptomyza pallida* occurred in gray and yellowish form; the gray form was predominant through the temperate and northern regions, while the yellow form distributed predominantly in tropical regions except colder northern and southern extremes. Stalker (1945) concluded on some experimental bases that the color differences of this species are at least partially dependent upon the temperature.

The specimens from Hawaii dealt with in this study were yellowish, those from Taiwan, Korea and Japan ranged in coloration from yellow to gray, and those from Nepal were dark brown.

1) Thanks are due to a partial financial support through a grant from the Japan Society for the Promotion of Science, as a part of the Japan-U.S. Cooperative Science Program.

2) Scientific results of Hokkaido University Expeditions to Himalaya, Entomology 2.

In the International Conference of Drosophila Taxonomists on the occasion of the XII International Congress of Genetics held at Tokyo in 1968, the present author announced that this species involved two types with respect of morphology of the male genital organs. Further detailed studies led the author to conclude that the specimens of *Scaptomyza*, coming from central and southern Japan, Hawaii and Taiwan should be treated as a new species and were named *Scaptomyza elmoi* Takada in honor of Professor D. Elmo Hardy, University of Hawaii. In addition, one more new species, *S. himalayana* Takada, was described here for the specimens from the grassy plain of Nepal which were supplied through the courtesy of Professor M. Yamada, Hokkaido University. The geographical distributions of the three species here considered are as follows (Fig. 1):

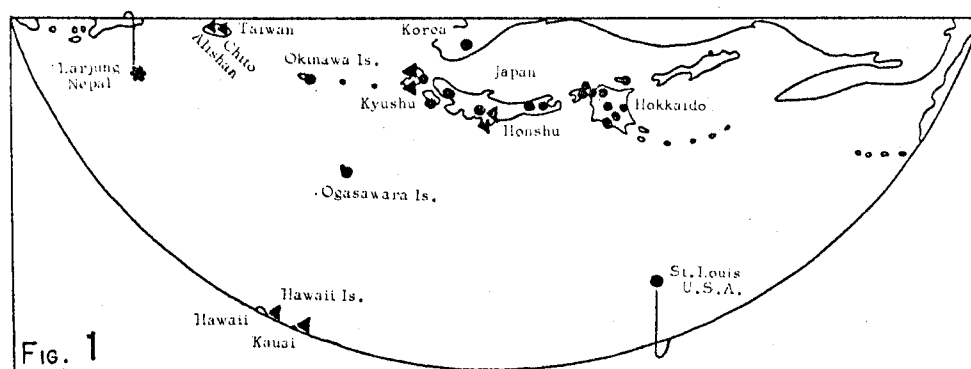


Fig. 1. A part of the Pacific area, showing the collecting sites. ● *Scaptomyza pallida*, ▲ *S. elmoi* n. sp. * *S. himalayana* n. sp.

Scaptomyza pallida (Zetterstedt)

Japan (Hokkaido, Honshu, Kyushu, Shikoku, Okinawa Is. and Ogasawara Is.), Korea and U.S.A. (Mainland)

Scaptomyza elmoi Takada n. sp.

Japan (Honshu and Kyushu), Taiwan and U.S.A. (Hawaii Is.)

Scaptomyza himalayana Takada n. sp.

Nepal

Genus *Scaptomyza* Hardy

Scaptomyza Hardy, 1849. Berwickshire Nat. Club. Proc. 361.

Type species: *Scaptomyza graminum* Fallén, 1823; Europe.

Subgenus *Parascaptomyza* Duda

Parascaptomyza Duda, 1924. Arch. Naturgesch. 90A (3): 203.

Type species: *Drosophila pallida* Zetterstedt, 1847; Europe.

1. *Scaptomyza* (*Parascaptomyza*) *pallida* (Zetterstedt)

Drosophila pallida Zetterstedt, 1847. Dipt. Scandinaviae 6:2571.

Scaptomyza disticha Duda, 1921. Ver. f. schles. Ins. 13:64.

Parascaptomyza disticha, Basden, 1954. Trans. R. Soc. 72: 648.

External genital apparatus of male (Fig. 2, A)

Scaptomyza graminum, Hsu, 1949. Univ. of Texas Publ. 4920: 89.

Scaptomyza graminum, Frey, 1954. Results of the Norwegian Scientific Expedition to Tristan da Cunha 1937-1938, 26: 53.

Scaptomyza pallida, Wheeler & Takada, 1964. Insect of Micronesia, 14, 6: 197.

Scaptomyza pallida, Wheeler & Takada, 1966. Univ. of Texas Publ. 6615: 75.

Genital arch heavily chitinized along the upper half of anterior and posterior margins, two bristles at heel and approximately three near posterior margin; under margin concave; toe long and tapering with approximately 6-8 hairs on its lower side. Anal plate bent at middle, the upper part like ordinary anal plate, fused at rear angle to genital arch; lower part in the form of a secondary clasper, bent, protruded, bearing one very large tooth at tip, one or two smaller teeth above the large one, and 5-7 stout bristle-like teeth below; also are two very long and a group of 5-6 shorter bristles present on this portion; the middle part less chitinized, incised, free from bristle. Clasper long and arched, bow shaped; the arch coincides with the incision of under margin of genital arch; a row of more than fifteen long and bristle-like teeth is present along the lower margin of clasper; a group of long bristles is also present at tip of clasper.

Copulatory organs of male (Fig. 2, B)

Scaptomyza pallida Wheeler & Takada, 1964. Insect of Micronesia, 14, 6: 197.

Scaptomyza pallida, Wheeler & Takada, 1966. Univ. of Texas Publ. 6615: 75.

Penis egg-like shaped, apically bifid, ventrally with a subapical lobe and serration. Anterior gonapophysis small, and with three apical sensilla. The process of hypandrium laterally hemispherically curved, with a pair of long ventral processes. Hypandrium longer than broad. Phallic formula = abCdEfgHikLMN. Phallosomal index approximately 0.6.

Specimens examined: In Hokkaido; Rishiri, July, 1956, Takada. Okkope, August, 1959, Kaneko. Mt. Asahi, August, 1953, Takada. Akanko-han, August, 1954, Takada. Sapporo, July, 1960, Takada. Yoichi, September, 1955, Takada. Shakotan, July, 1958, Takada. Hakodate, August, 1954, Takada. Taisei, September, 1959, Toyofuku & Kimura. Kushiro, July, 1967, Takada.

Honshu; Inazumi, Akita, October, 1957, Okada. Kumotoriyama, Tokyo, June, 1952, Okada. Okutsu, Okayama, October, 1959, Okada. Takamatsu, Kagawa, November, 1964, Okada. Hikosan, Fukuoka, May, 1964, Okada.

Okinawa; Izumi, October, 1963, Hirashima. Ogasawara Is.; Haha-jima, Apr.-May, 1958, Snyder. Korea; Mt. Key Lyong, 1959-1957, Lee. U.S.A.; St. Louis, Missouri, 1968, Stalker.

2. *Scaptomyza* (Parascaptomyza) *elmoi* Takada, n. sp.

Japanese name: Minami-kofuki-himeshojobae.

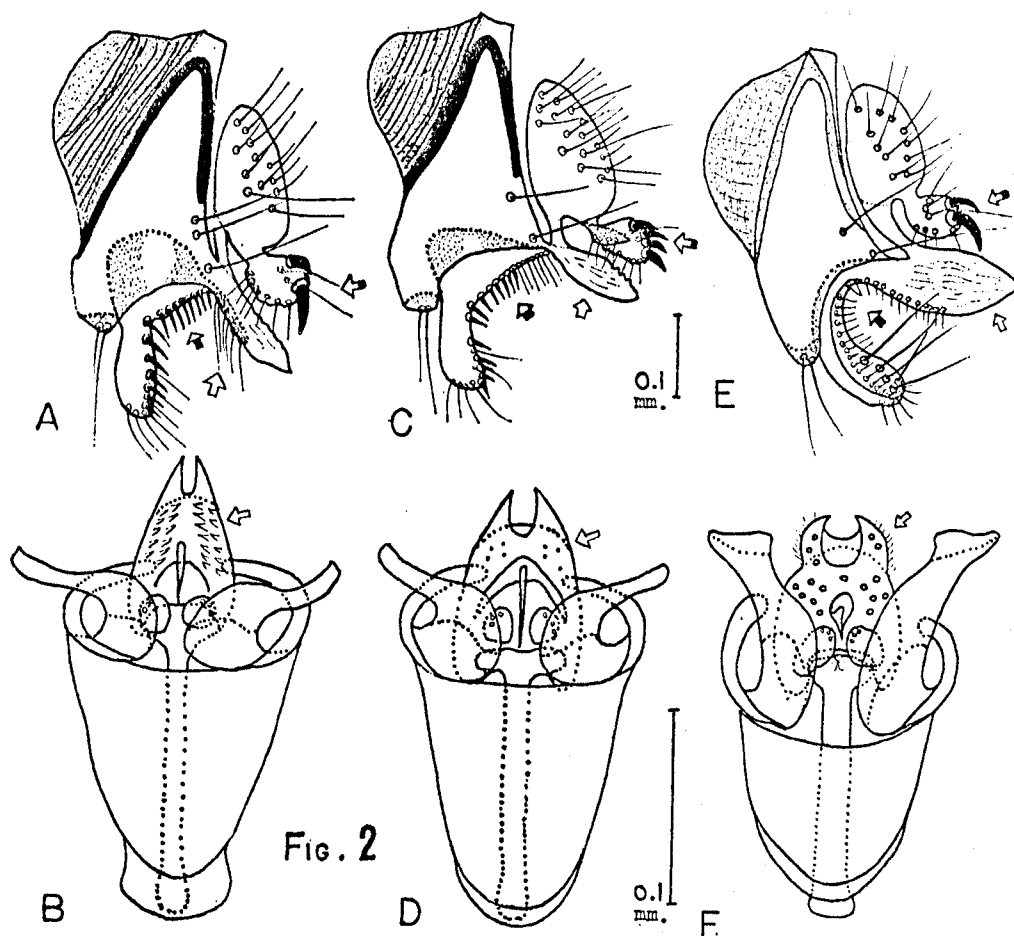


Fig. 2. A-B: *Scaptomyza pallida* (Zetterstedt). C-D: *S. elmoi* Takada n. sp. E-F: *S. himalayana* Takada n. sp. A, C and E: external genital apparatus of male. B, D and F: phallic organs. Arrows indicate structural features characteristic of the three species.

External genital apparatus of male (Fig. 2, C)

Scaptomyza disticha, Okada, 1956. Systematic study of Drosophilidae and allied families: 69.

Parascaptomyza disticha, Burla, 1957. Jh. Ver. vaterl. Naturk. Wurttemberg, 112: 41.

Scaptomyza pallida, Hardy, 1965. Insect of Hawaii, 12: 608.

Genital arch with approximately two bristles near posterior margin; toe without hair at lower side. The secondary clasper of anal plate bearing approximately four large teeth at tip, and approximately nine stout bristles below. Also there are two long bristles on this portion. Clasper with a row of thirteen bristle-like teeth at middle and approximately six hairs at upper portion of clasper and with approximately six long bristles at lower portion.

Copulatory organs of male (Fig. 2, D)

Scaptomyza disticha, Okada, 1956. Systematic study of Drosophilidae and allied families: 69.

Parascaptomyza disticha, Okada & Kurokawa, 1957. Kontyu, 25: 3.

Parascaptomyza disticha, Burla, 1957. Jh. Ver. vaterl. Naturk. Wurttemberg, 112: 41.

Penis oval at ventral aspect, basally broad, apically bifid, without serration, and with three subapical lobes at ventral side. Phallic formula = aBCdEfgoHilk-MN. Phallosomal index approximately 0.7.

Holotype; male, Chito, Taiwan, July 20, 1968, Takada.

Allotype; female, collected together with holotype.

Paratype; 3 males, collected together with the holotype.

Other specimens examined; seven males and fifteen females, Kipuka Puauulu, Hawaii, July 18, 1964, Takada. Two males, Kokoe, Kauai, July 21, 1964, Heed. Two males and two females, Alishan, Taiwan, July 29, 1968, Takada. Two males, Kiyozumi, Chiba, June 11-13, Okada. Two males, Kumotori Yama, Tokyo, June 2, 1952, Okada. Two males and a female, Fukazawa, Tokyo, May 29, 1958, Okada. One male, Hikosan, Fukuoka, May 13-15, 1964, Okada.

Five males, Choojyabaru-Boogatsuru, Mt. Kuju, Oita, June 15, 1968, Okada.

Relationships: Distinctly differs from *Scaptomyza* (*Parascaptomyza*) *pallida* (Zetterstedt) from Europe, in the shape of the external genital apparatus and the phallic organs.

3. *Scaptomyza* (*Parascaptomyza*) *himalayana* Takada n. sp.

Japanese name: Himalaya-kofuki-himeshojobae.

Scaptomyza (*Parascaptomyza*) *pallida*, Okada, 1966. Diptera from Nepal, Cryptochaetidae, Diastatidae & Drosophilidae. Bull. of the British Mus. Ent. Suppl. 6; 59.

Arista 4/1. Anterior reclinate orbital one-fourth length of proclinate, the latter four-fifths length of posterior reclinate. Second oral less than half length of first.

Acrostichal hairs in two rows; ndprescutellars. Mesonotum dark brown, with a brown median stripe. Abdomen generally darker posteriorly, tergites five to six black. C3-fringe on basal one-fourth. 5X-index of wings approximately 1.2. External genital apparatus of male (Fig. 2, E)

The lower part of anal plate with one very large tooth at tip, one smaller tooth above the large one, and approximately bristles below. Toe of genital arch broad and with approximately hairs on its lower side. The tip of clasper with approximately five long stout bristles.

Copulatory organs of male (Fig. 2, F)

Penis massive, apically pubescent and bifid, ventrally with small warts on its surface. The ventral process of hypandrium broad and massive. Phallic formula = aBcdEfgoHiklMN. Phallosomal index approximately 0.6.

Holotype; male, Larjung, Palpa, Nepal, May 7, 1968, Matsumura.

Allotype; female, collected together with the holotype.

Paratype; Eighteen males and sixteen females, collected together with the holotype. Other specimens examined; one male and four females, Gorapani, Nepal, May 11, 1968, Matsumura. One female, Godavari, Nepal Valley, Nepal, April 20, 1968, Matsumura. Eleven males and eleven females, Godavari, Nepal Valley, Nepal, April 26, 1968, Matsumura.

Relationships: Closely allied to *Scaptomyza* (*Parascaptomyza*) *pallida* (Zetterstedt) from Europe, especially in having one large tooth at tip of the lower part of anal plate in male genitalia, but differs from it in having dark brown mesotum (yellow to gray in *pallida*) and massive ventral process of hypandrium in phallic organs.

ACKNOWLEDGEMENTS

The author is very grateful to Professor Eiji Momma, Hokkaido University, Professor Toyohi Okada, Tokyo Metropolitan University, and Professor Harrison D. Stalker, Washington University at St. Louis, for their invaluable criticism and furnishing materials for the present study. Cordial thanks are also due to Dr. Lynn H. Throckmorton, University of Chicago, Dr. Taek J. Lee, Chunggang University at Seoul, Mr. Fei J. Lnn, Academia Sinica at Taipei, Professor Mayumi Yamada and Mr. Takeshi Matsumura, members of Hokkaido University Scientific Expeditions to Nepal-Himalaya, 1968, for their friendly assistance in providing many specimens. Helpful advice given by Professor Sajiro Makino, Hokkaido University, is cordially acknowledged here.