

The first record of the genus *Acymatopus* Takagi (Diptera: Dolichopodidae) from Korea

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The genus *Acymatopus* Takagi is reported for the first time from Korean fauna along with two nominate species, *A. minor* Takagi, 1965 and *A. takeishii* Masunaga, Saigusa & Yang, 2005. This genus belonging to the subfamily Hydrophorinae in the family Dolichopodidae. It comprised of only six species in the world and distributed only in Japan and China thus far. The genus is diagnosed by a metallic bluish-green body with thick gray tomentum, lacking black and white markings of mesonotum, 2 pairs of long marginal setae at scutellum and male's dorsally slightly curved fore tarsomere 1. Both adults and larvae of this genus are known to be found on rugged and rocky marine shores of the tidal zone. The authors found the first recorded species in the west seaside of Korea, where many barnacles inhabit. The descriptions and illustrations of external features including male genitalia of newly recorded species are provided in this paper.

Keywords: Aphrosylini, coastal species, Dolichopodidae, Hydrophorinae

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INTRODUCTION

The genus *Acymatopus* Takagi, 1965 which belonging to the subfamily Hydrophorinae in the family Dolichopodidae, is distributed only in Japan and China comprised of six species. In Japan, five species are recorded (*A. femoralis* Takagi, 1965; *A. longisetosus* Takagi, 1965; *A. major* Takagi, 1965; *A. minor* Takagi, 1965; *A. oxycercus* Masunaga, Saigusa & Yang, 2005), while only one species is recorded in China (*A. takeishii* Masunaga, Saigusa & Yang, 2005) (Masunaga *et al.*, 2005). Both adults and larvae of this genus can be found on rugged and rocky marine shores of the tidal zone (Takagi, 1965). The specimens that authors collected were frequently found with barnacles. The adults often were found behind or in rock crevices, likely to avoid strong winds blowing from the sea (Fig. 1).

In this paper, the genus *Acymatopus* Takagi, 1965 is reported for the first time from Korean fauna along with two nominate species, *A. minor* Takagi, 1965 and *A. takeishii* Masunaga, Saigusa & Yang, 2005. The descriptions and illustrations of external features including male genitalia of these species are provided here.

MATERIALS AND METHODS

External features including male genitalia were photographed by using Olympus SZX 16 stereo microscope (Olympus, Tokyo, Japan), Olympus BX50 compound microscope (Olympus) and Michrome 16 CMOS camera (Tucsen, Fujian, China). All specimens examined in the present study were deposited in the collection of the Department of Plant Medicine at Kyungpook National University, Daegu, Korea. Morphological terms followed Cumming and Wood (2017). Abbreviation: C - costal vein; cer - cercus; CuA + CuP - anterior branch of cubital vein + posterior branch of cubital vein; dm + m - discal median crossvein; epd - epandrium; hyp - hypandrium; M - median vein; phal - phallus; R - radial vein; Sc - subcostal vein.

TAXONOMIC ACCOUNTS

Order Diptera Linnaeus, 1758
Superfamily Empidoidea Latreille, 1809
Family Dolichopodidae Latreille, 1809



Fig. 1. Habitat of *Acymatopus minor* Takagi, 1965.

Subfamily Hydrophorinae Lioy, 1864

Genus *Acymatopus* Takagi, 1965

갯바위장다리파리속 (신칭)

Acymatopus Takagi, 1965: 78. Type species: *Acymatopus major* Takagi, 1965.

Diagnosis. Body metallic bluish green with thick gray tomentum; mesonotum lacking black and white markings; proboscis short; gena extremely narrow, almost absent; tiny setae irregularly on lateral portions of mesoscutum and between of setae of dorsocentral rows present; male fore tarsomere 1 slightly curved dorsally with a ventral strong seta; scutellum with four long marginal setae (Takagi, 1965; Masunaga *et al.*, 2005).

***Acymatopus minor* Takagi, 1965 (Fig. 2)**

갯바위장다리파리 (신칭)

Acymatopus minor Takagi 1965: 81. Type locality: Sata-misaki, Kyushu, Japan.

Redescription.

Male (Fig. 2A, C-F). Head: metallic bluish green with mainly thick gray tomentum and black setae and setulae; 1 reclinate and divergent fronto-orbital seta; ocellar seta divergent; postocellar seta short and proclinate; postvertical seta slightly convergent and proclinate; frons with yellowish gray tomentum; face and clypeus with gray tomentum; compound eye with tiny pale setulae between facets; lower occiput with several black setae; postocular

setae black in a single row; antenna black; scape without dorsal setae; pedicel with apical ring of setae; post pedicel triangular shaped with several setae entirely covered with pale short setulae; arista with stylus-like apex; palpus dark gray with gray tomentum and 18–29 black setae; proboscis black with pale setulae. Thorax: metallic bluish green with mainly thick gray tomentum and black setae and setulae; mesonotum with yellowish gray tomentum except marginal gray tomentum; acrostichial setae short and irregularly biseriate; 6 long and 0–2 short dorsocentral setae; 1 long postpronotal seta; 1 presutural, 1 sutural, and 1 postsutural intra-alar setae; 1 notopleural seta; 1 postalar seta; 2 pairs of long marginal scutellar setae; proepisternum with 2 long and 2–3 fine setae; 2 (sometimes 1 or 3) tiny setae on front of posterior spiracle. Legs: metallic bluish green with mainly thick gray tomentum and black setae and setulae except dark yellow to dark brown femoral knee; fore coxa with black setae; fore femur with apical 1 anteroventral and 1 posteroventral setae; fore tibia without strong seta except apical ring of short setae; fore tarsomere 1 slightly curved dorsally with a strong ventral seta at base; fore tarsomere 3 with strong dorsal setae; relative ratio of fore femur, tibia and tarsomere 1–5: 6.29 : 5.07 : 2.46 : 1.92 : 0.99 : 0.86 : 1; mid coxa with black setae; mid femur with 2 anterior and 1 posterior setae, and apical 1 anteroventral and 1 posteroventral setae; mid tibia with 1 anterodorsal, 1 anteroventral, 2 posterodorsal 1 short posteroventral and apical ring of setae; mid tarsus simple; relative ratio of mid femur, tibia, tarsomere 1–5: 7.59 : 6.05 : 3.51 : 1.83 : 1.14 :

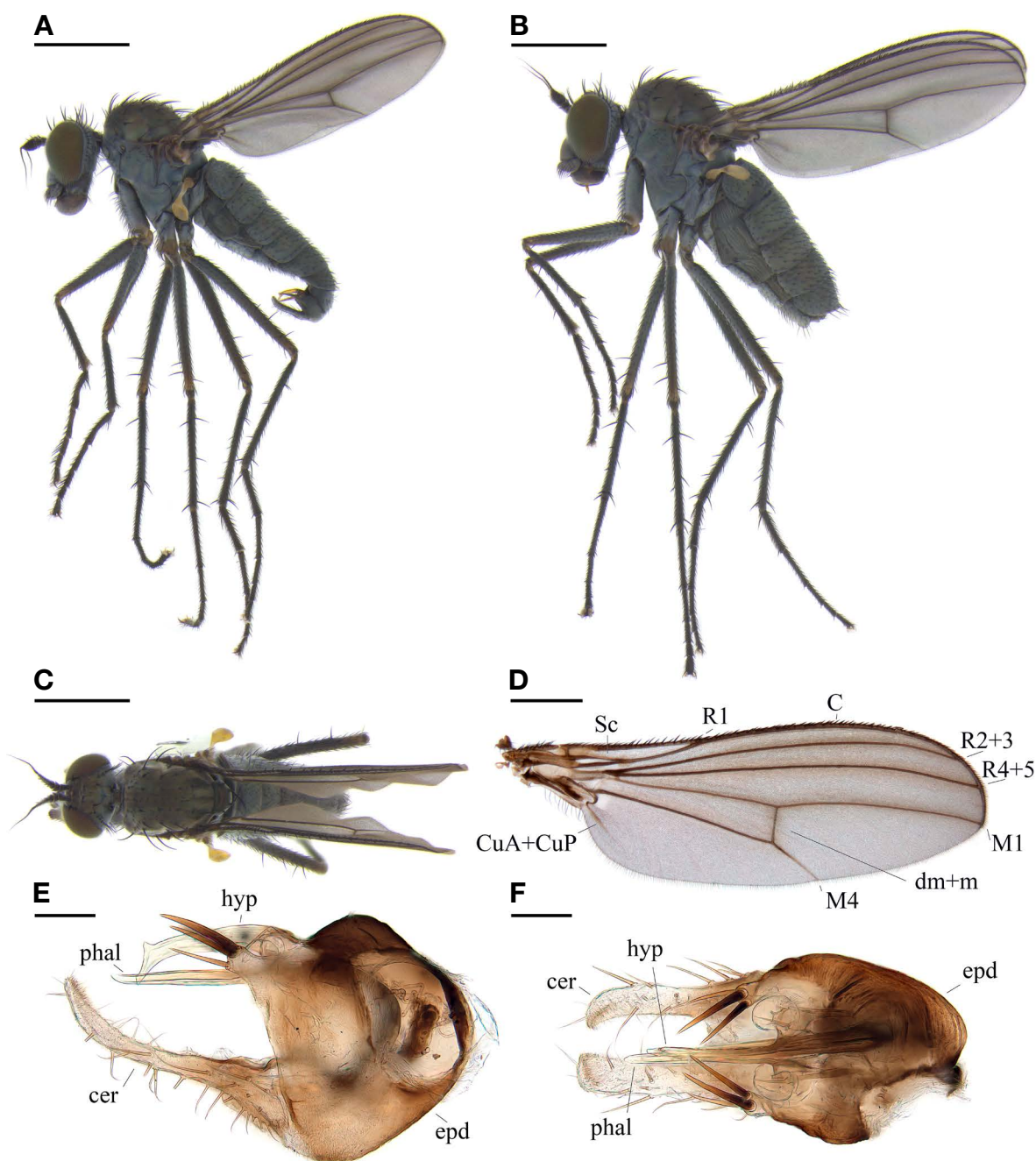


Fig. 2. *Acymatopus minor* Takagi, 1965: A. male, lateral view; B. female, lateral view; C. male, dorsal view; D. male wing; E. male genitalia, lateral view; F. male genitalia, dorsal view. Scale bars: 1.0 mm (A-C), 0.5 mm (D), 0.1 mm (E, F).

0.76 : 1; hind coxa with black setae; hind femur with 2–5 anterodorsal and 1–2 posterodorsal setae, and apical 1 anteroventral and 1 posteroventral setae; hind tibia with 1 anterodorsal, 0–2 anteroventral, 2 posterodorsal, 0–2 posteroventral and apical ring of setae; hind tarsomere 1 with a strong ventral seta at base; relative ratio of hind femur, tibia, tarsomere 1–5: 8.01 : 6.49 : 2.53 : 2.32 : 1.27 : 0.82 : 1. Wing: entirely darkened; veins dark brown; C

with spine like setae and ended at M1; Sc fused to R1 at middle; R1 slightly curved to posterior; R2 + 3 slightly curved to anterior; R4 + 5 slightly curved to anterior; M1 straight before dm-m and slightly curved to anterior after dm-m; R4 + 5 and apical M1 almost parallel; M4 straight; crossvein dm-m straight; relative ratio of apical M4 and dm-m: 1 : 1.5–1.6; CuA + CuP weak and not reached to wing margin; calypter pale brown with black setulae on

fringe; halter yellow. Abdomen: metallic bluish green with mainly thick gray tomentum and black setae and setulae; hypopygium same color as abdomen; hypandrium laterally flat with dorsal projection at apex; epandrial lobe with 2 strong ventral and 1 weak dorsal setae; cercus long and tapered. Body Length: 3.0–3.6 mm.

Female (Fig. 2B). Almost same with the male except for the following characters: face and clypeus broader; fore tibia with 1 (rarely 2) anterodorsal seta; fore tarsomere 1 not curved dorsally; fore tarsomere 3 without strong dorsal setae. Body Length: 3.2–3.4 mm.

Material examined. 2♂ 1♀, Kekura, Kagoshima-shi, Japan, 24.III.1983, T. Sunose Coll.; 1♀, Kekura, Kagoshima-shi, Japan, 15.IV.1989, K. Kusigemati Coll.; 10♂ 6♀, Yongsu-ri, Hangeong-myeon, Jeju-si, Jeju, 4.V.2019, S.J. Suh Coll.; 25♂ 20♀, Gyeokpo-ri, Byeonsan-myeon, Buan-gun, Jeollabuk-do, 31.V.2019, S.J. Suh Coll.; 8♂ 4♀, Duyeon beach, Seungeon-ri, Anmyeon-eup, Taean-gun, Chungcheongnam-do, 18.VI.2020, S.J. Suh Coll.; 31♂, ditto, 17.VI.2023, S.J. Suh Coll.

Distribution. Korea (new record), Japan.

Remarks. *Acymatopus minor* is externally very similar to *A. takeishii*, but different in following characteristics: palpus with 18–29 black setae; M1 slightly curved to anterior after dm-m; R4+5 and M1 almost parallel apically; crossvein dm-m straight; relative ratio of apical M4 and dm-m: 1 : 1.5–1.6.

***Acymatopus takeishii* Masunaga, Saigusa & Yang, 2005 (Fig. 3)** 짧은갯바위장다리파리 (신칭)

Acymatopus takeishii Masunaga, Saigusa & Yang, 2005: 309. Type locality: Shahekou, Dalian, Liaoning, China.

Redescription.

Male (Fig. 3A, C–F). Head: metallic bluish green with mainly thick gray tomentum and black setae and setulae; 1 fronto-orbital seta reclinate and divergent; ocellar seta divergent; postocellar seta short and proclinate; postvertical seta slightly convergent and proclinate; frons with yellowish gray tomentum; face and clypeus with gray tomentum; compound eye with tiny pale setulae between facets; lower occiput with several black setae; postocular setae black in a single row; antenna black; scape without dorsal setae; pedicel with apical ring of setae; post pedicel triangular shaped with several setae entirely covered with pale short setulae; arista with stylus-like apex; palpus dark gray with gray tomentum and 12–15 black setae; proboscis black with pale setulae. Thorax: metallic bluish green with mainly thick gray tomentum and black setae and setulae; mesonotum with yellowish gray tomentum except marginal gray tomentum; acrostichial setae short and irregularly biseriolate; 6 long and 0–2 short dorsocentral setae; 1 long postpronotal seta; 1 presutural, 1 sutural, and 1 postsutural intra-alar setae; 1 each of presutural, sutural,

postsutural supra-alar setae; 1 notopleural seta; 1 postalar seta; 2 pairs of long marginal scutellar setae; proepisternum with 2 long and 2–3 tiny setae; 2 (sometimes 1 or 3) tiny setae in front of posterior spiracle. Legs: metallic bluish green with mainly thick gray tomentum and black setae and setulae except dark yellow to dark brown femoral knee; fore coxa with black setae; fore femur with apical 1 anteroventral and 1 posteroventral setae; fore tibia with 1 weak anterodorsal and apical ring of short setae; fore tarsomere 1 slightly curved dorsally with a strong ventral seta at base; fore tarsomere 3 with strong dorsal setae; relative ratio of fore femur, tibia and tarsomere 1–5: 5.95 : 4.79 : 2.43 : 1.71 : 0.99 : 0.76 : 1; mid coxa with black setae; mid femur with 2 anterior and 1 posterior setae, and apical 1 anteroventral and 1 posteroventral setae; mid tibia with 1 anterodorsal, 2 anteroventral, 2 posterodorsal, 1 short posteroventral and apical ring of setae; mid tarsus simple; relative ratio of mid femur, tibia, tarsomere 1–5: 7.25 : 6.37 : 3.34 : 1.76 : 1.05 : 0.28 : 1; hind coxa with black setae; hind femur with 2–3 anterodorsal and 1 posterodorsal setae, and apical 1 anteroventral and 1 posteroventral setae; hind tibia with 1 anterodorsal, 2 anteroventral, 2 posterodorsal and apical ring of setae; hind tarsomere 1 with a strong ventral seta at base; relative ratio of hind femur, tibia, tarsomere 1–5: 8.00 : 6.90 : 2.68 : 2.14 : 1.27 : 0.86 : 1. Wing: entirely darkened; vein dark brown; C with spine like setae and ended at M1; Sc fused to R1 at middle; R1 slightly curved to posterior; R2+3 slightly curved to anterior; R4+5 slightly curved to anterior; M1 almost straight; R4+5 and apical M1 slightly convergent at apex; M4 straight; crossvein dm-m slightly arched to apex; relative ratio of apical M4 and dm-m: 1 : 1.7–1.8; CuA+CuP weak and not reached to wing margin; calypter pale brown with black setulae on fringe; halter yellow. Abdomen: metallic bluish green with mainly thick gray tomentum and black setae and setulae; hypopygium concolorous as abdomen; hypandrium laterally flat with small dorsal projection at apex; epandrial lobe with 1 strong ventral and 2 moderate dorsal setae; cercus broad and oval shaped. Body Length: 3.3–3.6 mm.

Female (Fig. 3 B). Almost same with the male except for following characters: fore tibia with 1 anterodorsal seta; face and clypeus broader; fore tarsomere 1 not curved dorsally; fore tarsomere 3 without strong dorsal setae. Body Length: 2.8–3.6 mm.

Material examined. 3♂ 1♀, Gyeokpo-ri, Byeonsan-myeon, Buan-gun, Jeollabuk-do, 31.V.2019, S.J. Suh Coll.; 6♂ 10♀, Duyeon beach, Seungeon-ri, Anmyeon-eup, Taean-gun, Chungcheongnam-do, 17.VI.2023, S.J. Suh Coll.

Distribution. Korea (new record), China.

Remarks. *Acymatopus minor* is externally very similar to *A. takeishii*, but different in following characteristics: palpus with 12–15 black setae; M1 almost straight after dm-m; R4+5 and apical M1 slightly convergent at apex;

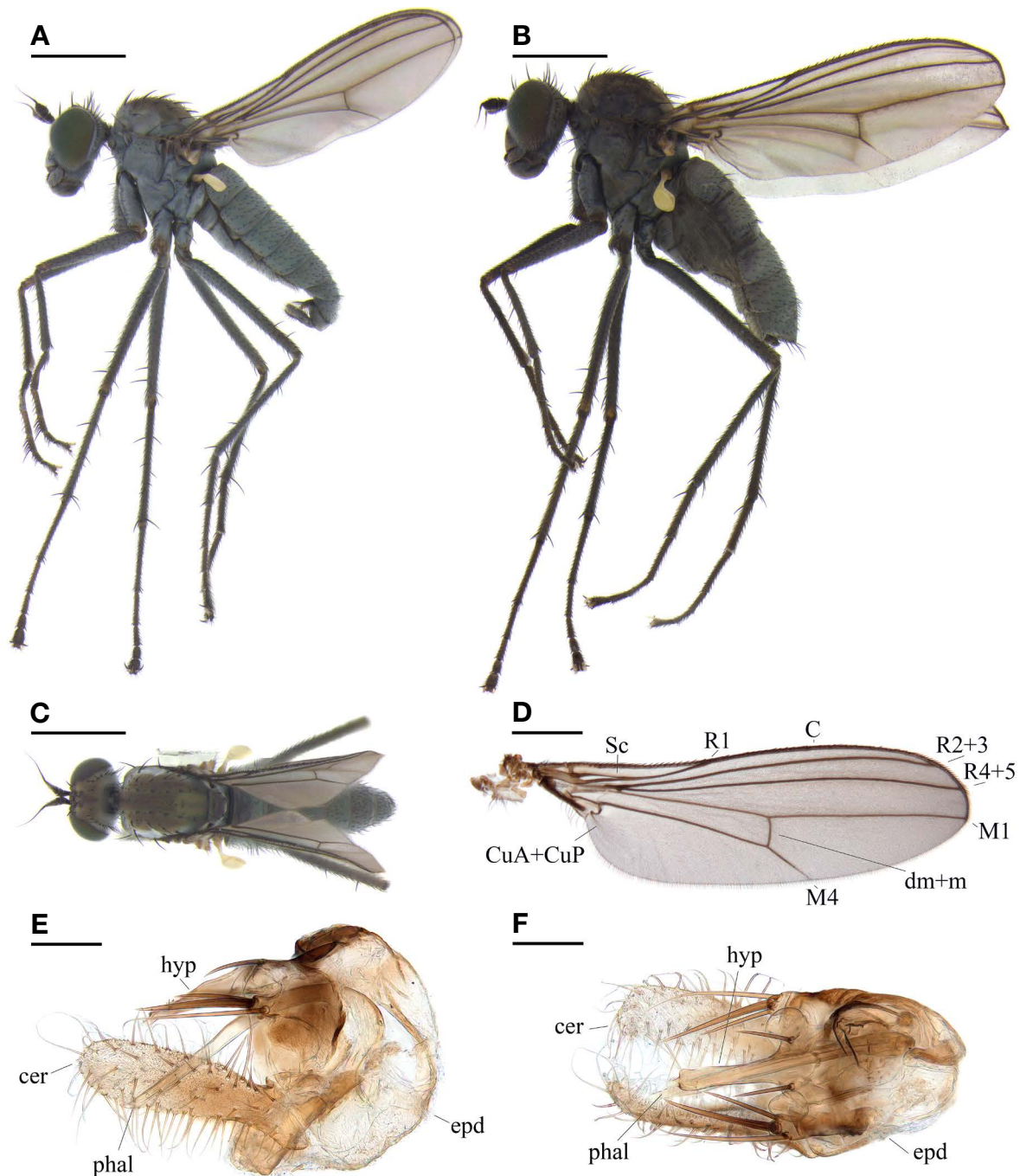


Fig. 3. *Acymatopus takeshii* Masunaga, Saigusa & Yang, 2005: A. male, lateral view; B. female, lateral view; C. male, dorsal view; D. male wing; E. male genitalia, lateral view; F. male genitalia, dorsal view. Scale bars: 1.0 mm (A–C), 0.5 mm (D), 0.1 mm (E, F).

crossvein dm-m slightly arched to apex; relative ratio of apical M4 and dm-m: 1 : 1.7–1.8. Matsunaga *et al.* originally described relative ratio of apical M4 and dm-m as 1 : 1.2, but it is not matched to Korean species, and was also different from the ratio they suggested in the attached picture. So, it is necessary to find out whether a mistake has been made.

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