

## *Prionolabis* crane flies (Diptera: Limoniidae) of Korea

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This study is based on crane fly specimens collected more than 80 years ago in 1938–1939 and preserved at the United States National Museum, Smithsonian Institution, Washington DC, USA. Despite many attempts with a variety of methods, no additional specimens of this genus were captured. This likely means that this genus is extinct on the Korean Peninsula, or its distribution is restricted to the northern areas of the Democratic People's Republic of Korea (North Korea). The genus *Prionolabis* Osten Sacken, 1860 with four species, one of them *Prionolabis dis* (Alexander, 1950) endemic to North Korea, was recorded by Ch. P. Alexander (Alexander, 1938, 1940, 1950). All succeeding papers listing these species were based on these original works without study based on actual specimens. For each species, we present general information on genus, redescriptions of species based on Korean specimens, illustrations of important taxonomical structures, elevation range, period of activity, habitat information, general distribution, and a distribution map for the Korean Peninsula.

Keywords: endemic, habitat, identification key, North Korea, taxonomy

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### INTRODUCTION

*Prionolabis* Osten Sacken, 1860 originally was erected as a subgenus of a vast genus *Limnophila* Macquart, 1834, which included many groups recently recognized as a separate genus, during an attempt to make a new classification of North American short-palped crane flies (Osten Sacken, 1860). This genus was based on single, previously undescribed North American species *Limnophila rufibasis* Osten Sacken, 1860. Later, more species were added not only from North American, but also from Asian and European continents. Despite a long history of investigation lasting for more than 160 years, very little is known about habitat preferences, females being flightless in many species are not described for most species, and preimaginal stages are completely unknown.

Investigation into Korean short-palped crane flies, family Limoniidae (Diptera), started more than a century ago with the first specimens collected as early as 1915 (Podenas *et al.*, 2019). The first publication on that group of insects, with four descriptions of new species, was written by Ch. P. Alexander (Alexander, 1934). He described 49 species from Korea, most of them from the

northern part of the peninsula, now North Korea (Podenas, 2013). Nearly 80 years later, in 2012, further investigation into Limoniidae crane flies on the Korean Peninsula were initiated by the authors of this publication and researchers from the National Institute of Biological Resources in Incheon, South Korea. Prior to these studies, 95 species of Limoniidae were recorded from North and South Korea (Podenas, 2013), the new findings summarized in the National List of Species of Korea (Cho, 2019), this already including 144 species.

Likely, *Prionolabis* crane flies are semiaquatic, developing in wet shaded places, but because flightless females have limited distribution capability, they are unable to reach isolated habitats even short distance from original locality. Fragmentation of habitats often leads to reduced population size and complete extinction of such sedentary and specialized species. Despite the first *Prionolabis* specimens being collected more than 80 years on the Korean Peninsula, no more specimens were located in the scientific collections or collected by different methods used by authors of this publication.

Since 2012, crane flies have been collected annually in different localities, at different times and using different methods throughout the country. Despite original

and subsequent descriptions of East Palearctic species over a long period of time, some of these species were known only from the original descriptions and no illustrations were available. The aim of our study was to document, redescribe, illustrate, and prepare keys for all Korean crane fly species identified to date. In this article, we provide photographs of important taxonomic details, such as antennae, wings, and male terminalia. No females of Korean species were seen by the authors. We also include distribution maps and a key for all species of the Korean Peninsula. This publication is a continuation of our previous work on short-palped crane flies (Limoniidae) from Korea.

## MATERIALS AND METHODS

Korean crane flies available for this study are preserved in the collections of the United States National Museum (USNM), Smithsonian Institution, Washington DC, USA. All specimens were collected in 1938 and 1939 in the northern part of the Korean Peninsula (now Democratic People's Republic of Korea (North Korea)) by A. M. Yankovsky. These crane flies are mounted on their side on a paper point, with legs generally surrounding the insect pin. The genitalia of males were cleared overnight in approximately 10% potassium hydroxide (KOH) and preserved in microvials filled with glycerol on the same pin as the dry insect. Information on the examined material is given exactly as it is on the labels regardless of style, measurement unit or other information. Specimens are arranged in the publication according to the collecting date. A female of *P. hospes* is preserved at the Natural History Museum in Neuchâtel, Switzerland.

Adult crane flies were also collected by authors of this publication starting in 2012 in various ways, including by insect nets, with Malaise traps, LED light traps, black light traps, Mosquito Magnet® traps (Pro Model, Woodstream Corp., Lititz, PA), New Jersey traps and at light sources, but no single specimen was captured.

Crane flies were observed using an Olympus SZX10 dissecting microscope. Photographs were taken with a Canon EOS R5 digital camera through a Canon MP-E 65 mm macro lens and through Mitutoyo M Plan Apo 10× and 20× lenses mounted on same camera.

The terminology of adult morphological features generally follows that of Cumming and Wood (2017).

General distribution of species is given according Oosterbroek (2021).

## TAXONOMY

### *Prionolabis* Osten Sacken, 1860

*Limnophila* (*Prionolabis*) Osten Sacken 1860: 239.  
- Ishida 1959: 2–3. - Alexander 1966: 379, 391.

*Prionolabis* Savchenko & Krivolutsкая 1976: 58, 70.  
- Savchenko 1983: 50; 1986: 299; 1989: 112–113.

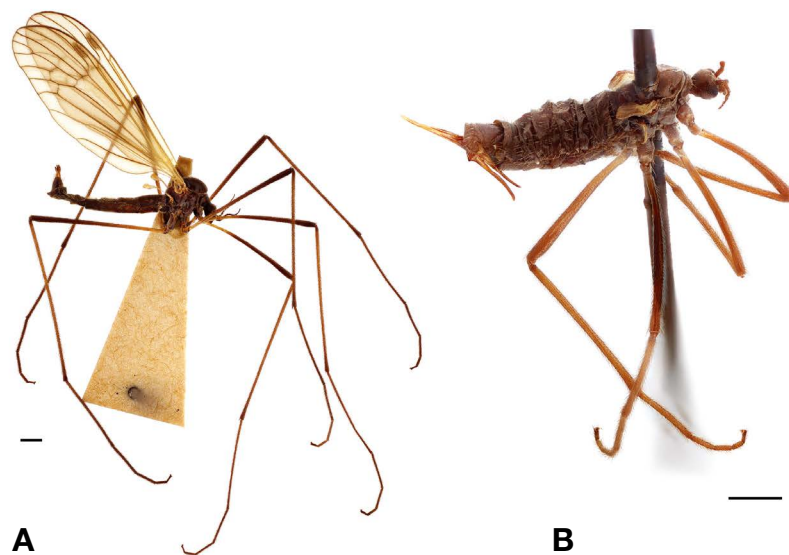
Type species - *Limnophila rufibasis* Osten Sacken, 1860 (Nearctic).

#### Adult.

Small to medium-sized crane flies with body length 6.0–11.5 mm, wing length 6.9 mm to 11.5 mm in fully winged specimens, females of some species brachypterous with wing length about 3.5 mm. General body coloration varies from brownish yellow to dark brown, gray, or black, but most species are dark colored.

Head: Rounded posteriorly without neck-like extension. Eyes widely separated in both sexes, width of vertex approximately equals length of both basal antennomeres taken together. Male antenna medium-long to long, reaching from base of wing to tip of abdomen, if bent backwards, female antenna shorter. If antenna shorter, then length of verticils approximately equals length of respective segments, but if longer, then verticils missing. Flagellomeres covered with erect pubescence on ventral side. Scape elongate, subcylindrical, pedicel short, egg-shaped. Flagellum usually 14-segmented, sometimes 13-segmented, flagellomeres short or elongate. Rostrum short.

Thorax: Frontal margin of pronotum without emargination. Mesonotal prescutum without tubercular pits, pseudosutural fovea closer to anterior margin of sclerite, longitudinal stripes missing. Pleuron uniformly colored, katapisternum setoseless. Meron small, thus middle and posterior coxae close together. Wing wide and patternless (Fig. 1A), wing cells without macrotrichiae. Females of many species with reduced wings unsuitable for flight (Fig. 1B). Arculus present. Vein *Sc* long, reaching wing margin at or slightly beyond branching point of *Rs*, *sc-r* before tip of *Sc*. Radial sector long, arched or angulate and short spurred at base, usually branching into  $R_{2+3+4}$  and  $R_5$ , but in some species into  $R_{2+3}$  and  $R_{4+5}$ . Length of  $R_1$  varies from short and oblique to slightly elongate.  $R_2$  before  $R_1$  tip, but position varies according to species.  $R_3$  and  $R_4$  diverging. Cell  $r_3$  with short stem, or stem is missing completely. Cell  $m_1$  present or absent, if present, then it has long stem distinctly longer than cell itself. Discal cell slightly elongate. Cross-vein *m-cu* at about one-third to middle of discal cell. Vein *CuP* and anal vein slightly diverging. Anal vein slightly sinuous, reaching wing margin close to the level of *Rs* base. Anal cell long with widely rounded posterior margin. Calypter setoseless. Halter long. Legs with well developed tibial spurs, single on fore, paired on middle and posterior leg. Claw simple, without spines. Arolium reaching to about middle of claw or beyond that.



**Fig. 1.** Sexual dimorphism in *Prionolabis* Osten Sacken, 1860. A. male of *P. acanthophora* (Alexander, 1938). B. female of *P. hospes* (Egger, 1863). Scale bars: 1.0 mm.

Abdomen: Abdominal tergites with paired transverse sutures. Male terminalia just slightly wider than the rest of the abdomen. Ninth segment fused into complete genital ring. Ninth tergite emarginate or with two lobules at middle of posterior margin. Gonocoxite without interbase. Two pairs of terminal gonostyli. Outer gonostylus usually complicated with dentate or branched apex, often with additional lobe at middle or at base. Inner gonostylus often sclerotized with dentate or branched distal part. One pair of parameres. Paramere usually flattened, sometimes narrow, rod-shaped. Aedeagus elongate, narrows towards tip, apex curved downwards. Ovipositor elongate. Distal part of cercus raised upwards, blunt-apexed.

Preimaginal stages unknown.

Genus has 73 extant species and no recognized subgenera. It has Holarctic and Oriental distribution, with most species recorded from Eastern Palaearctic (33) and Nearctic (23) (Oosterbroek, 2021). Fossils belonging to this genus unknown (Evenhuis, 2014).

**Check list of Korean *Prionolabis* crane flies**

- Prionolabis acanthophora* (Alexander, 1938)
- Prionolabis clavaria* (Alexander, 1950)
- Prionolabis dis* (Alexander, 1950)
- Prionolabis yankovskiyana* (Alexander, 1940)

**Key to Korean species of the genus *Prionolabis* Osten Sacken**

- 1. Wing cell  $m_1$  present (Figs. 2B, 3B)..... 2
- Wing cell  $m_1$  missing (Figs. 4B, 5A)..... 3

- 2. Inner gonostylus of male genitalia five-toothed at apex (Fig. 2D). Tibia light brown with dark brown distal part (Fig. 1A). Knob of halter pale yellow.....  
.....*Prionolabis acanthophora* (Alexander, 1938)
- Inner gonostylus of male genitalia, bifid at apex (Fig. 3C, 3D). Tibia dark brown with black apex. Knob of halter brownish.....  
.....*Prionolabis clavaria* (Alexander, 1950)
- 3. Male antenna reaching to about middle of abdomen, if bent backwards, antennal flagellum 13-segmented (Fig. 4A). Outer gonostylus of male genitalia not branched, bearing just small subapical tooth (Fig. 4C).....  
.....*Prionolabis dis* (Alexander, 1950)
- Male antenna nearly as long as the entire body, antennal flagellum 14-segmented. Outer gonostylus of male genitalia with two long branches (Fig. 5B).....  
.....*Prionolabis yankovskiyana* (Alexander, 1940)

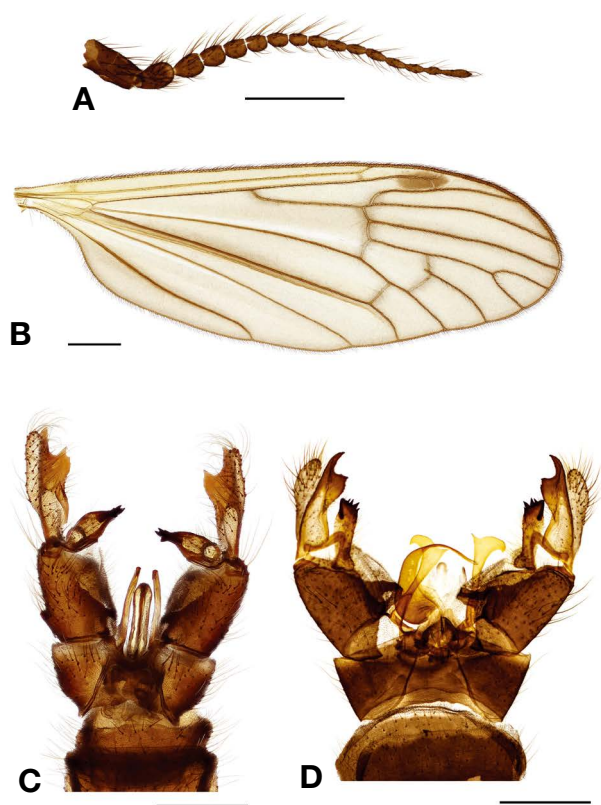
***Prionolabis acanthophora* (Alexander, 1938)**

*Limnophila* (*Prionolabis*) *acanthophora* Alexander, 1938: 157; 1940: 49–50.

*Prionolabis acanthophora* Savchenko, 1983: 57; 1989: 113; Oosterbroek, 2021.

General (Fig. 1A): Body coloration polished dark brown to black. Body length of male 6.5–10.0 mm, of female about 10 mm. Wing length of male 8.5–11.0 mm, of female 3.5 mm.

Head: Black, sparsely dusted with brownish, more heavily so in front, and covered with short yellowish setae. Eyes widely separated in both sexes, distance between eyes in male approximately equals to the length



**Fig. 2.** *Prionolabis acanthophora* (Alexander, 1938), male. A. antenna. B. wing. C. male genitalia in glycerol, dorsal view. D. male genitalia slide-mounted, dorsal view, Alexander's metatype. Scale bars: 0.5 mm (A, C, D), 1.0 mm (B).

of both basal antennomeres taken together. Antenna (Fig. 2A) 2.1 mm long in male, reaching to about middle of prescutum in male if bent backwards. Scape elongate, nearly cylindrical, twice as long as pedicel, black, dusted with gray, covered with scarce erect black setae dorsally. Pedicel egg-shaped, dark brown, covered with black setae. Flagellum 14-segmented, entirely dark brown. Basal flagellomeres short, just slightly longer than wider, indistinctly swollen and covered with short yellowish pubescence on ventral face, distal flagellomeres slightly elongate, fusiform, apical segment large, 1.7 times as long as preceding. Three distal flagellomeres of female antenna subequal. Longest verticils up to 1.7 times as long as respective segment. Rostrum black, dusted with brownish. Palpus dark brown. Mouth parts rufous.

**Thorax:** Cervical sclerites dark brown to black. Thorax semi-polished, dark brown to black, covered with sparse brownish pruinosity dorsally, grayish pruinosity ventro-laterally. Pronotum large dark brown, dusted with brownish pruinosity, more heavily dorsally and covered with sparse erect brownish setae. Mesonotal prescutum dark brown, fronto-lateral margin lighter brown, longitudinal stripes missing, surface covered with erect yellow-

ish setae. Tubercular pits missing, pseudosutural fovea wide and shallow. Central part of scutal lobe polished dark brown to black, margins brownish pruinose, area between lobes densely pruinose. Scutellum dark brown, pruinose, with few erect brownish setae along posterior margin. Mediotergite brown to dark brown, sparsely pruinose. Pleuron dark brown, pruinosity, more heavily ventrally. Male wing (Fig. 2B) slightly iridescent, translucent, with brownish tinge, yellowish at base and costal area, without any darker spots except brown elongate stigma. Veins brown, pale at wing base. Venation: *Sc* long, reaching wing margin slightly beyond branching point of *Rs*, *sc-r* before tip of *Sc*, at branching point of *Rs*. Radial sector long, arched at base. Free end of *R*<sub>1</sub> short, oblique, disappearing at wing margin. *R*<sub>2</sub> slightly before tip of *R*<sub>1</sub>, indistinct. *R*<sub>3</sub> and *R*<sub>4</sub> slightly diverging towards wing margin, *R*<sub>4</sub> and *R*<sub>5</sub> nearly parallel to each other. Cell *r*<sub>3</sub> with very short stem. Discal cell elongate, 1.7 times as long as wide. Stem of cell *m*<sub>1</sub> 1.25 times as long as cell itself. Cross-vein *m-cu* at about two-thirds of discal cell length. *CuA* slightly arched before wing margin, *CuP* straight, anal vein slightly sinuous. Anal angle long and wide, posterior margin widely rounded. Calypter without setae. Female wing reduced, unsuitable for flight. Length of male halter 1.5–1.7 mm. Stem of halter brownish with rusty brown base, knob pale yellow. Coxae dark brown, dusted with gray, covered with long yellowish setae. Meron small, thus second and third pairs of coxae close to each other. Trochanters brown, just posterior somewhat darker dorsally. Femur dark brown with narrowly yellowish base, wider on posterior pair. Tibia light brown with dark brown apex. Tarsus dark brown with lighter brown base of basal tarsomere. Male femur I: 5.0–5.2 mm long, II: 5.0–6.0 mm, III: 6.0–7.0 mm, tibia I: 6.5–7.0 mm, II: 6.2–6.5 mm, III: 7.0–8.0 mm, tarsus I: 7.4–7.8 mm, II: 6.6–7.0 mm, III: 7.4–8.2 mm. Claw comparatively small and simple, without spines. Arolium reaching to beyond middle of claw.

**Abdomen:** Dark brown, tergites and sternites covered with yellowish setae. Paired transverse sutures on tergites indistinct. Male terminalia (Fig. 2C, 2D) concolorous with the rest of abdomen. Ninth tergite wider than longer, posterior margin with U-shaped medial incision. Gonocoxite slightly elongate, 1.7 times as long as width at base, simple, without additional lobes. Outer gonostylus sclerotized, with straight apical spine and point-apexed subapical lobe, additional fleshy and setose lobe starting at about one third on dorsal surface and reaching nearly to the tip of apical spine of the gonostylus. Inner gonostylus wider at basal half, narrowing towards blackened 5-toothed apical part and bearing small rounded setose lobe ventro-basally. Paramere yellow, with long stem and shaped like a very long shoe with raised apex

and spinous heel. Aedeagus very long, narrows towards distal end, which is curved downwards. Ovipositor with elongate brown cerci and black hypovalvae.

Elevation range in Korea: Altitudes from sea level to nearly 1,200 m (Alexander, 1940).

Period of activity: Adults are active and flying from mid-May through end of June (Alexander, 1940) in Korea, from late May through late July in the Far East of Russia (Savchenko, 1983).

Habitats: Unknown in Korea. Among dense grassy vegetation that covers small water pools surrounded by forests, along forest roadsides, on margins of streams and rivers in the Far East of Russia (Savchenko, 1983).

General distribution: North Korea and the Far East of Russia.

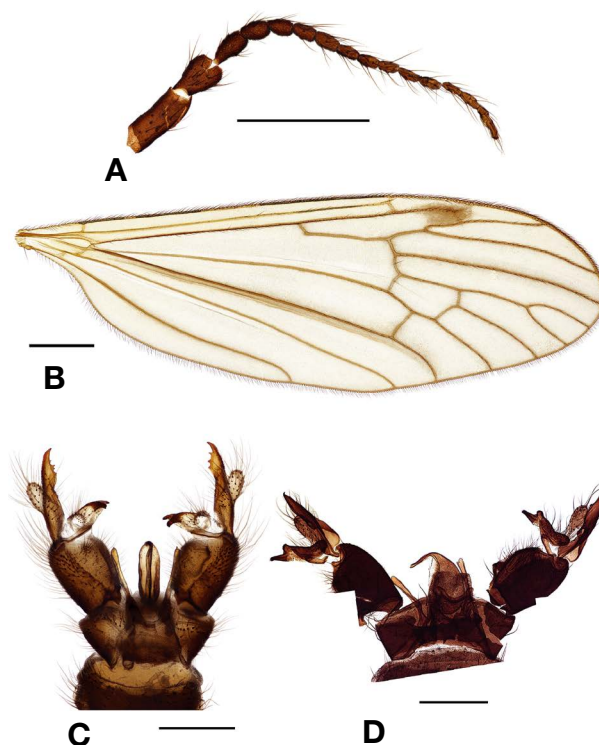
Examined material (Fig. 6A): holotype (as *Limnophila* (*Prionolabis*) *acanthophora*), male (antenna, fore leg, wing and genitalia slide mounted), North Korea, Ompo, alt. 150 ft. [46 m], May 29, 1938, A. M. Yankovsky (USNM); 4 males (pinned), North Korea, Ompo, alt. 750 ft. [229 m], May 16, 1938, A. M. Yankovsky (USNM); metatype, male (antenna, leg, wing and genitalia slide mounted), North Korea, Ompo, alt. 900 ft. [274 m], May 19, 1938, A. M. Yankovsky (USNM); 1 male (pinned), North Korea, Ompo, alt. 800 ft. [244 m], May 21, 1938, A. M. Yankovsky (USNM); 1 male (pinned), North Korea, Ompo, alt. 400 ft. [122 m], May 23, 1938, A. M. Yankovsky (USNM); 1 male (pinned), North Korea, Ompo, alt. 200 ft. [61 m], May 24, 1938, A. M. Yankovsky (USNM).

### ***Prionolabis clavaria* (Alexander, 1950)**

*Limnophila* (*Prionolabis*) *clavaria* Alexander, 1950: 429  
*Prionolabis clavaria* Savchenko & Krivolutskaya, 1976: 70; Savchenko, 1989: 113; Oosterbroek, 2021.

General: Body coloration dark brown to black. Male body length 8.5 mm, wing length 8.8 mm.

Head: Dark brown, sparsely dusted with brownish, covered with blackish to yellowish setae, longer laterally, shorter dorsally. Distance between eyes in male approximately equals to the length of scape. Male antenna (Fig. 3A) 1.6 mm long, reaching frontal margin of prescutum if bent backwards. Scape elongate, nearly cylindrical, 1.6 times as long as pedicel, dark brown at base, black at apex, dusted with brownish gray and bearing few black semi-adjacent setae. Pedicel widening towards distal end, black, covered with black setae. Flagellum 14-segmented, entirely black. Basal flagellomere slightly elongate, less than twice as long as wide, 2–5 flagellomeres oval, distal flagellomeres slightly elongate, apical segment 1.3 times as long as preceding. Longest verticils up to 1.7 times as long as respective segment. Rostrum, palpus and mouth parts black, dusted



**Fig. 3.** *Prionolabis clavaria* (Alexander, 1950), male. A. antenna. B. wing. C. male genitalia in glycerol, dorsal view. D. male genitalia slide-mounted, dorsal view, holotype. Scale bars: 0.5 mm (A, C, D), 1.0 mm (B).

with brownish gray.

Thorax: Cervical sclerites, pronotum and mesonotal prescutum black, covered with brownish pruinosity and erect blackish to yellowish setae. Longitudinal stripes on mesonotum missing. Tubercular pits missing, pseudosutural fovea indistinct, wide and shallow. Scutal lobe black, pruinosity scarcer than on prescutum. Area between scutal lobes black and densely dusted. Scutellum black with dark reddish brown posterior apex. Mediotergite dark brown to black, sparsely pruinose. Pleuron black, more heavily dusted ventrally, sparsely variegated with semi-polished areas where the bloom has been denuded, katapisternum setoseless. Male wing (Fig. 3B) slightly iridescent, translucent, with brownish tinge, yellowish at base and costal area, without any darker spots except brown oval stigma. Veins brown, yellowish at wing base and in costal area. Venation: *Sc* long, reaching wing margin at branching point of *Rs*, *sc-r* at tip of *Sc*. *Rs* long, angulate at base. Free end of *R*<sub>1</sub> short, just slightly longer than *R*<sub>2</sub>. *R*<sub>3</sub> and *R*<sub>4</sub> diverging towards wing margin, *R*<sub>4</sub> and *R*<sub>5</sub> nearly parallel to each other. Cell *r*<sub>3</sub> with short stem which approximately equals length of *m-cu*. Discal cell twice as long as wide. Stem of cell *m*<sub>1</sub> just slightly exceeds length of cell it-



self. Cross-vein *m-cu* at about middle of discal cell. *CuA* slightly arched before wing margin, *CuP* nearly straight, anal vein slightly sinuous, reaching wing margin slightly before level of *Rs* base. Anal angle long and wide, posterior margin widely rounded. Calypter without setae. Length of male halter 1.4–1.7 mm. Stem of halter pale, widely rusty brown at base, knob brownish with pale base. Coxae black, densely dusted brownish gray, covered with long blackish to yellowish setae. Meron small, thus second and third pairs of coxae close to each other. Trochanters black, just posterior narrowly rusty brown ventrally. Femur dark brown, narrowly pale at base, black at apex. Tibia dark brown with black apex. Tarsus dark brown turning black towards distal end. Male femur I: 4.7–5.0 mm long, II: 5.0 mm, III: 5.5–6.0 mm, tibia I: 5.5–5.8 mm, II: 5.5 mm, III: 6.5 mm, tarsus I: 6.2–6.7 mm, II: 6.5 mm, III: 6.2 mm. Claw short and simple, without spines, brown with black apex. Arolium reaching to about middle of claw.

Abdomen: Very dark brown, nearly black, dusted with brown pollen. Erect setae covering abdominal sclerites blackish at base, pale at distal end. Paired transverse sutures on tergites black but narrow. Male terminalia (Fig. 3C, 3D) concolorous with the rest of abdomen. Ninth tergite wider than longer, posterior margin with U-shaped medial notch and blunt apexed lobules on both sides of it. Gonocoxite slightly elongate, 1.7 times as long as width at base, simple, without additional lobes. Outer gonostylus sclerotized, narrows distally, apex curved and hook-shaped, additional fleshy and setose lobe starting at base of dorsal surface and reaching to about two-thirds of gonostylus. Inner gonostylus elongate, sclerotized with bifid tip, outer branch longer with setose apex, inner branch rounded. Paramere long and narrow with needle-like apex that is turned downwards at a straight angle; very apex usually not visible in exactly dorsal view, thus in slide-mounted specimens only preapical part, that is rounded or with small apical notch, is visible. Aedeagus very long, narrows towards distal end, that is curved downwards.

Female: unknown.

Elevation range in Korea: Altitudes from more than 1,100 m to more than 1,800 m.

Period of activity in Korea: Adults are active and flying from late June through middle of July.

Habitats: Unknown in Korea, margins of streams in the Far East of Russia (Savchenko, 1983).

General distribution: Eastern Kazakhstan, North Korea, distribution in the Far East of Russia needs confirmation.

Examined material (Fig. 6B): holotype (as *Limnophila* (*Prionolabis*) *clavaria*), male (antenna, wing, hind leg and genitalia slide mounted), North Korea, Kankyo Nando, Puksu Pyaksan, Toorisani, alt. 6,000 ft. [1,829 m], June

22, 1939, A. M. Yankovsky (USNM); 2 males (pinned), North Korea, Seren Mts., alt. 3,800 ft. [1,158 m], July 10, 1938, A. M. Yankovsky (USNM).

***Prionolabis dis* (Alexander, 1950)**

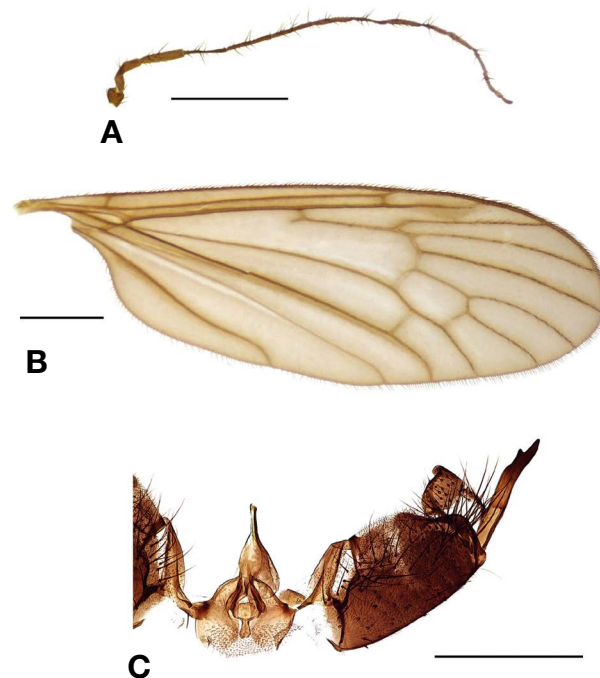
*Limnophila dis* Alexander, 1950: 430.

*Prionolabis dis* Oosterbroek, 2021.

General: Body coloration black. Body length of male 6.0–6.5 mm, wing length 6.9–8.0 mm.

Head: Black, pruinose. Male antenna (Fig. 4A) 4.2–4.5 mm long, reaching to about middle of abdomen, if bent backwards. Both basal antennomeres black. Flagellum 13-segmented, dark brown, flagellomeres elongate, cylindrical, decreasing in length towards apex, apical segment 1.4 times as long as penultimate. Flagellum covered with abundant erect pubescence. Longest verticils reaching to about one-third length of respective segment. Rostrum and palpus black.

Thorax: Black, sparsely pruinose. Mesonotal prescutum black, pruinose, longitudinal stripes missing. Pleuron uniformly black, densely dusted with brownish gray. Male wing (Fig. 4B) translucent, with dark brown tinge, darker in costal area, weakly darkened along cord, *Rs*, distal margin of discal cell, along veins *CuA* and *A*<sub>1</sub>. Stigma oval, light brown. Veins brown. Venation: *Sc* long, reaching wing margin at branching point of *Rs*, *sc-r* its own length



**Fig. 4.** *Prionolabis dis* (Alexander, 1950), male. A. antenna. B. wing. C. aedeagus, gonocoxite and gonostyli of male genitalia, slide-mounted, dorsal view, holotype. Scale bars: 1.0 mm (A, B), 0.5 mm (C).

before tip of *Sc*. *Rs* long, angulate and short spurred at base. Free end of *R*<sub>1</sub> elongate, *R*<sub>2</sub> indistinct, nearly missing. *R*<sub>3</sub> and *R*<sub>4</sub> diverging towards wing margin, *R*<sub>4</sub> and *R*<sub>5</sub> also slightly diverging towards wing margin. Cell *r*<sub>3</sub> without stem, starting before basal deflection of *R*<sub>5</sub>. Discal cell 1.8 times as long as wide. Cell *m*<sub>1</sub> missing. Cross-vein *m-m* short but distinct, thus veins *M*<sub>1+2</sub> and *M*<sub>3</sub> separated at base. Cross-vein *m-cu* at about mid-length of discal cell. *CuA* and *CuP* slightly arched before wing margin, anal vein slightly sinuous, reaching wing margin before level of *Rs* base. Anal angle long and wide, posterior margin widely rounded. Whole halter darkened except paler base of stem. Coxa black, sparsely pruinose, trochanter dark brown to black, femur black, tibia and basal tarsomere dark brown with blackened apices, remainder of tarsus black.

Abdomen: Black. Male terminalia (Fig. 4C) concolorous with the rest of abdomen. Posterior margin of ninth tergite with shallow notch. Gonocoxite elongate, 1.7 times as long as wide, simple, without additional lobes. Outer gonostylus sclerotized, long and narrow with small subapical tooth medially. Inner gonostylus simple, short fleshy and setose, blunt-apexed. Paramere shaped as long flat plate narrowing towards rounded apex. Aedeagus long, wide at base, distal part narrow, rod-shaped.

Female: unknown.

Elevation range in Korea: All specimens collected at nearly 1,700 m altitude.

Period of activity in Korea: Adults are active and flying in mid-June.

Habitats: Unknown.

General distribution: Endemic to North Korea.

Examined material (Fig. 6C): holotype (as *Limnophila dis*), male (antenna, wing, legs and genitalia slide mounted), North Korea, Kankyo Nando, Puksu Pyaksan, alt. 5,500 ft. [1,676 m], June 13, 1939, A. M. Yankovsky (USNM).

#### ***Prionolabis yankovskyana* (Alexander, 1940)**

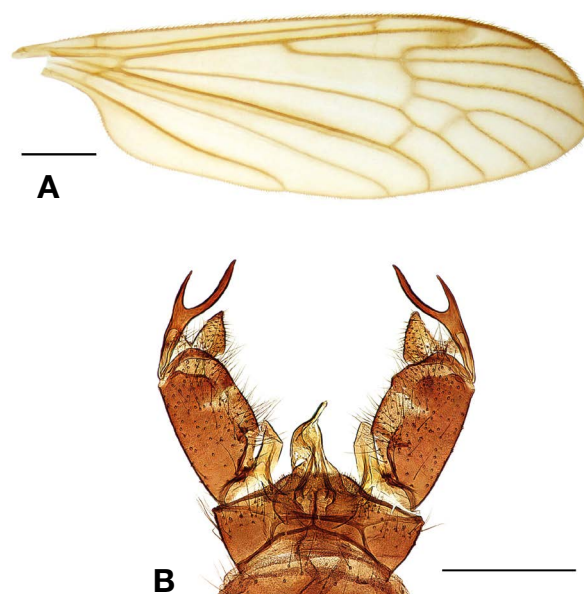
*Limnophila yankovskyana* Alexander, 1940: 50

*Prionolabis clavaria* Savchenko, 1983: 57; 1989: 114;

Oosterbroek, 2021.

General: Body coloration polished black. Body length of male 6.5–7.0 mm, wing length 7.2–8.0 mm.

Head: Black, pruinose. Distance between eyes in male right above antennae approximately three times exceeds width of scape. Vertical tubercle low. Male antenna black, 6.0–6.2 mm long, nearly as long as the entire body. Flagellum 14-segmented, flagellomeres elongate, cylindrical, decreasing in length towards apex, apical segment only about one third as long as penultimate. Flagellum covered with abundant erect setae with verticils just slightly exceeding their length. Rostrum and



**Fig. 5.** *Prionolabis yankovskyana* (Alexander, 1940), male. A. wing. B. male genitalia slide-mounted, dorsal view, paratype. Scale bars: 1.0 mm (A), 0.5 mm (B).

palpus black.

Thorax: Polished black. Mesonotal prescutum covered with short setae, longitudinal stripes missing. Male wing (Fig. 5A) translucent, with brownish tinge, yellowish at base and costal area, weakly darkened along cord, *Rs*, distal margin of discal cell, along veins *CuA* and *A*<sub>1</sub>, and along distal wing margin. Stigma oval, light brown. Veins brown, yellowish at wing base and in costal area. Venation: *Sc* long, reaching wing margin slightly before branching point of *Rs*, *sc-r* short distance before tip of *Sc*. *Rs* long, arched at base. Free end of *R*<sub>1</sub> short, just slightly longer than *R*<sub>2</sub>. *R*<sub>3</sub> and *R*<sub>4</sub> diverging towards wing margin, *R*<sub>4</sub> and *R*<sub>5</sub> also slightly diverging towards wing margin. Cell *r*<sub>3</sub> without stem. Discal cell 1.7 times as long as wide. Cell *m*<sub>1</sub> missing, cross-vein *m-m* nearly missing, thus veins *M*<sub>1+2</sub> and *M*<sub>3</sub> reaching each other. Cross-vein *m-cu* slightly before midlength of discal cell. *CuA* distinctly arched before wing margin, *CuP* nearly straight, anal vein slightly sinuous, reaching wing margin slightly before level of *Rs* base. Anal angle long and wide, posterior margin widely rounded. Stem of halter pale, knob brownish. Coxa black, trochanter dark brown to black, femur black with narrowly pale base, tibia brown with blackened apex, tarsus black.

Abdomen: Polished black. Ninth tergite of male genitalia (Fig. 5B) wider than longer, posterior margin with wide and shallow notch. Gonocoxite elongate, twice as long as wide, simple, without additional lobes. Outer gonostylus sclerotized, bifid, both branches long and narrow, point-apexed, inner branch twice as long as out-

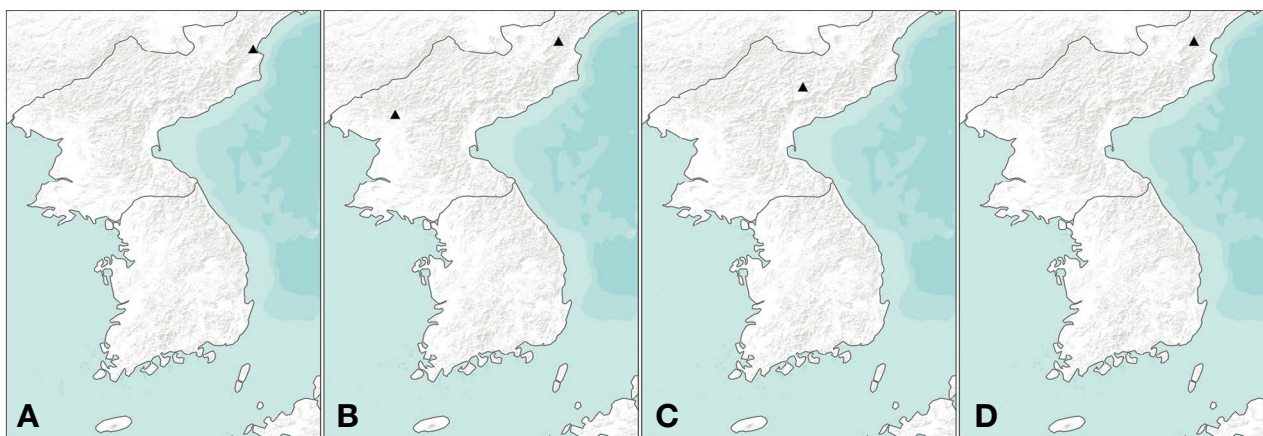


Fig. 6. Distribution maps of Korean *Prionolabis*. A. *P. acanthophora*. B. *P. clavaria*. C. *P. dis*. D. *P. yankovskyana*.

er. Inner gonostylus fleshy and setose, triangle-shaped. Paramere shaped as long parallel-sided plate. Aedeagus long, wide at base, distal part narrow, rod-shaped.

Female: unknown.

Elevation range in Korea: Altitudes from slightly above 700 m to more than 1,500 m.

Period of activity in Korea: Adults are active and flying for only about three weeks starting from the beginning of July in Korea, their flight starts later and lasts for about ten days longer in the Far East of Russia close to the border with Korea (Savchenko, 1983).

Habitats: Unknown.

General distribution: North Korea and southeastern corner of the Far East of Russia, close to the border with North Korea.

Examined material (Fig. 6D): paratype (topotypic) (as *Limnophila yankovskiana*), male (antenna, wing, fore and hind legs, genitalia slide mounted), North Korea, Seren Mts., alt. 5,000 ft. [1,524 m], July 10, 1938, A. M. Yankovsky (USNM); paratype (as *Limnophila yankovskyana*), male (antenna, wing, leg and genitalia slide mounted), North Korea, Seren Mts., alt. 3,500 ft. [1,067 m], July 19, 1938, A. M. Yankovsky (USNM).

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