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A new species of *Prionoglaris* Enderlein (Psocodea: 'Psocoptera': Prionoglarididae) from an Armenian cave, with an account of the distribution of the genus

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Abstract: The cavernicolous species *Prionoglaris kapralovi* sp. nov. is described from Armenia. A key to the three species of *Prionoglaris* known from adults is given and the variability of some characters is discussed. All published locality records of the genus, including those of nymphs, are summarized, along with previously unpublished records based on the collection of the Geneva Natural History Museum.

Keywords: Insecta - Trogiomorpha - Morocco.

INTRODUCTION

The family Prionoglarididae, the members of which are predominantly cavernicolous, is one of the most fascinating families of psocids, due to its mix of partly archaic and partly extremely derived morphology and the specialized reproductive biology of some genera, e. g. the use of a female penis in the Neotropical genus *Neotrogla* Lienhard in Lienhard *et al*., 2010b (Yoshizawa *et al*., 2014; Lienhard, 2020). The family belongs to the suborder Trogiomorpha and is one of the most basal groups of the order Psocodea, probably having existed since the mid-Permian (Yoshizawa *et al*., 2006, 2019). The monophyly of the Prionoglarididae is still controversial (Yoshizawa *et al*., 2006; de Moya *et al*., 2021). However, according to Yoshizawa & Lienhard (2020) two morphological characters may be considered as synapomorphies of the members of this family: broadened and rounded forewings, and long slender antennae with a reduced number of segments (at most 13 flagellomeres). Both characters are unique within the suborder Trogiomorpha. Monophyly of the family is also supported by phylogenetic analyses based on mitochondrial genome sequences (Yoshizawa *et al*., 2017).

The family Prionoglarididae is subdivided in two subfamilies, Prionoglaridinae and Speleketorinae (Lienhard, 2004; Yoshizawa *et al*., 2018). The type genus is *Prionoglaris* Enderlein, 1909 which contains three species: *P. stygia* Enderlein, 1909 and *P. dactyloides* Lienhard, 1988, known from the western Palaearctic, and *P. lindbergi* Badonnel, 1962, only known from a single nymph collected in Afghanistan. The latter is not included in the key below because there are no diagnostic characters to distinguish nymphs at the species level within this genus. The species definitions are based on adult characters, especially on male genitalia. Unfortunately, adults of this genus are rarely collected, usually most of the specimens collected in caves are nymphs (Lienhard, 1988). However, nymphs can easily be recognized as belonging to the genus *Prionoglaris* (see diagnosis in Lienhard, 1988, 1998 and habitus figure in Schneider & Weber, 2013), nymphal records therefore provide valuable data on the geographic distribution of the genus.

In the following a new species of *Prionoglaris* is described on the basis of a male and a female from an Armenian cave. The assignment of a Moroccan population to the species *Prionoglaris stygia* is discussed and some information on the variability of several morphological characters is provided. A species key to adults is given and the known distribution of the genus is summarized, including also records of nymphs.

MATERIAL AND METHODS

The type material of the new species, and of *P. dactyloides* and *P. lindbergi,* as well as the specimens examined for unpublished records are deposited in the Muséum d'histoire naturelle, Geneva, Switzerland (MHNG). The type material of *P. stygia* (only nymphs, syntypes) was not examined because it could not be located (see Lienhard, 1988: 95). Dissection and slide-mounting was performed according to the methods described by Lienhard (1998).

Abbreviations used in the description: AP = areola postica

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(marginal cell in forewing formed by veins CuA1 and CuA2); BL = body length (in alcohol); FW = forewing (length); FWw = forewing (greatest width); HW = hindwing (length); IO/D = shortest distance between compound eyes divided by longitudinal diameter of compound eye in dorsal view of head. Abbreviations of wing veins are used according to Yoshizawa (2005).

TAXONOMIC PART

Prionoglaris Enderlein, 1909

Synonymy: see Lienhard & Smithers, 2002.

Type species: *Prionoglaris stygia* Enderlein, 1909.

Generic diagnosis: See Lienhard (1988, 1998).

Diagnoses of known species: For *P. stygia* see Lienhard (1988, 1998) and additional figures in Lienhard (2004, 2011); for *P. dactyloides* see Lienhard (1988, 1998); for *P. lindbergi* see Badonnel (1962, nymph only).

Prionoglaris kapralovi sp. nov.

Figs 1-2

Holotype: MHNG; male (some parts slide-mounted); Armenia, 8.3 km SW of Yeghegnadzor, Mozrov Cave; WGS84 39.71258, 45.25953; 1540 m a.s.l., under stones near cave entrance; 14.AUG.2018; leg. S. A. Kapralov.

Paratype: MHNG; female (some parts slide-mounted); same data as for holotype.

Diagnosis: This new species can be distinguished from all known species of the genus *Prionoglaris* by the absence of an internal membranous vesicle on the anterior claw and by the absence of a basal tooth on the posterior claw of each pretarsus (Fig. 2C-D). See also key below.

Etymology: The species is dedicated to Sergei A. Kapralov who collected the type material.

Description

General characters: Head and thorax (including antenna, maxillary palp and legs) yellowish to light or medium brown. Vertex, frons and genae with some small brown patches. Compound eye uniformly dark grey to black (after 2 years in alcohol). Wings hyaline, veins medium brown, pterostigma colourless but slightly opaque (Fig. 1B). Abdomen whitish, dorsally and laterally with numerous patches of dark hypodermal pigment forming irregular transversal bands (Fig. 1A-B). Terminalia light to medium brown, ventro-median process of phallosome dark brown (Fig. 1C).

Mouthparts typical for the genus; lacinial rudiment with an acuminate tip (Fig. 2E). Antennae long and slender (Fig. 1A), both damaged in male and female examined (highest number of flagellomeres observed is 7, in right antenna of holotype, 7th flagellomere broken near base). Anterior claw of each pretarsus (Fig. 2C) with a long basal seta, lacking internal membranous vesicle and preapical denticle. Posterior claw of each pretarsus simple (Fig. 2D), lacking basal tooth and preapical denticle. Forewing broadly rounded, clearly longer than twice its width (FW/FWw about 2.4); venation typical for the genus (Fig. 2A), but AP somewhat shorter in male than in female (in male its marginal length about same as its height, see Fig. 1A; in female marginal length slightly exceeding height, see Fig. 2A-B). Hindwing as in *P. stygia*. Vein aberrations observed in forewings and hindwings: right forewing of female with a cross-vein between R1 and R2+3, and M1 bifurcate near wing margin (Fig. 2B); right forewing of male with a short spurvein on R1, just basally to point where Sc reaches R1 (Fig. 1A); left hindwing of male with a transversal vein between R1 and Rs (Fig. 1A), and both hindwings of female with slightly aberrant M2.

Male genitalia: Sac-like proximal body of phallosome relatively short (Fig. 2H-I), about half of total length of phallosome; ventro-median process strongly curved in lateral view (Fig. 2H); dorso-lateral appendages of

Key to species of the genus *Prionoglaris* (adults only)

Note: Adults of *P. lindbergi* are not known (see Introduction).

1A Claws of each pretarsus clearly asymmetrical. Anterior claw with a long basal seta and an internal membranous vesicle situated in basal half of claw (Fig. 3B). Posterior claw simple but bearing a short basal tooth (Fig. 3C), preapical denticle usually absent, rarely present (Fig. 3C), sometimes minute. Sac-like proximal part of phallosome longer than half of total length of phallosome (Fig. 3A). Spermapore sclerite a thin and weakly sclerotized plate, spermathecal duct running straight through the sclerite (Fig. 3K-L) 2

1B Asymmetry of pretarsal claws less pronounced. Anterior claw with a long basal seta but lacking internal membranous vesicle (Fig. 2C). Posterior claw simple, lacking basal tooth and preapical denticle (Fig. 2D). Sac-like proximal part of phallosome relatively short (Fig. 2H-I), about half of total length of phallosome. Spermapore sclerite a thick and heavily sclerotized plate, spermathecal duct within the sclerite curved (Fig. 2F-G) ..... *P. kapralovi* sp. nov.

2A Dorso-lateral appendages of phallosome of about same width between base and broadly rounded apex (Fig. 3I) or only weakly narrowing towards apex (Fig. 3E-H) ..... *P. stygia*

2B Dorso-lateral appendages of phallosome digitiform, narrow throughout except for slightly broader basal one third (Fig. 3J)..... *P. dactyloides*

about same width between base and apex, only weakly narrowing towards apex (Fig. 2I); medio-internal appendage with one fine hair on each side (Fig. 2H-I).
Female genitalia: Subgenital plate and gonapophyses typical for the genus, only external valvula well developed, bearing 6 apically hooked setae near broadly rounded apex. Spermapore sclerite a thick and heavily sclerotized plate, proximally broadly rounded, distally narrowly rounded (Fig. 2F); spermathecal duct curved inside the sclerite (Fig. 2G) and widened towards spermathecal vesicle shortly after the spermapore sclerite (length of the narrow portion of the duct, before widening, about 1.5 times length of spermapore sclerite).

Measurements: *Male*: BL = 3.3 mm; FW = 3.7 mm; FWw = 1.5 mm; HW = 2.5 mm; IO/D = 1.8. – *Female*: BL = 4.1 mm; FW = 4.1 mm; FWw = 1.7 mm; HW = 2.7 mm; IO/D = 1.9.

Distribution: Only known from type locality in Armenia.

Type locality: Armenia, Mozrov Cave near Yeghegnadzor, 1540 m a.s.l. This cave is situated on the

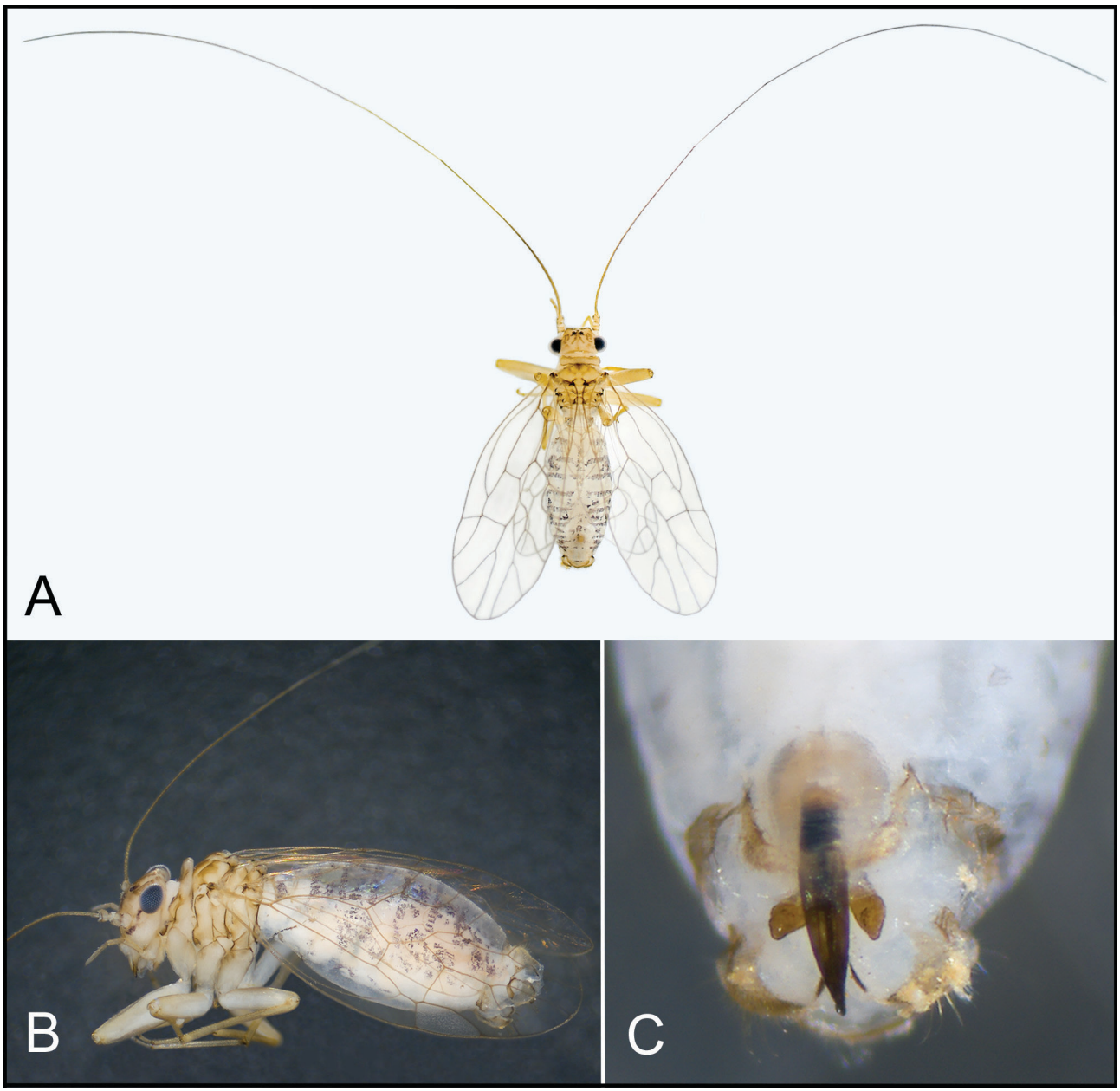

Fig. 1. *Prionoglaris kapralovi* sp. nov. (A) Habitus of male, dorsal view of holotype, in alcohol (body length 3.3 mm). (B) Habitus of female, lateral view of paratype, in alcohol (body length 4.1 mm). (C) Male terminalia, ventral view of holotype, in alcohol. Photographs by S. A. Kapralov.

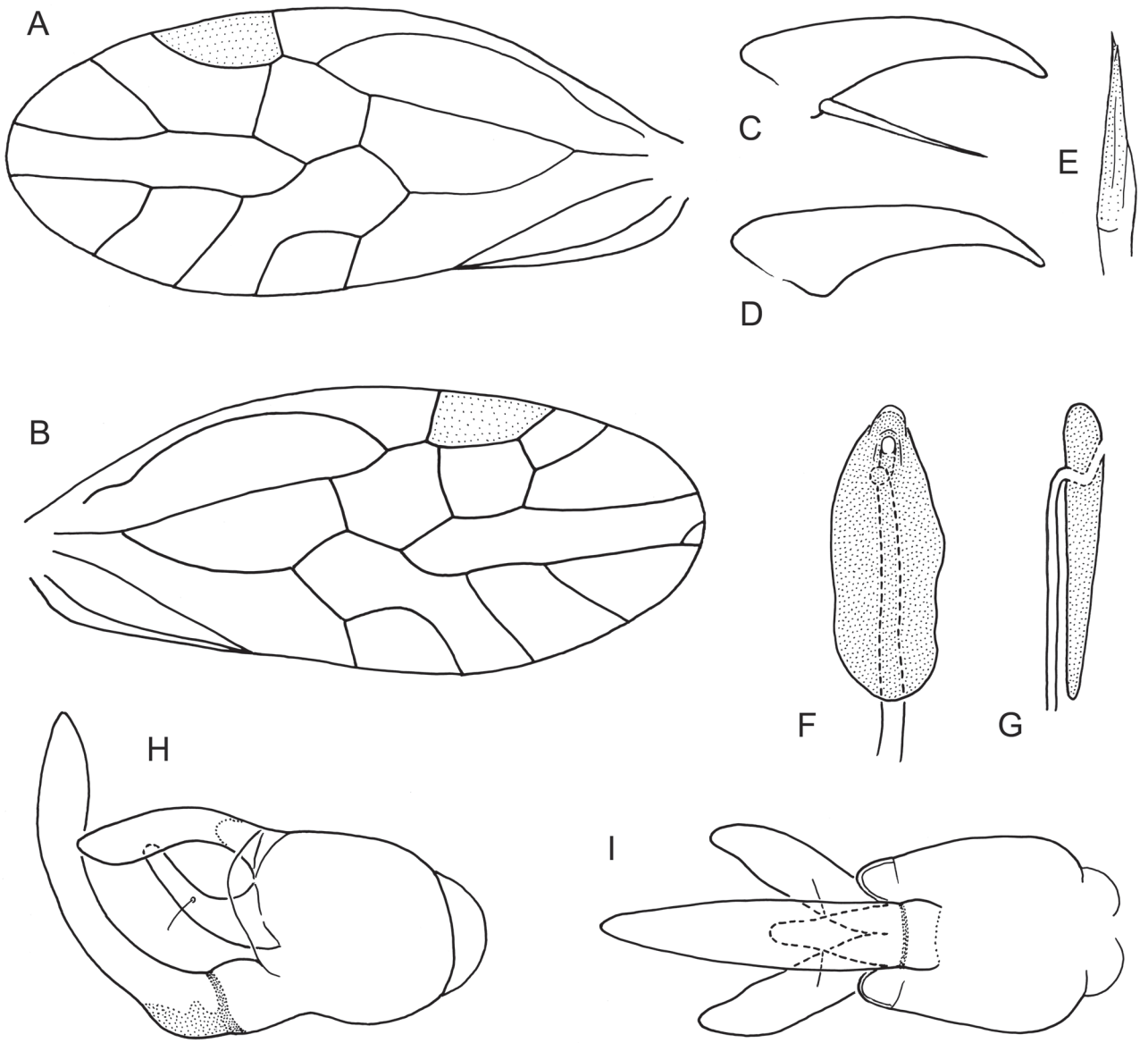

Fig. 2. *Prionoglaris kapralovi* sp. nov., female (A-G), male (H-I). (A) Left forewing. (B) Right forewing. (C) Anterior claw of hind pretarsus. (D) Posterior claw of hind pretarsus. (E) Lacinial rudiment (length 0.2 mm). (F) Spermapore sclerite and distal part of spermathecal duct, ventral view. (G) Idem, optical longitudinal section, lateral view. (H) Phallosome, lateral view. (I) Idem, ventral view.

rolling steppe-like plateau on the left bank of the Arpi river.

Remarks: Judging from most morphological characters, especially the male genitalia, this species clearly belongs to the genus *Prionoglaris*. However, the asymmetry of the claws of each pretarsus is less pronounced in the new species than in the other species of this genus, especially due to the absence of the membranous vesicle on the anterior claw. This membranous extension is always well developed in the other species of *Prionoglaris*. The presence of a membranous extension on the anterior claw has been considered as an autapomorphy of the subfamily Prionoglaridinae (Lienhard, 2004). No intra-generic variability concerning this character has previously been observed in this subfamily. The membranous extension is particularly well developed in the Oriental genus *Siamoglaris* Lienhard, 2004, and in the fossil genus *Palaeosiamoglaris* Azar, Huang & Nel in Azar *et al*., 2017 from Burmese amber, but weakly developed in the fourth genus of this subfamily, the troglobitic *Speleopsocus* Lienhard in Lienhard *et al*., 2010a which is only known from a single Venezuelan cave. Therefore the absence of this structure in the new species has to be interpreted as an apomorphic reduction. See the discussion below.

Remarks on a Moroccan sample of *Prionoglaris stygia*

The only morphological character that distinguishes the closely related species *P. stygia* and *P. dactyloides* is the shape of the dorso-lateral appendages of the phallosome. Specimens from a Moroccan sample assigned to *P. stygia*, collected in the Friouato Cave (see Distribution, below), slightly differ from European *P. stygia* by the shape of these appendages, and by the presence of a preapical denticle on the posterior claw of each pretarsus (Fig. 3C). The dorso-lateral appendages of the phallosome are apically slightly narrowing in the Morrocan males (Fig. 3E-F and Lienhard, 1996: figs 4-6, 1998: fig. 41b), while they are broadly rounded in *P. stygia* males from the type locality of this species (Fig. 3I) and in most other European males. The variability of the phallosome in several European populations of *P. stygia* and in the two known Greek populations of *P. dactyloides* from the Peloponnese (male holotype) and from Eastern Crete (male paratype) was illustrated by Lienhard (1988: figs 17-36). These figures also show the high variability of the number of fine lateral hairs of the medio-internal appendage of the phallosome (1-13 hairs on each side, but often not the same number on both sides of the appendage). Here figures of the dorso-lateral and medio-internal appendages of two additional European males are presented, one from Switzerland (Fig. 3G), the other from Spain (Fig. 3H). Both males are somewhat intermediate between *P. stygia* males from the type locality (Fig. 3I) and the Moroccan males (Fig. 3E-F). However, the preapical denticle on the posterior claw, always present in the Moroccan specimens (though sometimes smaller than in Fig. 3C), is completely absent in these two males, as it is generally the case in the European *P. stygia* and in *P. dactyloides* (only in one mesothoracic leg of a paratype of the latter could a minute preapical denticle be observed).

When looking for other potentially diagnostic characters which could allow the Moroccan specimens to be distinguished from the European *P. stygia*, I discovered some differences in the ratio between forewing length and width (FW/FWw) and in the micromorphology of the spermapore sclerite. In both sexes the Moroccan specimens have particularly broad and slightly shortened wings (Fig. 3D), with FW/FWw varying from 2.0 to 2.1 (N = 2). In the European *P. stygia* forewings are clearly longer than twice their width, FW/FWw varying from 2.2 to 2.5 (N = 6; the mean is 2.4). In *P. dactyloides* this ratio varies from 2.1 to 2.3 (N = 2).

In the only Moroccan female available for this study the spermapore sclerite is proximally broadly rounded and distally slightly elongated and beak-shaped (Fig. 3K). In the European *P. stygia* this sclerite is similar in shape to that of *P. kapralovi* sp. nov., i.e. narrowly rounded distally but not elongated and beak-shaped (see figures in Lienhard, 1988, 1998). However, in a female of *P. stygia* from the type locality (French Pyrenees) a distally weakly elongated spermapore sclerite was observed (Fig. 3M), about intermediate in shape between the other *P. stygia* and the Moroccan female.

In view of the considerable variability of the above mentioned characters, and of the low numbers of specimens examined for this study, the slight differences observed between the Moroccan population and the European *P. stygia* are not sufficient to warrant a formal separation of the Moroccan form as a new species. The only character which can be considered as diagnostic for the Moroccan form is the presence of a preapical denticle on the posterior claw of each pretarsus.

Distribution of the genus *Prionoglaris*

Distributional data based on all known material, including nymphs, are here summarized. Only males and associated females and/or nymphs are assigned to one of the known species. Isolated females or nymphs are not assigned to a species (given as *Prionoglaris* spec.) or are tentatively assigned to a species (given as *Prionoglaris* cf. *stygia* and *Prionoglaris* cf. *dactyloides*). All "cf.-assignments" are based on plausibility due to the geographical position of the locality in comparison with the known distribution of male-based records.

***Prionoglaris stygia* Enderlein, 1909**

Previous records: Male records listed in detail by Lienhard (1988): France, Belgium, Germany, Greece (western Crete).

Additional records: 1 male (MHNG) (record published by Badonnel & Lienhard, 1994); Switzerland, canton of Valais, between Vouvry and Vionnaz, cave "Pierre à Perret", entrance zone, on rocky wall of cave covered by green algae, 480 m a.s.l.; 28.JUN.1993; leg. C. Lienhard. – 12 nymphs (MHNG, unpublished record); same cave, under stones covered by green algae; 10.AUG.1989; leg. C. Lienhard. – 12 nymphs (MHNG, unpublished record); same data; leg. B. Hauser. – 1 nymph (MHNG, unpublished record); same data; leg. S. Hauser. – 2 nymphs (MHNG, unpublished record); same data, leg. P. Strinati. – 1 male, 1 female (MHNG, unpublished record); Spain, Prov. Castellon, W of Atzeneta del Maestrat, valley W of Eremita de Sant Juan, 485 m a.s.l., under stones in dense evergreen oak forest on steep, north facing slope; 30.MAY.2010; leg. S. Huber & A. Schönhofer. – Unspecified number of males (A. Baz, *in litt.* 1999; unpublished record); Spain, Madrid, Malaise trap and on *Quercus pyrenaica*. – 2 males, 6 females, 8 nymphs (recorded by Baz, 2003, without giving details where males were collected); Spain: three caves in Andalusia: Almeria, Sierra de Gador, cave "Cueva del Lobo", 800-900 m a.s.l.; Almeria, Sierra de Gador, cave "Cueva Nueva", 800-900 m a.s.l.; Jaen, Pontones, cave "Cueva del Jabali", 1400-1500 m a.s.l. – 3 males, 1 female

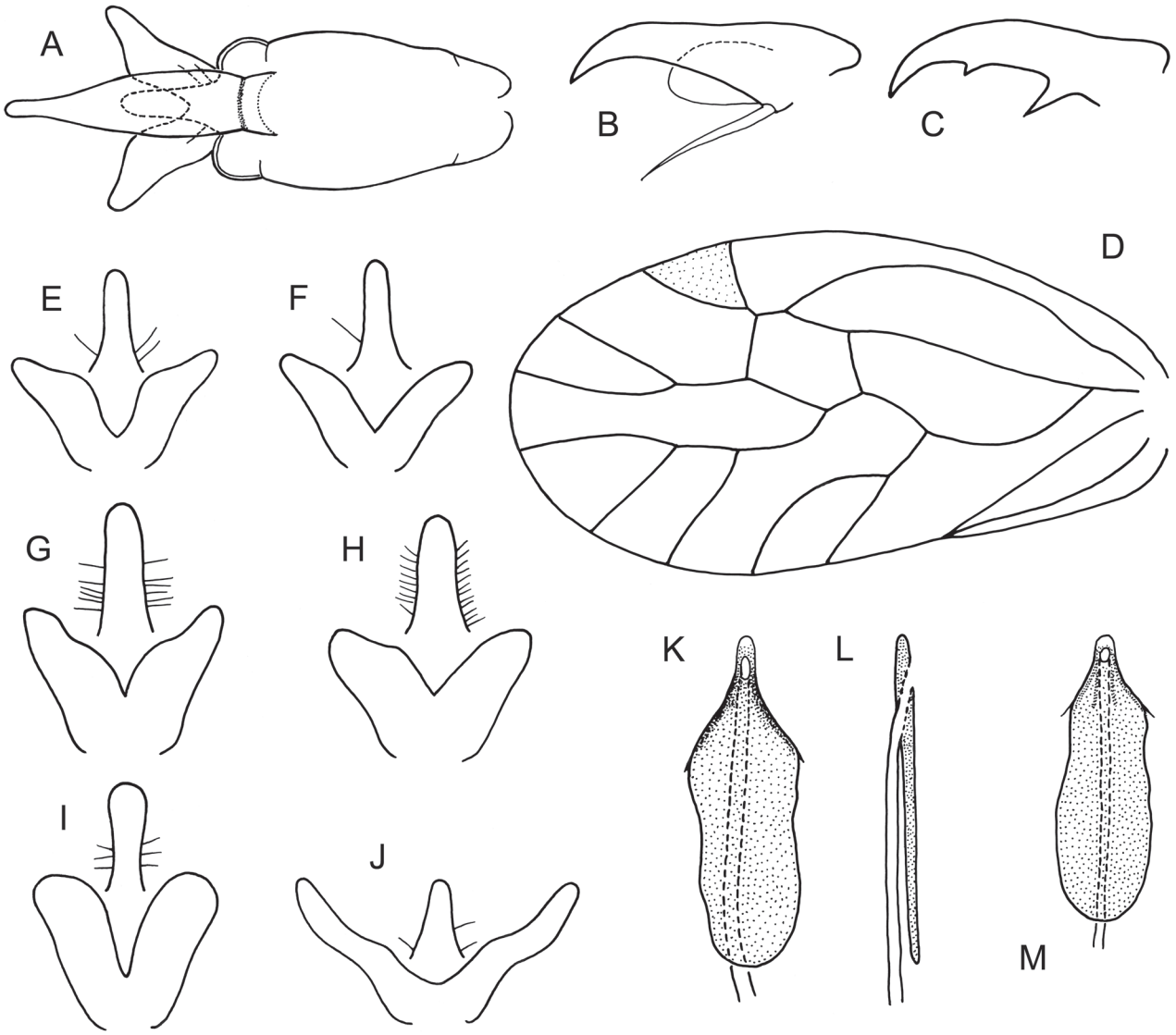

Fig. 3. *Prionoglaris* spp.: *P. stygia* males from Friouato Cave, Morocco (A-F), *P. stygia* male from Pierre à Perret Cave, Switzerland (G), *P. stygia* male from W of Atzeneta del Maestrat, Spain (H), *P. stygia* male from the type locality, Compagnaga Cave, French Pyrenees (I), *P. dactyloides*, male holotype (J), *P. stygia* female from Friouato Cave, Morocco (K-L), *P. stygia* female from the type locality, Compagnaga Cave, French Pyrenees (M). – (A) Phallosome, ventral view. (B) Anterior claw of hind pretarsus. (C) Posterior claw of hind pretarsus. (D) Left forewing. (E-J) Dorso-lateral appendages and medio-internal appendage of phallosome, not in situ (E same male as in A). (K-M) Spermapore sclerite and distal part of spermathecal duct (K and M ventral view; L optical longitudinal section, lateral view).

(reared from nymphs), 9 nymphs, leg. C. Lienhard, and 21 nymphs, leg. B. Hauser (MHNG, record published by Lienhard, 1996); Morocco, Middle Atlas, S of Taza, region of Daya Chiker, cave "gouffre du Friouato", 1450 m a.s.l., on rocky wall of cave covered by green algae, not far from cave entrance; 15.JUN.1990. – 1 nymph (MHNG) (mentioned as *Prionoglaris* spec. by Lienhard, 1988); same cave; 1.OCT.1979; leg. P. Strinati & V. Aellen.

Remark: An insect-pathogenic fungus was described from one nymph from the type locality in southern France by Keller (2011).

Prionoglaris cf. *stygia*

Previous records: Records of females or nymphs (and in one case a damaged male) as listed in detail by Lienhard (1988) from France, Germany (damaged male, phallosome lost), and nymphs from Portugal listed by Lienhard (1988) as *Prionoglaris* spec.

Additional records: 9 nymphs (MHNG, unpublished record); France, Savoie, St Christophe la Grotte, cave "Echelles Inférieure" (also called "Grands Goulets"), 570 m a.s.l.; 10.MAY.2018; leg. J. Lips. – 3 nymphs (MHNG, unpublished record); France, Savoie, St

Christophe la Grotte, cave "Perret" (also called "Fontaine Noire"), 470 m a.s.l.; 12.MAY.2018; leg. J. Lips. – 1 nymph (MHNG, unpublished record); France, Savoie, Vérel-de-Montbel, cave "Mandrin"; 26.MAY.2018; leg. J. Lips. – 2 nymphs (MHNG, unpublished record); France, Gard, Montclus, cave "Prével"; 6.MAY.2018; leg. J. Lips. – 4 nymphs (MHNG, unpublished record); France, Drôme, La Chapelle-en-Vercors, cave "Ferrières", 1020 m a.s.l.; 16.JUN.2017; leg. J. Lips. – 1 nymph (MHNG, unpublished record); France, Bouches-du-Rhône, Jouques, cave "Adaouste", 413 m a.s.l.; 02.FEB.2019; leg. J. Lips. – 1 nymph (MHNG, unpublished record); Switzerland, canton Schwyz, Muotathal, cave "Lauiloch", 460 m a.s.l.; 5.NOV.1996; leg. F. Auf der Maur. – Several nymphs (see Schneider *et al*., 2012); Germany, Hessen and Rheinland-Pfalz, in nine caves. – 1 female and 90 nymphs (see Schneider & Weber, 2013); Luxembourg, near Mersch and near Muellerthal, in 11 caves. – Several nymphs; Luxembourg, collected by N. Schneider, considered as belonging to *Prionoglaris stygia*, used for molecular analysis by K. Yoshizawa (see Yoshizwa *et al.*, 2018, also Yoshizawa, *in litt*.). – 1 female (MHNG, unpublished record); Spain, Prov. Valencia, between Pego and Val de Ebo, 405 m a.s.l., macchia with few interspersed trees, under stones; 02.JUN.2010; leg. S. Huber & A. Schönhofer.

Prionoglaris dactyloides Lienhard, 1988

Previous records: Male records listed in detail by Lienhard (1988): Greece (Peloponnese and eastern Crete).

Prionoglaris cf. *dactyloides*

Previous records: Records of nymphs listed in detail by Lienhard (1988): Greece (Peloponnese).

Additional record: 10 nymphs (MHNG, unpublished record); Greece, eastern Crete, between Lassithiou and Tzermiado, near Ag. Timios, 1100-1200 m a.s.l., under stones; 10.APR.1998; leg. K. Thaler & B. Knoflach.

Prionoglaris lindbergi Badonnel, 1962

Previous records: 1 nymph holotype (see Badonnel, 1962) mounted on two slides (MHNG); Afghanistan, Karghaleh (above Kotouk, Ghourband valley), under stone, 3100 m a.s.l.; 06.AUG.1957; leg. Lindberg.

Prionoglaris kapralovi sp. nov.

Previous records: Armenia, see description above.

Prionoglaris spec.

Previous records: Records of females or nymphs listed in detail by Lienhard (1988): Former Yugoslavia (exact locality not known), Turkey.

Additional records: 2 nymphs (MHNG, unpublished record); Greece, western Crete, near Georgioupolis, between boulders, 100 m a.s.l.; 29.MAR.1999; leg. K. Thaler & B. Knoflach. – 1 nymph (MHNG, unpublished record); Greece, Island of Samos, road from Platanakia to Manolates, below Manolates, "valley of the nightingales", forest near river, 80 m a.s.l.; 26.NOV.1991; leg. B. Hauser. – 1 nymph (MHNG, unpublished record); Greece, Island of Rhodos, Petaloudes, Ag. Kalopetra, under stones in forest of pine trees and broad-leaved trees, 300 m a.s.l.; 09.APR.1996; leg. B. & K. Thaler. – 1 nymph (MHNG, unpublished record); Greece, Epirus, Timfi Mountains, above Mikro Papingo, under stones in rocky forest (limestone); 10.SEP.1996; leg. K. Thaler & B. Knoflach. – 3 nymphs (MHNG, unpublished record); Greece, Oros Iti, near Lamia, above Ipati, 1300 m a.s.l., limestone boulders; 18.SEP.1997; leg. K. Thaler & B. Knoflach. – 3 nymphs (see Georgiev & Ivanova, 2018a); Greece, Island of Corfu, in two caves. – Several nymphs; Greece, Island of Crete; leg. C. Lienhard; used for molecular analysis by K. Yoshizawa (see Yoshizwa *et al*., 2018, also Yoshizawa, *in litt*.; identified as sp. 249). – Numerous nymphs (see Georgiev & Ivanova, 2018b; identified as *Prionoglaris* cf. *stygia*); Bulgaria, in several caves. – Several nymphs (see Georgiev, 2019); Bulgaria, in caves. – 1 nymph; Turkey, N of Adana, mountain E of Aksaray; leg. K. Yoshizawa; used for molecular analysis by K. Yoshizawa (see Yoshizwa *et al*., 2018, also Yoshizawa, *in litt*.; identified as sp. 468).

Remark: Specimens of *Prionoglaris* spec. from Portugal listed by Lienhard (1988) are here considered as belonging to *Prionoglaris* cf. *stygia* (see above), and the single nymph recorded from the Moroccan cave "Gouffre du Friouato" belongs to *P. stygia* (see above).

DISCUSSION

Following the discovery of the new species *P. kapralovi*, the diagnosis not only of the genus *Prionoglaris* but also of the subfamily Prionoglaridinae has to be slightly modified, because the characteristic membranous vesicle on the inner side of the anterior pretarsal claw is absent in this species. The presence of a membranous extension on this claw in all other members of the subfamily Prionoglaridinae, and also in the fossil genus *Palaeosiamoglaris* from Cretaceous Burmese amber, was mentioned in the Remarks following the description of the new species. The sustained presence of this character since the mid-Cretaceous, i.e. during at least 100 million years, suggests that this structure has an important function in the life of these insects.

In other psocids possessing membranous extensions on pretarsal claws, as the pulvilli in the psocomorphan families Caeciliusidae and Ectopsocidae (symmetrically arranged on both claws of each pretarsus), these structures have an adhesive function enabling them to move on

smooth surfaces. In these families membranous pulvilli are also present in nymphs, and practically no variability concerning these adhesive organs has been observed among or within genera (Lienhard, 1998).

Our knowledge of the biology of Prionoglaridinae is very limited and the function of the membranous extension of the anterior pretarsal claw is unknown. In contrast to the above mentioned families, this membranous extension is absent in nymphs of the genus *Prionoglaris* (nymphs of the other genera of Prionoglaridinae are not known), as is the basal tooth of the posterior claw (Lienhard, 1988, 1998), which is usually present in adults of this genus (Fig. 3C), but absent in *P. kapralovi* sp. nov. (Fig. 2D). No difference in the biology of nymphs and adults in this genus is known that can explain this difference in claw morphology. However, important morphological differences in the mouthparts of nymphs and adults of *Prionoglaris* (see Lienhard, 1988, 1998) suggest that considerable differences in their mode of life exist.

The absence of a membranous vesicle and of a basal tooth in pretarsal claws of adults of *P. kapralovi* sp. nov. has to be considered as a neotenic character but its biological function remains enigmatic. Although the apomorphic neotenic absence of the membranous extension of the anterior claw and the basal tooth of the posterior claw in adults of this species is unique, it does not justify the formal establishment of a new supra-specific taxon.

The above remarks on the variability of some characters also show that a further splitting at species level, by recognizing a somewhat particular Moroccan cave population as a new species, would clearly be premature. However, the relative high variability of some morphological characters and the considerable molecular differences observed by Yoshizawa *et al.* (2018) between nymphs of three populations of *Prionoglaris* in Luxembourg (see Distribution, under *Prionoglaris* cf. *stygia*), Greece and Turkey (*Prionoglaris* spec.: sp. 249 and sp. 468 respectively) suggest the existence of some cryptic species in this genus (Lienhard, 2020: 7). Nonetheless, it cannot be ruled out that sp. 249 from Greece belongs to *P. dactyloides* and sp. 468 from Turkey to *P. kapralovi* sp. nov. It would therefore be very interesting to carry out a combined molecular and mophological study of *Prionoglaris* that also includes the Moroccan and Armenian populations.

The above overview on the known distribution of the genus, including records of nymphs, encourages to collect at these localities again and thereby obtain a more diverse material for molecular studies. In view of the scarcity of adults directly captured in nature, indispensable comparative morphological studies based on adults should be facilitated by rearing nymphs. A simple method for rearing nymphs has been described by Lienhard (1988).

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