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RESEARCH ARTICLE

Four new species of the subfamily Phycitinae (Lepidoptera: Pyralidae) from Kazakhstan

Четыре новых вида подсемейства Phycitinae (Lepidoptera: Pyralidae) из Казахстана

E.V. Tsvetkov

Е.В. Цветков

Eugene V. Tsvetkov, Apt. 30, 3/1 Mechnikov Ave., St Petersburg 195271, Russia. E-mail: tsvcountcal@rambler.ru

Abstract. *Trachypteryx electrica* **sp. nov.** is described from West Kazakhstan. The new species significantly differs from other species of the genus *Trachypteryx* Ragonot, 1893 in the female genitalia: the ductus bursae is strongly reduced and the diverticulum is absent. Two species of the subgenus *Bazaria* Ragonot, 1887 of the genus *Gymnancyla* Zeller, 1848, *G. turanica* **sp. nov.** and *G. latialata* **sp. nov.**, are described from the Kyzylorda Province of Kazakhstan. *Christophia constricta* **sp. nov.** is described from the same locality. The male and female genitalia are illustrated for all species described.

Резюме. *Trachypteryx electrica* **sp. nov.** описан из Западного Казахстана. Новый вид существенно отличается от остальных видов рода *Trachypteryx* Ragonot, 1893 по гениталиям самок: проток сумки сильно редуцирован, а дивертикулум отсутствует. Описаны два вида из подрода *Bazaria* Ragonot, 1887 рода *Gymnancyla* Zeller, 1848 из Кызылординской области Казахстана: *G. turanica* **sp. nov.** и *G. latialata* **sp. nov.** Из той же местности описан новый вид *Christophia constricta* **sp. nov.** Для всех новых видов приведены иллюстрации гениталий самцов и самок.

Key words: Kazakhstan, Pyralidae, Phycitinae, *Bazaria*, *Christophia*, *Gymnancyla*, *Trachypteryx*, new species

Ключевые слова: Казахстан, Pyralidae, Phycitinae, *Bazaria*, *Christophia*, *Gymnancyla*, *Trachypteryx*, новые виды

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Introduction

The subfamily Phycitinae Zeller, 1839 remains rather poorly studied in Middle Asia. At the same time, this region is peculiar for its rich and highly specific fauna of Pyralidae. The study of Phycitinae of Turanian semideserts and deserts, in particular, the Phycitinae associated with Amaranthaceae, is relevant in faunal, taxonomic and ecological aspects. The subfamily Phycitinae is divided into four tribes: Anerastiini Ragonot, 1885, Cabniini Roesler, 1968, Cryptoblabini Roesler, 1968 and Phycitini Zeller, 1839. This article includes the descriptions of four new species in the genera *Christophia* Ragonot, 1887, *Gymnancyla* Zeller, 1848 and *Trachypteryx* Ragonot, 1893 of the tribe Phycitini.

The genus *Christophia* comprises 20 species distributed in the southern Palaearctic, mostly in its Asian part (Amsel, 1935; Roesler, 1993; Falkovitsh, 1999; Liu & Li, 2013; Leraut, 2014). Obviously, the

genus requires a revision, as its members are highly diverse in morphology of the genitalia, the head and venation. A new species provisionally placed to *Christophia* is described below.

The Palaearctic genus *Gymnancyla* comprises 25 species distributed in southern areas (Roesler, 1973, 1993; Du & Yan, 2009; Liu & Li, 2010; Alipanah et al., 2014; Leraut, 2014; Gastón & Vives Moreno, 2018; Tsvetkov, 2019). According to Gastón & Vives Moreno (2018), the genus is divided into four subgenera: *Gymnancyla* Zeller, 1848, *Spermatophthora* Lederer, 1852, *Dentinodia* Ragonot, 1887 and *Bazaria* Ragonot, 1887. In contrary to this system and the synonymy established by Leraut (2014), sometimes *Bazaria* is considered in the rank of a genus (Sinev et al., 2019). Species of *Bazaria* are peculiar in the hindwing venation (veins M_2 and M_3 are on the common stalk), which differs the subgenus from the three other subgenera having the veins M_2 and M_3 on the hindwing merged. Two new species of *Bazaria* are described in this article.

The genus *Trachypteryx* Ragonot, 1893 comprises six species. Five of them are distributed in South Africa (Balinsky, 1991) and one species, *T. acanthotecta* Rebel, 1927, is known from North Africa and Middle East (Roesler, 1993; Slamka, 2019). In this article, a peculiar new species of *Trachypteryx* is described.

Material and methods

All specimens of the new species were attracted to light in arid open habitats. Photographs of the mounted specimens were taken with a Nikon Coolpix 4500 digital camera. Drawings of the genitalia, wing venation, palpi and projections of the frons, were prepared based on photographs.

The genitalia are kept in sugar syrup. They were prepared by rinsing and cleaning the abdomen after maceration in water for two days. The number of specimens (all are paratypes) with dissected genitalia is as follows: two males and one female of *Christophia constricta* **sp. nov.**, one male and one female of *Gymnancyla turanica* **sp. nov.**, two males and one female of *G. latialata* **sp. nov.**, two males and one female of *Trachypteryx electrica* **sp. nov.** A forewing and a hindwing were separated from the body of a paratype specimen for each of the four described species. The wings were placed in glycerol after examination of the venation. All type specimens are kept at the Zoological Institute of the Russian Academy of Sciences, in St Petersburg (ZIN).

The terminology of genital structures follows that of Falkovitsh & Stekolnikov (1978) with small exceptions. The accepted classification of the genera corresponds to that of Learut (2014), except for the classification of *Gymnancyla*, which follows Gastón & Vives Moreno (2018).

Order **Lepidoptera**

Family **Pyralidae**

Subfamily **Phycitinae**

Tribe **Phycitini**

Genus ***Christophia*** Ragonot, 1887

***Christophia constricta* sp. nov.**
(Figs 1, 2, 9, 13, 17, 21, 25–27, 39)

Holotype. Male; **Kazakhstan**, *Kyzylorda Prov.*, 14 km NW of Shieli Vill., 44°16′56″N, 66°34′42″E, 7.VII.2019, E.V. Tsvetkov leg. (ZIN).

Paratypes. 2 males, 2 females; same locality and date as in holotype, E.V. Tsvetkov leg. (ZIN).

Description. Length of forewing 9–10 mm. Forewing triangular; costal margin straight, sometimes with distal third slightly bent; outer margin convex, hind margin almost straight (Fig. 21).

Antennae nearly two-thirds of forewing in length; flagellum shortly ciliate in males and females; male flagellum strongly sinuate; male flagellomeres without chitinous projections, but flagellomeres 1–7 with modified scales looking as tiny spine-like structures; scape nearly four times as long as wide, slightly flattened, narrowed at both ends. Labial palpi nearly two diameters of eye in length, pointed up and ahead; third segment pointed ahead (Figs 9 and 13); second segment three times as long as first one; these two segments nearly equal in width; third segment tiny, first segment nearly twice as long and 2–2.5 times as wide as third segment. Maxillary palpi tiny, thin, nearly twice as long as third segment of labial palpi; second segment larger than first, both segments ovoid; third segment digitiform with slightly thicker distal third; brush-like scale tufts absent.

Frons possessing a strong chitinous projection (Fig. 17): flat vertical comb with three large prongs arising from slightly dentate scale-free area (medial prong the largest); this area surrounded by small chitinous walls from sides and from bottom.

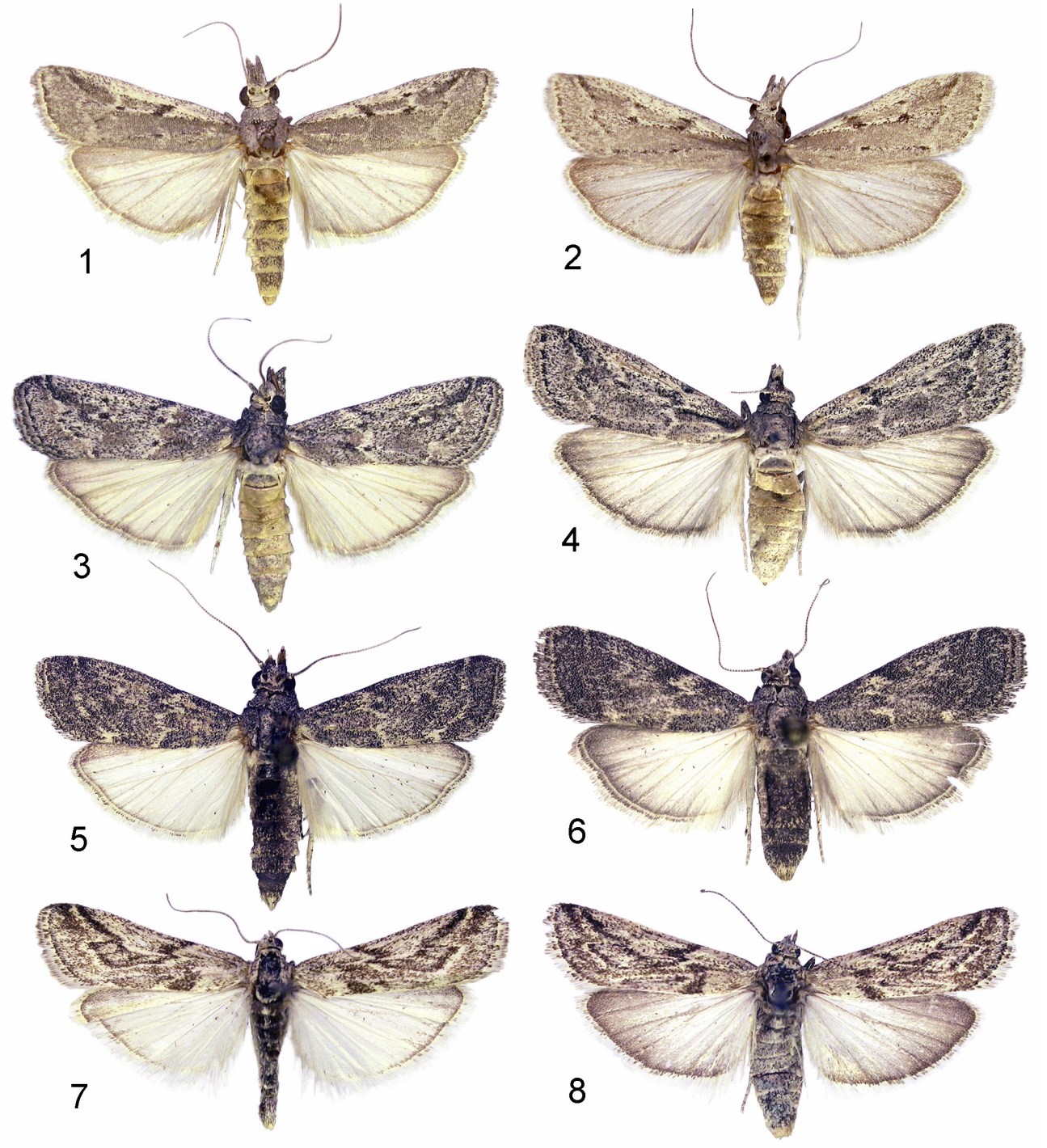
Frons (partly), labial and maxillary palpi, scape, fore and middle legs grey or brownish grey, with admixture of whitish scales. Hind legs whitish with admixture of greyish scales. Flagellum chequered (each segment partly white and partly brownish grey). Thorax grey or brownish grey dorsally and white ventrally. Abdomen brownish yellow dorsally and white ventrally.

Forewing ground colour light brown (Figs 1 and 2); white costal streak reaching postmedial line, sparsely dusted with black scales; vein *A* and stalk of vein *Cu* marked with black and white scales; two black discal spots unequal (lower spot larger), stretched along veins; antemedial line reduced to a short and bolded oblique black spot between *Cu* and *R* stalks; postmedial white line almost parallel to outer margin, fading, angled inwards at vein M_1, contrasted from inner side by oblique bolded black streak running from costa to vein M_1; short black streaks marking veins M_2, M_3, Cu_1 and Cu_2 present between cell and postmedial line; postmedial area densely dusted with whitish scales; thin black marginal line present; fringe light brown with basal whitish stripe. Forewing underside brown with white costal streak. Hindwing upperside and underside whitish with light brown tinge; marginal area and sector from costal margin to vein M_1 light brown; fringe whitish with light brown stripe basally.

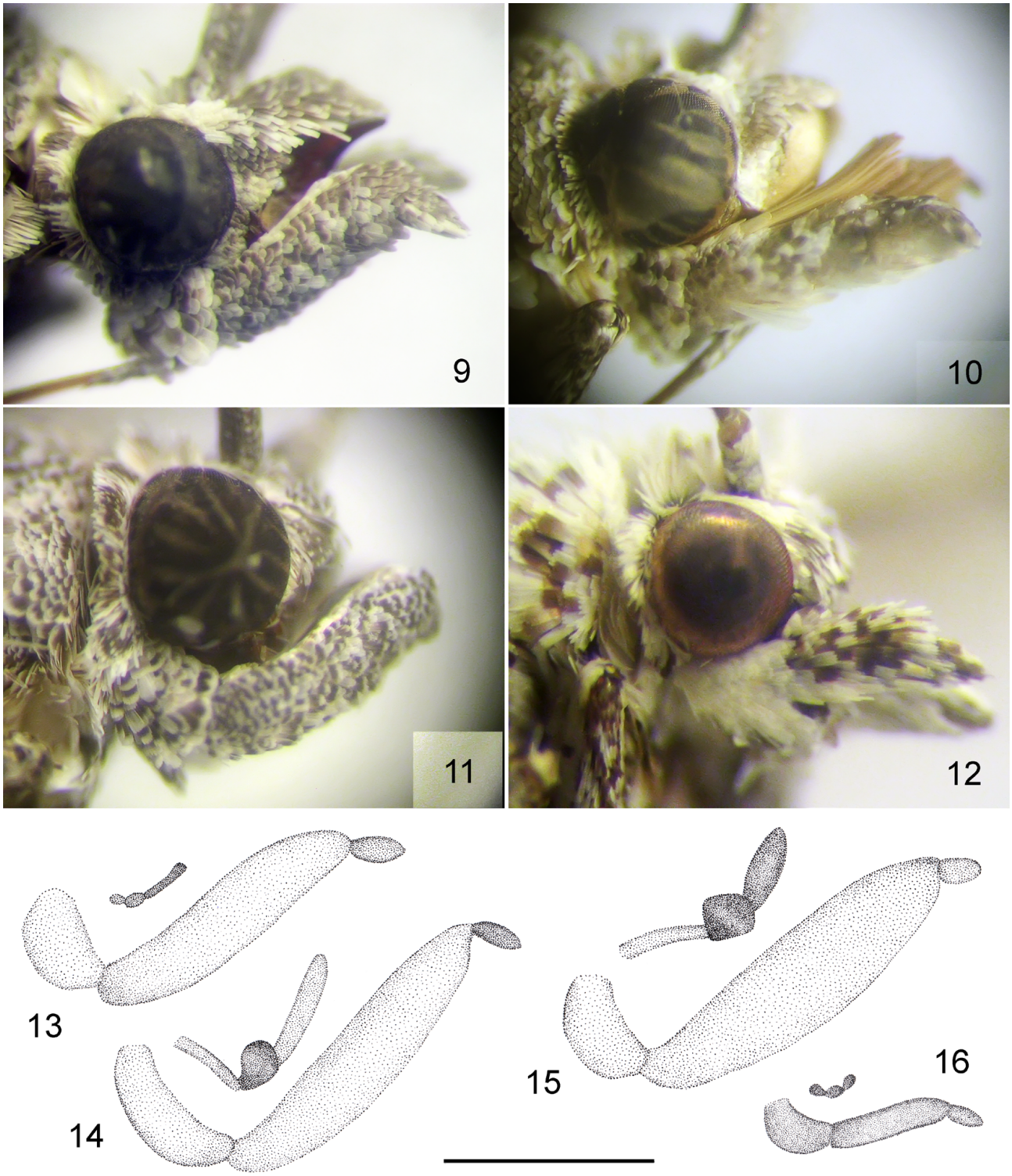
Male genitalia (Figs 25 and 26). Uncus rather long and narrow, triangular; dorsal surface covered with very short bristles. Gnathos elongate triangular, flattened dorsoventrally, with distal third hooked up. Branches of gnathos very broad at their ends. Transtilla components as relatively large elongate plates. Juxta large, in shape of sclerotised plate with stout basal part and narrower distal part. Valva elongate, with very narrow basal half and much broader cucullus; costal sclerite almost reaching apex of cucullus and evenly narrowing towards it. Editum present at base of costal sclerite as large weakly sclerotised nearly rectangular projection. Sacculus narrow, broadest in basal third, occupying some less than half of ventral edge of valva. A sclerotised fold at base of cucullus with a spine-like process at end. Distal half of aedeagus cylindrical, its distal end split into two walls folded inside; proximal half massive, broadening from the middle to proximal end. Vesica armed with one spine-like cornutus being nearly one-third of aedeagus length. Eighth sternum with culcita; anterior margin with rather long tapering median process; a narrow median process and weakly sclerotised lateral lobes located posteriorly (Fig. 27).

Female genitalia (Fig. 39). Papillae anales elongate, densely covered with bristles. Posterior apophyses 0.8–0.9 mm, anterior apophyses 0.7–0.8 mm. Eighth tergum with straight posterior margin and convex anterior margin. Antrum sclerotised, nearly cup-shaped, flattened dorsoventrally; dorsal wall divided posteriorly into a pair of ostial sclerites. Ductus bursae short and narrow, membranous. Corpus bursae elongate, almost cylindrical, rounded posteriorly and anteriorly. Seminal duct arising from left side of corpus bursae at about 0.4 from conjunction with ductus bursae. Two heavily sclerotised unequal signae located in the middle of corpus bursae on opposite sides. Each signa with rather long spines of different size and direction; spines straight or bent. Left side of corpus bursae posteriorly with a row of tiny different-sized spines.

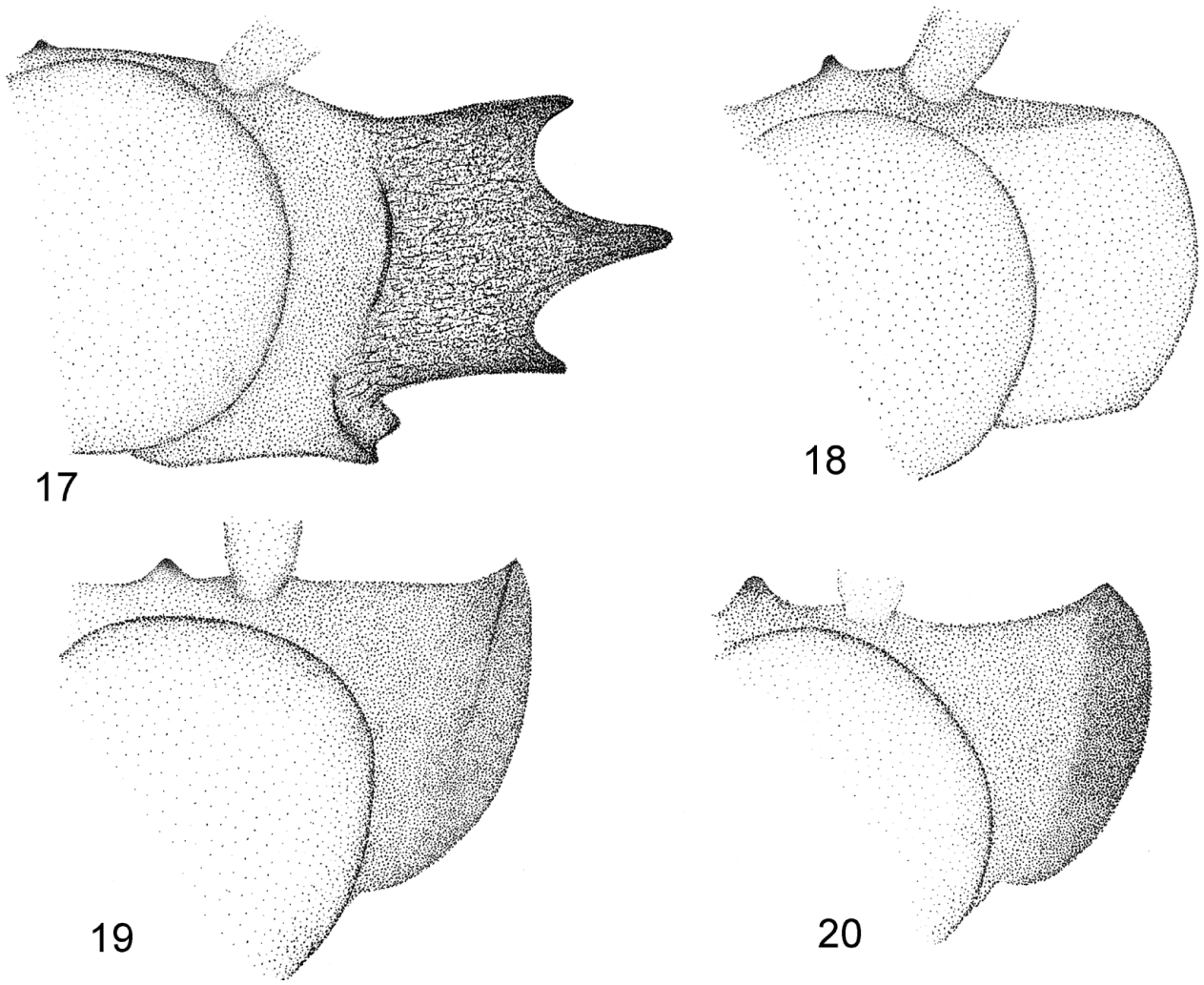
Comparison. The new species is provisionally placed to *Christophia*, considering its similarity with several species of this genus. *Christophia constricta* **sp. nov.** resembles *Ch. granulella* (Zerny, 1914), *Ch. paragranulella* Liu et Li, 2013 and *Ch. valvispinifera* Liu et Li, 2013 in the male genitalia, but strongly differs from these species in the female genitalia and also clearly differs from them in the appearance. As distinct from the three compared species, in males of *Ch. constricta* **sp. nov.** the cucullus of the valva is relatively shorter and broader, the spine-like process is present on the valva, and the cornutus in the vesica is shorter than half of the aedeagus. In addition, the new species is distinctive in the structure of the eight sternum: the anterior edge of the sternum has an elongate triangular protrusion in the centre. The female genitalia of *Ch. constricta* **sp. nov.**



Figs 1–8. New pyralid species, habitus of imago. **1**, **2**, *Christophia constricta* **sp. nov.**, holotype (1) and paratype, female (2); **3**, **4**, *Gymnancyla turanica* **sp. nov.**, holotype (3) and paratype, female (4); **5**, **6**, *G. latialata* **sp. nov.**, holotype (5) and paratype, female (6); **7**, **8**, *Trachypteryx electrica* **sp. nov.**, holotype (7) and paratype, female (8).



Figs 9–16. New pyralid species, head structure in males. Head in lateral view (paratypes) (9–12), labial and maxillary palpi (13–16). **9**, **13**, *Christophia constricta* **sp. nov.**; **10**, **15**, *Gymnancyla turanica* **sp. nov.**; **11**, **14**, *G. latialata* **sp. nov.**; **12**, **16**, *Trachypteryx electrica* **sp. nov.** Scale bar: 1 mm.



Figs 17–20. *Christophia* and *Gymnancyla* species, projections of the frons (in lateral view). **17**, *Ch. constricta* **sp. nov.**; **18**, *Ch. tessulata*; **19**, *G. turanica* **sp. nov.**; **20**, *G. sieversi.*

are characteristic for the shape of the signae and the structure of the antrum, allowing one to distinguish females of this species from the other Phycitinae.

Etymology. The species epithet is a Latin adjective *constrictus* (constricted or compressed). It is associated with the forewing pattern of the new species, which looks compressed perpendicular to the veins.

Distribution. The new species is so far known only from the Kyzylorda Province of Kazakhstan.

Bionomics. The specimens were collected in a sandy semidesert with various Amaranthaceae, *Calligonum* spp. and *Artemisia* spp. (Addenda: Fig. 41).

Genus ***Gymnancyla*** Zeller, 1848

Subgenus ***Bazaria*** Ragonot, 1887

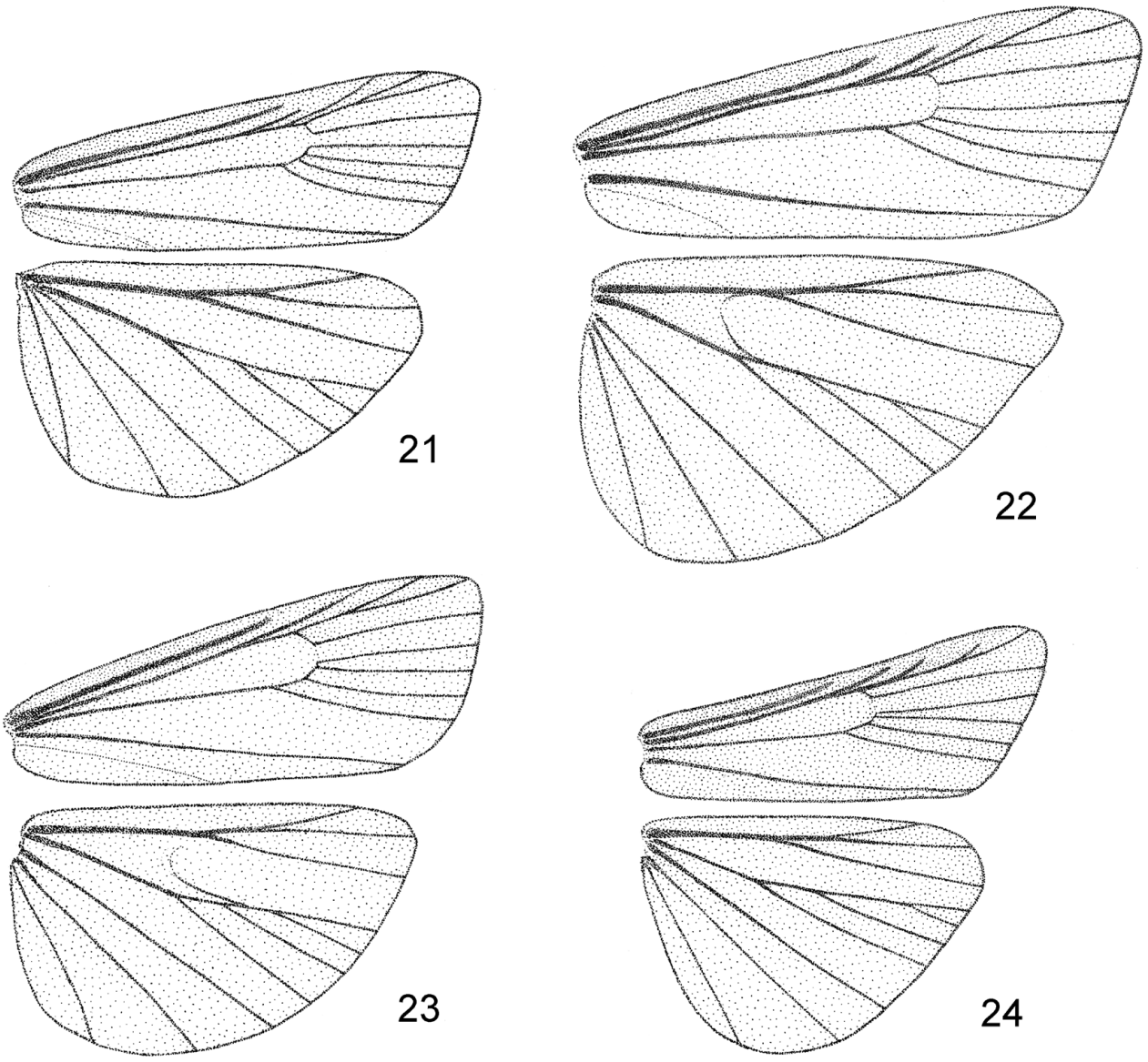
***Gymnancyla* (*Bazaria*) *turanica* sp. nov.**
(Figs 3, 4, 10, 15, 19, 22, 31–33, 37)

Holotype. Male; **Kazakhstan**, *Kyzylorda Prov.*, 14 km NW of Shieli Vill., 44°16′56″N, 66°34′42″E, 7.VII.2019, E.V. Tsvetkov leg. (ZIN).

Paratypes. 1 male, 2 females; same locality and date as in holotype, E.V. Tsvetkov leg. (ZIN).

Description. Length of forewing 11–12 mm. Forewing triangular with almost straight margins; costal margin slightly bent at apex, tornus widely rounded (Fig. 22).

Antennae nearly half of forewing in length; flagellum shortly ciliate in both sexes; male



Figs 21–24. New pyralid species, venation of the wings. **21**, *Christophia constricta* **sp. nov.**; **22**, *Gymnancyla turanica* **sp. nov.**; **23**, *G. latialata* **sp. nov.**; **24**, *Trachypteryx electrica* **sp. nov.**

flagellum sinuate; male flagellomeres 3–8 with tiny sclerotised spine-like projections increasing in size from third flagellomere to eighth; scape nearly 2.5 times as long as wide, slightly flattened, narrowed at both ends. Labial palpi nearly two diameters of eye in length, pointed up and ahead, with third segment pointed ahead (Figs 10 and 15); second segment 3.5 times as long and 1.5–1.6 times as wide as first segment; inner side of second segment with a longitudinal excavation containing scale tuft of maxillary palpus; third segment ovoid, nearly one-third as long and half as wide as first segment. Maxillary palpi relatively large, nearly twice as long as first segment of labial palpi, with large brush-like ochreous scale tufts in males (on segments 2 and 3); first segment thin, stick-like; second segment quadrangular with rounded corners, heavily sclerotised; third segment elongate, well-sclerotised, nearly equal to first segment in length and 1.9–2 times as thick.

Frons with a massive widely convex projection, its anterior part slightly stretched up and with sharp transverse edging (Fig. 19).

Labial palpi, frons (partly), scape, thorax and legs covered with mixture of whitish and grey scales. Flagellum chequered (each segment partly whitish and partly grey). Abdomen ochreous with golden tinge dorsally, white ventrally. Forewing ground colour grey with brownish tinge (black, brownish and white scales) (Figs 3 and 4); two black discal spots tiny; antemedial white line angulate, inconspicuous or sometimes indistinct, contrasted from outer side by thin black interrupting line; postmedial white line almost parallel to outer margin, fading, slightly angled inwards at vein M_1 and between veins *A* and Cu_2, contrasted by black line from inner side; thin marginal black line dotted; fringe consisting of brown and white scales, partly forming parallel brownish lines. Hindwing upperside and underside light brown or whitish with light brown tinge; marginal and subcostal areas brown; fringe whitish with light brown stripe basally.

Male genitalia (Figs 31 and 32). Uncus rather long and narrow, triangular; its dorsal surface covered with very short bristles. Gnathos elongate, flattened dorsoventrally, distal half tapering to apex, which is pointed and hooked up. Branches of gnathos abruptly broadening to their ends. Transtilla components as small well-sclerotised triangular plates. Juxta U-shaped, its side lobes elongate digitate, not parallel to each other. Valva with very narrow basal third and much broader cucullus; costal sclerite strong, divided distally into short and long parts, the latter reaching apex of cucullus; clasper weakly sclerotised, short digitate, pointed ventrally; sacculus narrow, nearly 0.4 of valva in length. Vinculum large, elongate, narrowing cranially. Aedeagus curved cylindrical, with distal end obliquely cut; vesica armed with one spine-like cornutus equal to nearly 0.4 of aedeagus in length. Eighth sternum weakly sclerotised, culcita present; anterior margin with rather long pointed median process, posterior margin with short rounded median process; lateral margins of sternum bent, well-sclerotised (Fig. 33).

Female genitalia (Fig. 37). Papillae anales relatively small, elongate triangular, densely covered with bristles. Posterior apophyses 0.9–1.0 mm; anterior apophyses 0.7–0.8 mm, broader than posterior apophyses and angulate at their bases. Eighth tergum trapezoidal, with straight posterior margin and convex anterior margin. Antrum sclerotised, flattened dorsoventrally; dorsal and ventral walls divided symmetrically by a narrow weakly sclerotised area. Ductus bursae membranous, 0.7–0.8 mm in length. Corpus bursae large, elongate, membranous. Seminal duct arising posteriorly from corpus bursae. Two heavily sclerotised unequal signae located in the middle of corpus bursae on opposite sides; each signa consisting of fused sections, resembling a cluster of fused thumb tacks (nine and six spiny sections in signae in examined female specimen).

Comparison. The new species is similar in the genitalia to several species of the genera *Gymnancyla* and *Christophia*, but it is easily distinguished from them by the combination of the frons structure and the forewing pattern. Examination of the genitalia can be also helpful for reliable separation. In males of *G. kuranella* (Amsel, 1970), the valva is narrower and nearly constant in width (the cucullus is not broadened) and the gnathos is smaller. Females of *G. kuranella* are distinguished from those of *G. turanica* **sp. nov.** by the presence of sclerites on the bursa copulatrix and partly on the surface of ductus bursae (in addition to two signae). Two species, *G. termacerba* Liu et Li, 2010 and *G. termifurcata* Liu et Li, 2010, are very different from *G. turanica* **sp. nov.** externally, but are similar to the latter in the genitalia. In males of *G. termacerba* and *G. termifurcata* the valva is narrower, the cucullus is only weakly broadened, and the costal sclerite of the valva is pointed apically. In females of *G. termacerba* the ductus is nearly twice as long as the anterior apophyses (*vs.* nearly equal to the anterior apophyses in the new species). Females of *G. termifurcata* possess much stouter anterior apophyses. *Gymnancyla sieversi* (Christoph, 1877) and *Christophia tessulata* Falkovitsh, 1999 bear similar projections of the frons (Figs 18 and 20), but *G. sieversi* is quite different from *G. turanica* **sp. nov.** in the appearance and in the genitalia, while *Ch. tessulata*, which is known only from one female, can be separated from *G. turanica* **sp. nov.** by the structure of projection of the frons. In the new species, the projection is slightly stretched up and bears a sharp transverse edging in contrast to *Ch. tessulata* (Figs 18 and 19). In females of *Ch. tessulata*, the antrum is membranous (*vs.* well-sclerotised in *G. turanica* **sp. nov.**).

In *Ch. triceratops* Falkovitsh, 1999 and *Ch. climacopterae* Falkovitsh, 1999, the frons bears a projection of quite different structure (flat vertical comb with three prongs). Males of these two species can be separated from males of the new species by the length of cornutus, which is less than 0.25 times the aedeagus and much shorter than in *G. turanica* **sp. nov.**

Etymology. The name *turanicus* is a Latin adjective derived from the name of the historical region of Turan, where the type locality of the new species is situated.

Distribution. The species is known from the Kyzylorda Province of Kazakhstan.

Bionomics. The specimens were collected in the same locality and habitat as the previous species (Addenda: Fig. 41).

***Gymnancyla* (*Bazaria*) *latialata* sp. nov.**
(Figs 2, 3, 5, 6, 11, 14, 34–36, 38)

Holotype. Male; **Kazakhstan**, *Kyzylorda Prov.*, 14 km NW of Shieli Vill., 44°16′56″N, 66°34′42″E, 7.VII.2019, E.V. Tsvetkov leg. (ZIN).

Paratypes. 5 males, 2 females; same locality and date as in holotype, E.V. Tsvetkov leg. (ZIN).

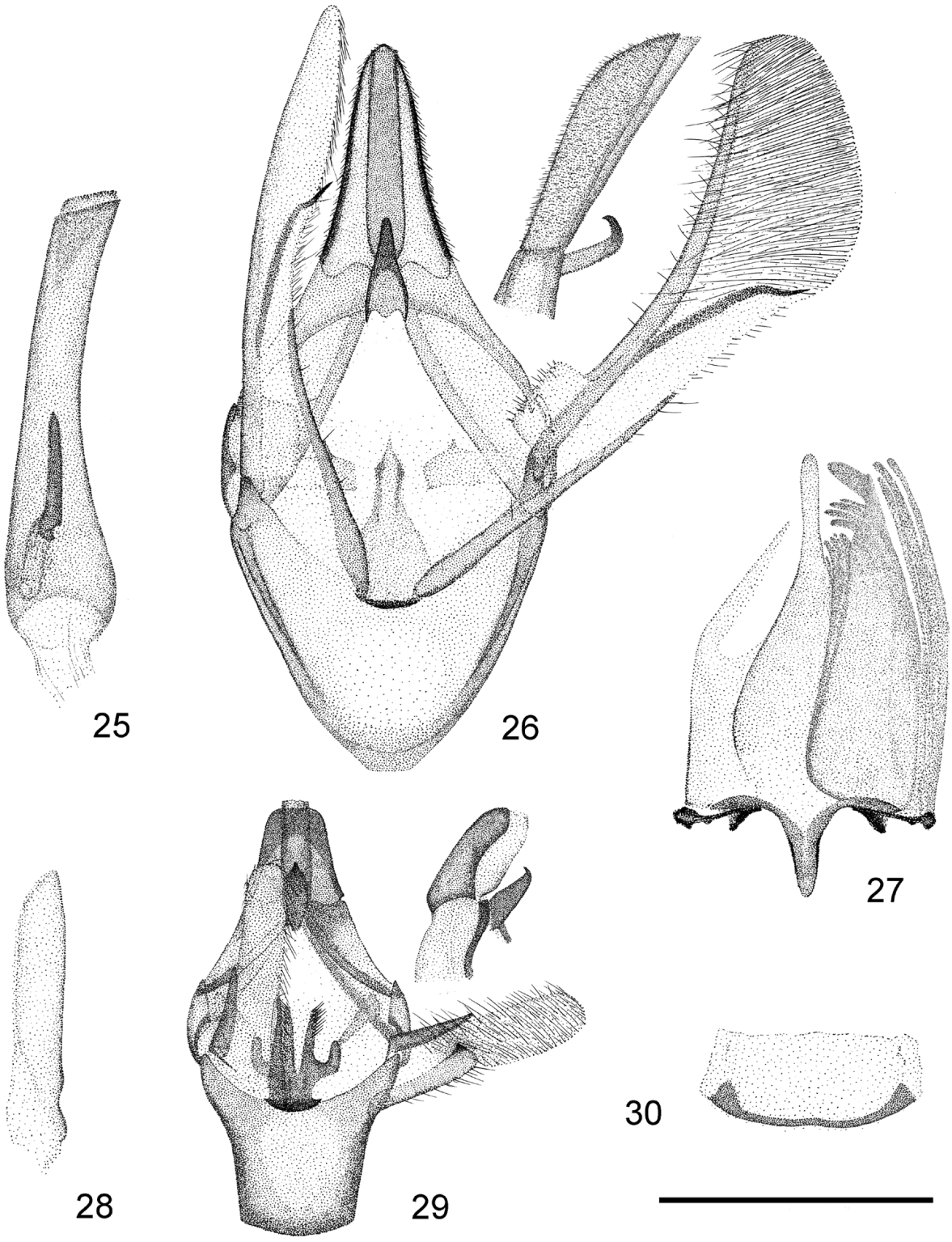
Description. Length of forewing about 10 mm. Forewing relatively broad, triangular; distal third of costal margin and basal third of hind margin convex, outer margin almost straight; tornus rounded (Fig. 23).

Antennae nearly 0.75 times the forewing length; cilia 0.5–0.6 times the diameter of flagellomere in males and much shorter in females; male flagellum weakly sinuate; male flagellomeres 1–7 with tiny chitinous vane-like projections; scape 1.6–1.7 times as long as wide, slightly flattened, narrowed at both ends. Labial palpi nearly 1.5 diameters of eye in length, pointed up and ahead, with third segment pointed ahead (Figs 11 and 14); second segment 2.5 times as long as first segment and slightly broader, its inner side with a longitudinal excavation containing scale tuft of maxillary palpus; third segment tiny, elongate, nearly one-third as long and half as wide as first segment. Maxillary palpi relatively large, nearly 1.5 times as long as first segment of labial palpi, with large brush-like ochreous scale tufts in males (on segments 2 and 3); first segment thin, stick-like; second segment flat and rounded, heavily sclerotised; third segment digitiform, nearly 1.5 times as long and thick as first segment. Frons flat or slightly convex.

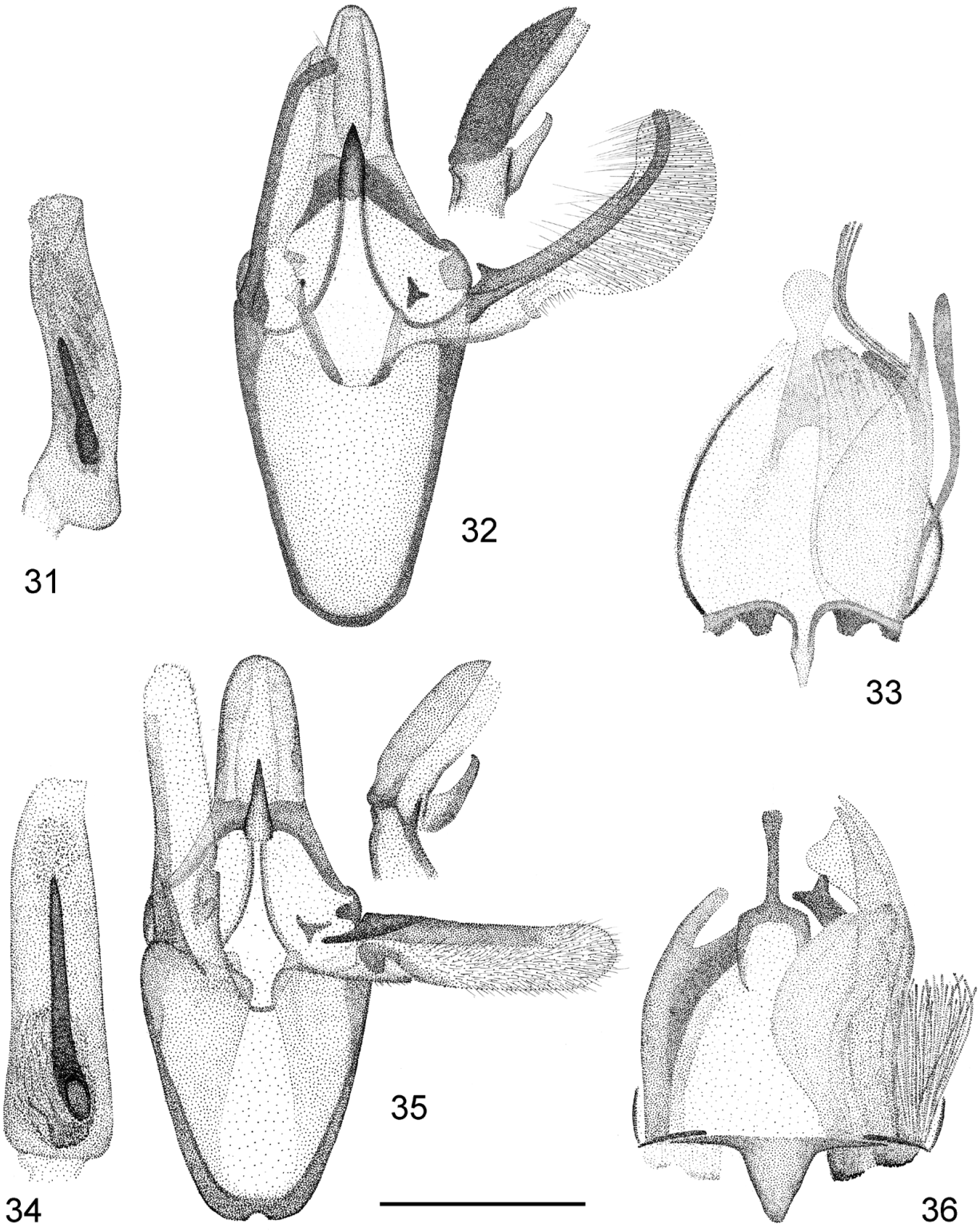
Labial palpi, frons (partly), scape and thorax covered with grey white-tipped scales. Legs partly white and partly covered with mixture of white and grey scales. Flagellum chequered (with whitish and grey areas on each segment). Abdomen grey, usually with lighter ventral side. Forewing grey (Figs 5 and 6); discal spots indistict or weakly defined; antemedial white line angulate, inconspicuous, sometimes indistinct; postmedial line absent or hardly distinct, more contrasting at hind margin; fringe brown, consisting of brown white-tipped scales. Hindwing upperside and underside white with light brown subcostal area and thin brown marginal line; fringe whitish brown with brown stripe basally.

Male genitalia (Figs 34 and 35). Uncus elongate, rounded apically. Gnathos elongate triangular, flattened dorsoventrally; apex pointed and slightly hooked up. Branches of gnathos very broad at their ends. Transtilla components as small well-sclerotised triangular plates. Juxta V-shaped, its lateral lobes club-like. Valva elongate, nearly constant in width, apically rounded; costal sclerite large, fading in distal half, basally stretched into a heavily sclerotised cranially pointed digitiform projection; well-sclerotised vane-like harpa located basally; sacculus short, narrow, occupying about 0.3 of ventral edge of valva. Vinculum large, elongate, narrowing cranially. Aedeagus cylindrical, slightly flattened; vesica armed with large spine-like cornutus being 0.7–0.8 times as long as aedeagus. Eighth sternum with culcita; anterior margin with median triangular prominence; a pair of lateral processes and a narrow median process located posteriorly (Fig. 36).

Female genitalia (Fig. 38). Papillae elongate, densely covered with bristles. Posterior apophyses nearly 0.7 mm; anterior apophyses 0.8–0.9 mm, broader than posterior apophyses, angulate and broadened at their bases. Eighth tergum with straight posterior margin and convex wavy anterior margin. Antrum membranous, ostial crescent sclerite located on dorsal wall. Ductus bursae membranous, thin and short. Corpus bursae elongate, irregularly shaped. Signa small, with several short spines (five spines in examined female specimen).



Figs 25–30. New *Christophia* and *Trachypteryx* species, male genitalia and eighth sternum. **25–27**, *Ch. constricta* **sp. nov.**; **28–30**, *T. electrica* **sp. nov.** Aedeagus (25, 28); genitalia (aedeagus removed) (26, 29); eighth sternum (left part of culcita removed) (27); eighth sternum (30). Scale bar: 1 mm.



Figs 31–36. Male genitalia and eighth sternum of *Gymnancyla* spp. **31–33**, *G. turanica* **sp. nov.**; **34–36**, *G. latialata* **sp. nov.** Aedeagus (31, 34); genitalia (aedeagus removed) (32, 35); eighth sternum (left part of culcita removed) (33, 36). Scale bar: 1 mm.

Comparison. *Gymnancyla latialata* **sp. nov.** is easily distinguished from the other species of *Gymnancyla* by the relatively short and broad forewing and also by its monotonous dark grey coloration. The combination of features in the genitalia (structure of the aedeagus, the valva, the gnathos and the eighth sternum in males; structure of the apophyses, the ductus bursae and the corpus bursae in females) makes it possible to separate the new species from all known species of the subfamily Phycitinae.

Etymology. The name of the new species is an adjective derived from the Latin adjectives *latus* (broad) and *alatus* (winged), referring to the forewing of this species, which is relatively broad.

Distribution. The species is known from the Kyzylorda Province of Kazakhstan.

Bionomics. The specimens were collected in the same locality and habitat as two previous species (Addenda: Fig. 41).

Genus *Trachypteryx* Ragonot, 1893

Trachypteryx electrica sp. nov.

(Figs 7, 8, 12, 16, 24, 28–30, 40)

Holotype. Male; **Kazakhstan**, *Mangistau Prov.*, 11 km E of Sarga Vill., terrace of Ustyurt Plateau, 3.V.2016, E.V. Tsvetkov leg. (ZIN).

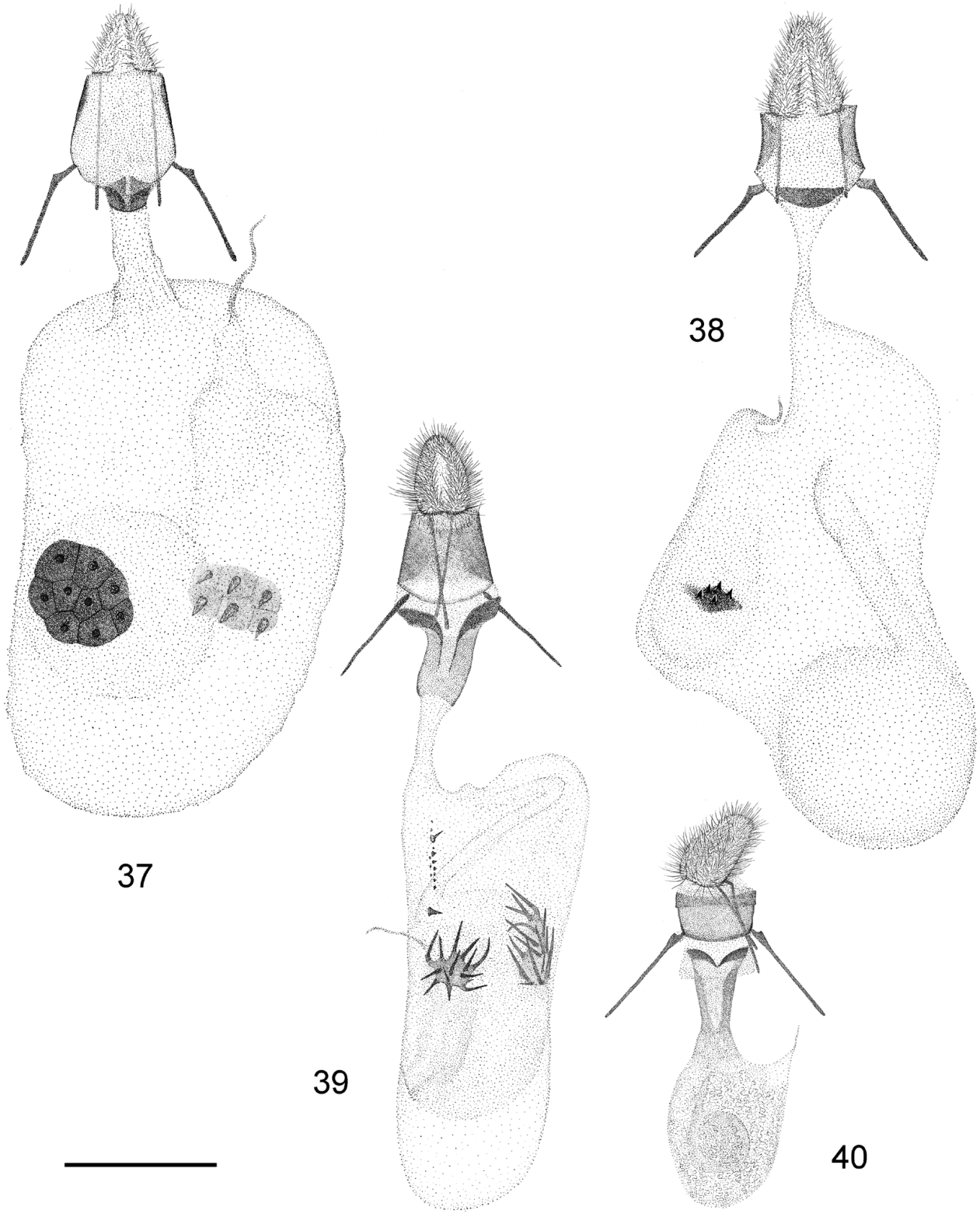
Paratypes. **Kazakhstan**, *Mangistau Prov.*: 3 females, S environs of spring Akmysh, 44°13′02″N, 51°58′26″E, 10.V.2016; 1 male, 1 female, 10 km NE of Taushchik Vill., 44°22′49″N, 51°28′52″E, 2.V.2019; 3 males, 9 km SW of Sai Otes Vill., canyon, 7.V.2018. *Atyrau Prov.*, 3 females, Akkergeshen Plateau, 47°19′14″N, 54°24′14″E, 22.V.2016 (all E.V. Tsvetkov leg.; ZIN).

Description. Length of forewing 7–9 mm. Forewing triangular; costal margin straight, outer margin evenly convex, hind margin convex basally (Fig. 24).

Antennae nearly 0.6 times the forewing length; cilia about two-thirds of flagellomere diameter in males and much shorter in females. Scape relatively small, nearly twice as long as wide, narrowed at both ends. In males, flagellomeres without chitinous projections, sinus not expressed. Labial palpi 1.5 diameters of eye in length, pointed ahead, third segment slightly drooping (Figs 12 and 16); second segment 1.8–1.9 times as long as first segment and thinner; third segment small, nearly half as wide as first segment; first segment 2.8–3 times as wide as third. Maxillary palpi tiny, with ovoid segments, nearly 1.5 times as long as third segment of labial palpi; second segment larger than first segment and larger than third one; brush-like scale tufts absent. Frons convex.

Head and body variegated, covered with mixture of white and black (or dark grey) scales. Forewing ground colour grey or whitish grey (with white, dark grey, black and sometimes brownish scales) (Figs 7 and 8); discal spots tiny or indistinct; whitish antemedial line inconspicuous, angulate, contrasted from outer side by oblique black streak at costa, and from inner side, by dark (dark grey or brownish grey) spot adjacent to hind margin; antemedial white line not contrasting, zigzag, angled outwards at veins *A* and M_2, angled inwards between veins *A* and Cu_2 and abruptly angled inwards between veins M_1 and M_2; postmedial line marked from inner side by contrasting black zigzag, interrupted between veins Cu_2 and *A*; zigzag line and antemedial black oblique spot at costal margin connected by black longitudinal streak between veins Cu_2 and *A*; vein *A* crossed by a heavily stretched O-shaped black line between antemedial and postmedial lines; submarginal area brownish or whitish brown, marginal black line usually inconspicuous; fringe whitish or whitish brown with two brownish, often unclear, stripes. Forewing underside brown, sometimes with lighter submarginal area and white costal streak. Hindwing upperside and underside coloration varying from light brown to whitish; marginal and subcostal areas usually darker brown; fringe whitish or whitish brown.

Male genitalia (Figs 28 and 29). Uncus trapezoidal with rounded angles or, in some cases, with widely rounded apex; distal part sclerotised more heavily; dorsal surface densely covered with bristles. Gnathos relatively large, wide (width of gnathos variable), broadest medially (in some specimens broadest in distal half or third), tapering proximally and distally; apex pointed and slightly curved up. Branches of gnathos very broad, abruptly broadening towards their ends. Tegumen bent (in lateral view) and angulate on sides. Transtilla components in shape of elongate nearly triangular plates. Juxta with a pair of short digitiform lateral lobes and a pair of long processes



Figs 37–40. New pyralid species, female genitalia. **37**, *Gymnancyla turanica* **sp. nov.**; **38**, *G. latialata* **sp. nov.**; **39**, *Christophia constricta* **sp. nov.**; **40**, *Trachypteryx electrica* **sp. nov.** Scale bar: 1 mm.

from centre. Each long process distally with a cluster of strong thorn-like bristles. Base of juxta as well-sclerotised plate with parallel lateral margins and cranial margin curved down. Valva relatively small, elongate; costal sclerite horn-shaped, well-sclerotised, reaching half or slightly less than half of costal edge of valva. Cucullus weakly sclerotised, more strongly sclerotised basally, evenly rounded at apex. Sacculus well-sclerotised, occupying nearly half of ventral edge of valva and nearly 0.35 of valva width. Medial part of valva with a strong dentate protrusion formed partly by sacculus and partly by base of cucullus. Vinculum trapezoidal with concave lateral margins and medial area weakly sclerotised. Aedeagus cylindrical, with proximal end slightly curved down, dorsal wall membranous, distal end obliquely cut, proximal third of aedeagus sclerotised only from ventral side; ductus ejaculatorius arising dorsally at proximal end of aedeagus. Eighth sternum short, almost rectangular; its anterior edge formed by heavily sclerotised, arched narrow plate broadened at ends; culcita absent (Fig. 30).

Female genitalia (Fig. 40). Papillae anales elongate, densely covered with bristles. Posterior apophyses nearly 0.7 mm; anterior apophyses nearly 0.8–0.9 mm, broader than posterior apophyses. Bases of anterior apophyses with small angulate broadenings. Eighth tergum rather short, trapezoidal with concave posterior margin and convex anterior margin. Antrum partly sclerotised, surface of walls covered with longitudinal wrinkles; lateral walls sclerotised more heavily than dorsal wall; ventral wall membranous. A pair of ostial sclerites in shape of angulate plates, located ventrally. Ductus bursae reduced. Corpus bursae nearly pear-shaped, membranous, densely covered with numerous wrinkles. Seminal duct arising posteriorly from cone on right side of corpus bursae.

Comparison. Trachypteryx electrica **sp. nov.** is distinctive among the known species of the genus. It is easily distinguished from the other species of *Trachypteryx* by the wing pattern and the genitalia. The juxta is characteristic in the male genitalia of the new species. It is very specific and rather untypical for the genus: not U-shaped, bearing a pair of digitiform lateral lobes and a pair of long median processes (Fig. 29). A strongly reduced ductus bursae with a pair of ostial sclerotised plates and the absence of the diverticulum are characteristic in the female genitalia. In all other known species of *Trachypteryx*, the ductus bursae is relatively long and the diverticulum of the ductus is developed.

Externally, *T. electrica* **sp. nov.** resembles a few species of the subfamily Phycitinae: *Epischnia glyphella* Ragonot, 1887, *Pristophorodes ruptifasciella* (Ragonot, 1887) and *Sengania ruehmekorfi* Amsel, 1951, but differs from the latter in the male genitalia: one cornutus is present in the vesica of *P. ruptifasciella* and two cornuti, in two other compared species, in contrast to the new species lacking cornuti in the vesica.

At the same time, the head structure and the male genitalia in the new species are typical of *Trachypteryx* (Figs 12, 16, 28, 29). It should be mentioned that the female genitalia in *T. electrica* **sp. nov.** resemble those of the genus *Repetekiodes* Amsel, 1961. However, unlike *T. electrica* **sp. nov.**, the labial palpi in *Repetekiodes* are pointed up and raised scales are present on the male forewing; the male genitalia in *Repetekiodes* are characterised by one strong cornutus in the vesica and the U-shaped juxta.

Etymology. The species epithet is a Latin adjective *electricus*. The name emphasises the forewing pattern with the postmedial line resembling a lightening sign.

Distribution. The species is widely distributed in West Kazakhstan.

Bionomics. In West Kazakhstan, the species occurs in various types of steppes and semideserts. The flight period lasts from late April to late May.

Addenda

Electronic supplementary material

Fig. 41. Semidesert in environs of the village Shieli (July 2019), a collecting habitat of *Christophia constricta* **sp. nov.**, *Gymnancyla turanica* **sp. nov.** and *G. latialata* **sp. nov.**

File format: JPEG.

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