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## New taxa and faunistic records of the tribe Gnorimoschemini from the Nearctic Region (Lepidoptera, Gelechiidae)

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**Abstract:** The following thirteen new species of the genus *Gnorimoschema* BUSCK are described: *G. brachiatum* sp.n., *G. clavatum* sp.n., *G. ligulatum* sp.n., *G. lobatum* sp.n., *G. nanulum* sp.n., *G. obscurior* sp.n., *G. petiolatum* sp.n., *G. powelli* sp.n., *G. rotundatum* sp.n., *G. segregatum* sp.n., *G. spinosum* sp.n., *G. reichli* sp.n. and *G. tunicatum* sp.n. With the exception of *G. powelli* sp.n., which appears to be a purely Californian taxon, all other species were collected on the sandy plains of Canada. *Gnorimoschem herbichi* (NOW.), widely distributed in the Palaearctic Region, was discovered in Canada, increasing the number of Holarctic taxa of this genus. *G. siskiyouense* POVOLNÝ 1985, described after the holotype male was rediscovered in California including its unknown female. *Ilseopsis (Euscrobipalpa) artemisiella* (TRTSCH.), another widely distributed transpalaearctic species, is for the first time recorded also from Canada together with the halophile *I. (E.) instabilella* (DOUGL.), another Palaearctic taxon. Additional faunistic and other records are published on *Gnorimoschema gallaesolidaginis* (RIL), *G. nordlandicolellum* (STRD.), *G. valesiellum* (STGR.), *Scrobipalpopsis arnicella* (CLRK.), *Ilseopsis (E.) atriplicella* (F.v.R.), *Scrobipalpulopsis lutescella* (CLRK.) and *Scrobipalpula psilella* (H.-SCH.). Genitalia sketches of all newly described taxa and their habitual figures are included.

**Key words:** Taxonomy, Gelechiidae (Lepidoptera), Nearctic.

### Introduction

The gelechioid tribe Gnorimoschemini comprised 85 Nearctic species in 12 genera (HODGES 1983), but only four studies were devoted specially to this tribe (POVOLNÝ 1967, POWELL & POVOLNÝ 1998 and POVOLNÝ 1998a, b), and still some described taxa are possibly scattered in numerous papers starting with such authors as RILEY (1869) or CHAMBERS (1875), about 130 years ago. In the papers by POWELL & POVOLNÝ (1998) and POVOLNÝ (1998a, b) additional 26 species were discovered recently, and the number of Nearctic genera increased to 15. The monophyly of the tribe was recognized as late as 1964 by the author of this paper and it is now recognized as a taxonomic entity. The tribe is practically cosmopolitan, its representatives being distributed in nearly all continents (with the exception of Madagascar and Antarctic) comprising several hundreds of species. There exist strong indications that the ancestral forms live especially in the xeromontane habitats of the Neotropical Region and also the deepest morphological differentiation is observed in its neotropical taxa (POVOLNÝ 1994).

Additional 13 new species of the nominotypical genus *Gnorimoschema* BUSCK 1900 are described in this paper and one species (widely distributed throughout the Palaearctic Region) was detected in Canada. Additional distributional and other new data are published on seven gnorimoschemine taxa.

The main part of the material studied was collected by Dr. Kauri Mikkola and his collaborators (M. Ahola, L. Kaila), Zoological Museum of the Finnish Museum of Natural History in Helsinki, during their expeditions to Canada in 1994 and 1995. Additional material of two species of *Gnorimoschema* from California is added from the collection of the Essig Museum, University of California, Berkeley, collected or presented by Professor Jerry Powell. I feel greatly obliged to all the above colleagues and institutions who enabled me to study this

important and partly very rare material and to publish this paper. I also wish to express my deep gratitude to Professor Dr. Ernst Rudolf Reichl, Linz who supported my activities for long years at a time when my opportunities of scientific work were extremely limited.

***Gnorimoschema brachiatum* sp.n. (Fig. 1, 2, 3, Photo 1)**

**Material studied:** Holotype ♂, S. Yukon Carcross, sand dunes, 12.7.1994, ad luc., M. Ahola & L. Kaila leg. Paratypes: 7♂♂, ♀♀ (partly unspread moths), S. Yukon Carcross, sand dunes, 12.7.1994, ad luc., M. Ahola & Kaila leg. (slides no. Hk. 5541, Hk. 5542, Hk. 5544, Hk. 5562, Hk. 5564); 1♂ dtto, leg. L. Kaila, swept from vegetation.

A delicate moth with distinctly bicolorous (black and white) radiate forewing pattern. Head, thorax and labial palpus milky white, tegula blackish; tip of third labial palpus black; forewing pattern consisting of a broadly elongate blackish stripe, especially on the dorsal forewing margin but partly also on the costal margin, white or whitish; forewing apex covered by a mixture of blackish and whitish scales, individual blackish scales also in bases of whitish cilia especially in forewing tornus. Hindwing covered by a mixture of grey and blackish scales. Cilia generally blackish. Abdomen plumbic lustrous with paler tip. Legs blackish with whitish annuli. Forewing length about 5.5 mm.

**Male genitalia.** Medium-sized, elongate; uncus upper edge broad, tipped centrally; gnathos slender ligulate with rounded tip; medial sacculus process with a narrow medial excision, double-shaped consisting of a smooth, broadly lobate and of a protruding slender part with a hairy field provided with an obtuse tip; parbasal process of valva slender stick-shaped, moderately curved with an obtuse subterminal hook reaching over tips of sacculus process; valva slender and narrow, concavely curved with shortly dilated obtuse tip; sacculus very broad, reinforced by a paired narrow ledge under paired sacculus process; saccus prominent, base broad, tip subtriangulate with concave sides and showing a comparatively broad obtuse tip distinctly exceeding robust vinculum edges. Aedeagus slender, longer than half of genitalia longitudinal axis, caecum short, broadly rounded, trunk narrow, prolongate, tip obtuse, membranous and broader than base of corpus aedeagi.

**Female genitalia.** Subgenital plate subquadrate with distinctly dilated apophysis base, slender apophysis only moderately longer than plate, its central part broadly membranous, sculptureless, pleurally with a narrow elongate ledge arising from apophysis base and extending caudally to form a moderately thickened end periostially protruding to form a short funnel, colliculum comparatively distinct forming a broad sclerotized annulus; signum of corpus bursae delicate, sickle-shaped, not armoured.

**Comments:** This taxon belongs to a limited number of species of the genus *Gnorimoschema* easily identified from the forewing pattern.

***Gnorimoschema clavatum* sp.n. (Fig. 4, Photo 2)**

**Material studied:** Holotype ♂, SW Sask.(atchewan), The Great Sand Hills, 60 km NE Tompkins prairie. ad luc., M. Ahola & L. Kaila leg. (slide no. Hk. 5545).

A medium-sized moth with deep brown forewing showing whitish costal margin and indication of an external (subterminal) transverse band. Male genitalia with striking, slender stick-shaped parbasal process. Head, thorax and tegula covered by deep chocolate brownish scales, frons milky white; slender labial palpus sabre-shaped, second segment interior whitish, external side dark, acute third segment blackish with whitish tip and with prebasal whitish ringlet. Forewing ground coloration essentially deeply brown to blackish, possibly with indication of two black axial stigmata near wing base and in wing centre; 3/4 of costal forewing margin with a comparatively broad whitish stripe and with a less distinct whitish subterminal transverse band interrupted by individual blackish scales, forewing apex with mixed blackish and white scales; forewing cilia grey with brownish hue; hindwing grey lustrous with blackish margin, especially

on costa; cilia grey. Legs blackish with whitish annuli especially on tarsal segments. Forewing length 5 mm.

**Male genitalia.** Medium-sized. Paired sacculus process separated by a short and narrow parallel-sided excision, broadly ear-shaped with obtuse tip and finely haired; parabasal process of valva striking - elongate stick-shaped with obtuse tip provided with a short subterminal spine reaching more than half of valva length; valva narrow, moderately curved with rounded tip; sacculus wall and paired process with a long semicrescent foliate ledge; saccus distinctive, subtriangulate, its narrowed tip distinctly exceeding vinculum edges. Aedeagus delicate, caecum broadly ovate, aedeagus trunk slender parallel-sided, moderately tipped and slightly exceeding length of caecum aedeagi.

### ***Gnorimoschema ligulatum* sp.n. (Fig. 5, Photo 3)**

**Material studied:** Holotype ♂, S. Yukon Carcross, sand dunes, 12.7.1984, L. Kaila leg., (slide no. Hk. 5554).

A comparatively big and rather slender-winged moth with deeply cinereous forewing showing black stigmata. Male genitalia stout with long ligulate saccus and long slender aedeagus. Head, thorax and tegula covered by a mixture of blackish and cinereous scales, frons whitish; prominent labial palpus with second segment deeply grey with whitish tip and with indication of parabasal whitish ring. Forewing covered by dense blackish scales irregularly mixed with groups of cinereous scales concentrating especially around deeply black stigmata and in wing apex. Forewing base with cinereous scales and with a blackish stigma on dorsal wing margin; a group of erect black scales arises near dorsal forewing margin near its 1/3; an ovate deeply black stigma is situated in forewing center; another blackish stigma consisting of erect scales is situated before indication of a cinereous external (subterminal) transverse band near dorsal (hind) forewing margin; cinereous forewing apex shows several groups of submarginal black scales; forewing cilia cinereous; hindwing grey with paler base, cilia deeply cinereous; legs blackish with paler ringlets especially on tarsal segments. Forewing length 8.2 mm.

**Male genitalia.** Big and robust. Uncus protruding to form a distinctive but obtusely tipped central process; paired sacculus process separated by a broad but short medial excision, short ear-shaped or foliate with rounded tips continued towards paired parabasal process by a broadly foliate sclerite showing a distinctly haired edge; adjacent parabasal process of valva delicate, slender cone-shaped to pipe-formed and thinly haired; valva short, moderately curved and obtusely inflated, not exceeding tip of uncus; broad sacculus wall provided with a distinct paired, elongate, moderately curved ledge; saccus robust, elongate ligulate, lateral edges nearly parallel-sided but slightly inflated centrally, tip truncate its edge moderately convex. Anterior sacculus edge deeply excised on both sides of sacculus base, reinforcing semicircular sclerotized ledge fusing with prominent and robust vinculum edges nearly as long as saccus; aedeagus longer than half of genitalia length, comparatively stout, caecum moderately inflated, elongate subovate, aedeagus trunk thick parallel-sided, tip distinct but obtuse, nearly entire aedeagus trunk is provided with a narrow but rather distinct serrate ledge.

### ***Gnorimoschema lobatum* sp.n. (Fig. 6, Photo 4)**

**Material studied:** Holotype ♂, Quebec Maham, sand pits, 15.6.1985, K. Mikkola leg. (slide no. Hk. 5524). Paratype ♂, Ontario, 45°15'N, 76°12'W, 5 km NNE Almonte alvar, at light 13.8.1995, K. Mikkola leg. (slide no. Hk. 5530).

A delicate moth with nearly uniformly cinereous forewing showing poor indications of blackish stigmata. Male genitalia subtle with distinct ear-shaped paired sacculus process, parabasal process absent. Head, thorax and tegula covered by cinereous scales with blackish tips; frons slightly paler; labial palpus essentially grey, elongate third segment somewhat darker. Forewing covered by uniformly cinereous scales with darker tips; two groups of blackish scales indicate delicate blackish stigmata axially, first at forewing centre, second in discal area, individual

blackish scales are also present in forewing apex; forewing cilia grey. Hindwing cinereous whitish with grey cilia. Legs deeply grey with paler annuli. Forewing length 5.1 mm.

**Male genitalia.** Small and delicate. Caudal uncus edge convex and running out into a distinct, comparatively acute tip, gnathos striking ligulate and long, with a rounded tip; paired sacculus process divided by a distinct but not very deep medial excision, broadly foliate with rounded tips and distinctly protruding from sacculus wall, because parabasal process of valva is absent; saccus subtriangulate with rounded tip as long as lateral vinculum edges; valva moderately sigmoid, rather parallel-sided with dilated obtuse tip not exceeding tip of uncus; aedeagus with very slender stick-shaped trunk contrasting with broadly inflated elongate subovate caecum.

### ***Gnorimoschema nanulum* sp.n. (Fig. 7, Photo 5)**

**Material studied:** Holotype ♂, Quebec, Maham, sand pits, 15.6.1985 ad luc, K. Mikkola leg. (slide no. Hk. 5521). Paratypes 1♂, Yukon, 24 km N. Whitehorse airport, *P. contorta*/sandy meadow, 9.7.1994, 11 p.m. - 01.00 a.m., L. Kaila leg. (slide no. Hk. 5544); 1♂, Quebec Maham, sand pits, 15.6.1985, ad luc., K. Mikkola leg. (slide no. Hk. 5528).

A small but comparatively broad-winged moth with deeply cinereous to blackish forewing with two black axial stigmata. Male genitalia with very long ligulate gnathos and very short and delicate paired processes. Head, thorax and tegula covered by dense, deeply cinereous scales with blackish tips; frons whitish; labial palpus covered by grey scales with blackish tips, appressed blackish scales cover especially third segment. Forewing covered by a mixture of uniformly grey scales with blackish tips; two distinct but delicate black stigmata are situated axially, first at forewing centre, second in discal area; forewing cilia cinereous. Hindwing deeply grey to blackish, cilia grey; legs blackish with whitish ringlets. Forewing length about 5 mm.

**Male genitalia.** Small and delicate. Uncus broad with a distinctly protruding spiny tip centrally; paired sacculus process short, subtle and paired, its central part broadly ear-shaped, separated from its second, shortly cone-formed, moderately tipped part; parabasal process only indicated by a short curved ledge adjacent to base of valva; valva distinct, moderately sigmoid with rounded tips not exceeding medial uncus spine; gnathos distinctly slender ligulate and very long; sacculus wall with a paired narrow and concavely rounded ledge; uncus comparatively distinctive, narrow subtriangulate with obtuse tip exceeding slender vinculum edges; aedeagus delicate but with striking, broadly ovate caecum contrasting with slender and delicate aedeagus trunk with moderately acute tip and with a minor subterminal spine.

### ***Gnorimoschema obscurior* sp.n. (Fig. 8,9, Photo 6,7)**

**Material studied:** Holotype ♂, S. Yukon Carcross, sand dunes, 12.7.1994, L. Kaila leg. (slide no. Hk. 5551); Paratypes 1♂, ditto (slide no. Hk. 5550); 1♂, Yukon, 24 km N Whitehorse airport, *P. contorta* sandy meadow, 9.7.1994, 11 p.m. - 01 a.m., L. Kaila leg., (slide no. Hk. 5540).

A medium-sized, comparatively slender-winged moth with blackish forewing with poor indication of black stigmata and paler apex. Male genitalia rather stout, robust, with broadly ligulate saccus and edges of vinculum; paired processes characteristic. Head, thorax and tegula covered by monotonous, dense, deeply grey to blackish scales, frons not paler; stout labial palpus with second segment showing whitish dorsal edge, its outside covered by somewhat erect blackish scales, third segment bicolourous, blackish with a white annulus centrally. Forewing covered by a dense mixture of deeply grey or blackish scales causing its dark coloration; two deeply black stigmata surrounded by brownish scales are situated axially in wing centre, second stigma being kidney-shaped, and a third stigma is indicated at 1/3 of forewing length on its dorsal margin; cinereous whitish scales indicate an external transverse band subterminally together with scattered cinereous whitish scales submarginally in forewing apex, forewing cilia blackish with cinereous bases. Hindwing whitish with thin blackish scales

and veins, cilia grey with brownish hue. Legs essentially black with whitish tarsal annuli. Forewing length 5.9 - 6.2 mm.

**Male genitalia.** Big and stout, elongate; uncus situated on comparatively narrow tegumen with obtuse moderately tipped edge; gnathos shortly ligulate; paired sacculus process narrow ear-formed, moderately curved and haired, medial excision broadly V-shaped; parabasal process short chisel-shaped running out into a distinct cone-shaped haired tip; sacculus wall under paired process is a broad crescentic sclerite with a long but narrow curved ledge reaching base of saccus; valva comparatively broad and distinctly parallel-sided, moderately sigmoid, reaching or slightly exceeding tip of uncus; saccus very long and broadly ligulate with lateral edges moderately convex, tip broadly obtuse; sacculus wall on both sides of saccus base deeply excised so that vinculum wall is visible on both sides of saccus, and vinculum edges are extremely robust exceeding tip of saccus; aedeagus compared with robust genitalia delicate, with thin and distinctly curved parallel-sided corpus aedeagi showing delicate groups of cornuti, obtuse tip provided with a rather distinct and curved subterminal spine. Caecum aedeagi is distinctly inflated, subovate, trunk very slender, tip obtuse with a distinctive, slender and curved subterminal spine.

**Comments.** This is a characteristic representative of a group of nearctic taxa of *Gnorimoschema* belonging to the gall producers and related to the *Gnorimoschema octomaculellum* - group of species. It seems that this taxon is widely distributed in the sandy habitats including the Great Plains of the western U.S.A. I have studied some individuals from California showing minor differences in male genitalia. The taxonomic status of this group can be definitely cleared when additional material becomes available. The male genitalia of this taxon show certain variation in size and distinctness of paired processes and in size and shape of saccus which is sometimes nearly parallel-sided with broader truncate tip. Aedeagus shows slight differences in shape of curved aedeagus trunk and in size of the curved subterminal spine.

#### ***Gnorimoschema petiolatum* sp.n. (Fig. 10,11, Photo 8)**

**Material studied:** Holotype 1♂, SW. Sask.(atchewan), The Great Sand Hills, 60 km NE Tompkins prairie. ad luc., M. Ahola & L. Kaila leg. Paratypes 2♂♂, 2♀♀, SW. Sask.(atchewan), The Great Sand Hills, 60 km NE Tompkins, prairie, 28.6.1994, M. Ahola & L. Kaila leg. (incl. slides no. Hk. 5532, Hk. 5545a, Hk. 5564).

A medium-sized, deeply chocolate-brown species with obscure forewing pattern. Head, thorax and tegula deeply chocolate to tea brown, frons cream whitish; labial palpus distinctive, whitish, second segment outside with erect whitish scales showing darker tips, sometimes uniformly dark; third segment with blackish tip and with blackish basal ringlet. Forewing ground coloration deeply chocolate brown to blackish with brownish hue; forewing pattern consists of more or less distinct whitish external (subterminal) transverse band and of a pale chocolate spot at dorsal forewing base; individual cinereous whitish scales disseminated in forewing apex; hindwing deeply grey with paler base, lustrous. Forewing and hindwing cilia blackish to grey; legs blackish with whitish annuli, especially on tarsi; Forewing length 6 - 7 mm.

**Male genitalia.** Medium-sized, elongate. Uncus broadly rounded with a distinctly protruding medial tip; gnathos delicately ligulate, comparatively short and rounded; sacculus with a narrow medial excision, paired process doubled, its basal part broadly lobate, rounded and smooth, distally forming an oblongate, sclerotized narrow foliate process with haired interior edge and nearly fusing with slender, elongate parabasal process exceeding tip of sacculus process by an obtuse tip provided with minor subterminal protrusion; valva slender, moderately sigmoid, rather parallel-sided with moderately broader obtuse tips; sacculus under paired process with a paired oblique thin ledge enforcing its wall; saccus robust, subtriangulate with basis strengthened by a convergent paired thin ledge and narrowing towards obtuse tip distinctly exceeding vinculum edges; aedeagus corresponding to more than half genitalia

length, stick-shaped, base moderately and shortly inflated to ovate, tip moderately broadening with obtuse tip.

**Female genitalia.** Subgenital plate shorter than distinctly longer and slender anterior apophyses showing inflated base; its central (towards ostium bursae) narrowing part membranous, but laterally sclerotized with numerous longitudinal folds forming its characteristic sculpture; periostial part shortly funnel-shaped, anterior margin deeply double-excised with a sclerotized paired convex ledge; colliculum with broadly rounded lateral sides and followed by a blister-shaped sclerotization of ductus bursae; signum of corpus bursae is a robust sickle-shaped spine arising from a broader base.

**Comments.** With some experience this species might be identified according to its external characters. The male genitalia show general similarity to those of *Gnorimoschema brachiatum*, especially concerning the paired processes and aedeagus, but the shape of uncus, valva and other structures show clear differences. Female genitalia are distinctly different. The moths of these two species, especially those of *Gnorimoschema brachiatum* may be identified on their completely different coloration and pattern.

### ***Gnorimoschema powelli* sp.n. (Fig. 12,13, Photo 9,10)**

**Material studied:** Holotype ♂, California: La Mesa, San Diego Co., October 4, 1967, r.f. stem gall on *Baccharis sarothroides*, emgd. 27.XI.1967, J. Powell no. 67K58 (P.A. Oppler, J. Powell, P.A. Rude coll.), dep. Essig Museum of Entomology, University of California, Berkeley; Paratypes 25 ♂♂, ♀♀, same data as holotype; 2 ♀, emgd. 27., 29.XI.1967; E. Monte Park, 7 mi. E. Lakeside, 1 ♀ 4.X.1967, r.f. stem gall *Baccharis sarothroides*, emgd. 27.XI.1967, J. Powell no. 67K64 (P.A. Rude); Naval Air Station, Mirimar, 18 ♂♂, 3 ♀♀ 10.XI. -11.XII.95, 1 ♂ 12.I.1996, black light traps (N. Bloomfield) (Essig Museum, San Diego Natural History Museum, U.S. National Museum of Natural History); Paratypes 117 ♂♂, 21 ♀♀, Naval Air Station, Mirimar (38 ♂♂, 5 ♀♀, 13.-30.XI.1995; 16 ♂♂, 10 ♀♀, 1.-11.XII.1995; 2 ♂♂, 16 ♀♀. - 27.XII.1995; 33 ♂♂, 4 ♀♀, 5.-21.I.1996; 1 ♂, 5.II.1996; 13 ♂♂, 4.-19.XI.1996; 14 ♂♂, 2 ♀♀, 8.-11.XII.1996), (N. Boomfield, San Diego Natural History Museum).

A big and comparatively (♂♂) narrow-winged species of cinereous coloration with dark radiate pattern and some delicate blackish stigmata. Female more broad-winged. Male genitalia stout, with short, broad and stout uncus, elongate ligulate, very rounded gnathos and stout elongate fingernail-shaped saccus. Female subgenital plate twice shorter than long slender anterior apophysis, and reinforced laterally with a crescent sclerotized ledge on each side. Anterior margin moderately funnel-formed. Signum is a robust spine. Head and part of thorax creamy white, tegula with admixture of grey scales. Frons white. Labial palpus stout with moderately erect scales of whitish coloration and with indication of a greyish spot on the second segment subterminally and of two spots on third segment, basally and subterminally; forewing ground coloration essentially cinereous whitish with numerous radiate striae of deeply grey to blackish coloration; forewing costa blackish. A distinct blackish stigma is situated in discal area. Forewing apex with a distinctive group of blackish stigmata with distinct black but delicate scales basally. There is a linear rust ochreous shade in apical area in specimens in good condition. Forewing cilia grey. Hindwing grey to whitish lustrous, veins darker. Cilia grey. Legs deeply grey with nebulous indications of annuli. Females stouter with slightly shorter wings. Male forewing length 11.3 - 13 mm, female forewing length 11.2 - 13 mm.

**Male genitalia** extremely robust and heavily sclerotized. Uncus rounded with obtuse convexity. Lateral uncus sclerites above tegumen broadly rounded. Saccus short, broadly ligulate. Valva rather parallel-sided with inflated curved tips. Parabasal process short and stout with rounded tip and with poorly indicated terminal spine. Paired process of sacculus fold is a sclerotized duplicature. Its ventral (fore) part is a robust crescent sclerite showing delicate dotted or foamy sculpture. Its hind part is more transparent, less sclerotized, at first with rounded margin continued by a straight, haired ledge. Saccus stout, elongate unguulate with broadly rounded tip not exceeding robust vinculum edges. Aedeagus stout, heavily sclerotized with caecum only moderately shorter than slenderer, subovate inflated, nearly parallel-sided

aedeagus trunk which is strengthened by a distinct elongate ledge. Tip rounded with a distinct subterminal serration.

**Female genitalia:** Subgenital plate subquadrate with moderately funnel-shaped protrusion strengthening ostium bursae. The plate proper is supported by a distinct crescent sclerite arising from apophyses base. Colliculum shows sclerotized rugose sides. Signum is a heavy spine arising from a broader base, blade-shaped, moderately curved.

**Biology.** The moths are nocturnal and fly in November and December, rarely into January. Presence of the larvae causes formation of persistent stem galls on *Baccharis sarothroides* (Asteraceae) that are similar in form to those of *Gnorimoschema baccharisella* BUSCK on *B. pilularis*. Mature galls of *G. powelli* are more or less uniformly spindle-shaped, ranging in size from 8 x 13 mm to 12 x 17 mm in outside diameter and height. The walls were 1 - 1.5 mm thick; larval feeding upon them created an irregularly hollowed chamber. Frass was tightly packed at the upper end of the chamber, retained by frail silken mesh. At maturity larvae left the galls via an emergence hole about 1 mm in diameter, usually excavated at or below the middle of the gall, and dropped to the ground for pupation. The gall interior was still green in early October, when most larvae were nearly fully grown. Emergence from the galls took place within 14 - 20 days following removal from the plants, and eclosion of adults followed 35 - 40 days later.

#### ***Gnorimoschema rotundatum* sp.n. (Fig. 14, Photo 11)**

**Material studied:** Holotype ♂, Ontario, 45°15'N, 76°12'W, 5 km NNE Almonte alvar, at light, 4.9.1985, K. Mikkola leg. (slide no. Hk. 5505).

A small moth of uniform, deeply grey forewing coloration, patternless. Male genitalia with very broad, unguulate saccus, with very stout and long vinculum edges and with cone-shaped, subtle parbasal process. Head, thorax and tegula covered by uniformly graphite-grey scales, frons slightly paler; labial palpus prominent, slender and nearly uniformly grey, third segment with admixture of blackish scales possibly indicating blackish spots. Forewing covered by a mixture of uniformly deeply grey scales with blackish tips; deeply blackish scales indicate possibly delicate blackish stigmata near forewing base and axially near forewing centre; forewing cilia grey; legs thinly grey with blackish hue and with paler ringlets. Forewing length 5.8 mm.

**Male genitalia.** Medium sized but rather robust. Unculoteguminal part comparatively narrow compared with broad sacculus wall and with extremely robust vinculum edges and with short, broadly rounded saccus; uncus obtuse with a short tip centrally, gnathos slender ligulate, short; paired process of extremely broad but short sacculus wall separated centrally by a short narrow excision, shortly ear-shaped, moderately curved with obtuse tip haired; parbasal process of valva situated medially on a broad sclerite above paired sacculus process forming very striking, shortly protruding, narrow cone-shaped and moderately curved haired process centrally. Sacculus wall under paired process broadly excised and strengthened by a paired sclerotized crescent-shaped hairy sclerite; saccus very robust, parallel-sided, broadly unguulate with semicircularly rounded, very broad tip: robust vinculum edges project beyond saccus edge and heavily sclerotized vinculum lobes are well visible behind saccus due to a deep paired excision of sacculus wall on both sides of saccus base; aedeagus compared with robust genitalia delicate, caecum distinctly inflated subovate, aedeagus trunk slender parallel-sided with obtuse tip.

**Comments.** The broad and obtusely rounded saccus of this species and the paired processes seem to indicate a relationship to the *Gnorimoschema octomaculellum* (CHAMBERS 1875) - *G. albimarginellum* (CHAMBERS 1875) - group of species.

***Gnorimoschema segregatum* sp.n. (Fig. 15, 16, 17, Photo 12)**

**Material studied:** Holotype ♂ Sask (atchewan), The Great Sand Hills, 60 km NE Tompkins, prairie, 28. 6. 1994, ad luc. M. Ahola, L. Kaila leg. Paratypes 12 ♂♂, ♀♀, The Great Sand Hills, prairie, 60 km NE Tompkins, 2. - 28. 6. 1994, M. Ahola & L. Kaila leg. (incl. slides no. Hk. 5533, Hk. 5546a, Hk. 5546b, Hk. 5565, Hk. 5566, Hk. 5567).

A medium-sized, pale greyish moth with whitish forewing and distinctive pattern of blackish stigmata. Male genitalia subtle with all structural elements characteristic of the genus; female subgenital plate with funnel-shaped colliculum and with a paired, striking periostial sclerite. Head, thorax and tegula covered by a mixture of cinereous whitish scales, frons paler, nearly white; labial palpus essentially white, second segment with several scales showing blackish tips, third segment with deeply black tip. Forewing ground coloration is a mixture of whitish scales with darker to blackish tips, sometimes concentrating in wing apex. Forewing pattern consists of delicate but sometimes very distinct black stigmata. Three of them situated axially (near wing base, in centre and in discal area), but additional blackish stigmata may be present in dorsal forewing fold, near base, or costally, and usually a series of blackish stigmata is situated at wing margin apically. Cilia cinereous. Hindwing of somewhat paler hue than forewing ground coloration, cilia cinereous. Some females are smaller than males, rather uniformly grey and patternless. Forewing length 7.8 mm (males), to 5.5 mm (females).

**Male genitalia.** Comparatively delicate. Uncus broadly obtuse with a short but distinct tip centrally; gnathos shortly ligulate with rounded tip. Paired sacculus process separated by a narrow excision and bipartite its medial part consisting of a smooth, sclerite with obtuse corner, distal part is a short, haired ledge running out to form a short tip followed by a short sclerite adjacent to a short cone-formed parbasal process provided with a delicate curved tip; valva slender, moderately curved, tip shortly inflated and rounded; saccus elongate subtriangulate tapering towards obtuse tip projecting slightly beyond vinculum edges; saeculus wall strengthened by two slender, paired ledges, first slender crescent-shaped under paired sacculus processes, second oblique stick-shaped above saccus base. Aedeagus slightly longer than longitudinal genitalia axis, caecum subovate, aedeagus trunk distinctly longer, slender and parallel-sided with a distinct subterminal spine.

**Female genitalia.** Subgenital plate subquadrate with rounded corners on posterior margin, its central part essentially membranous, but pleurally with a distinct sclerotized ledge arising from dilated apophysis base and curved caudally reinforcing posterior plate margin; a rather striking paired broadly foliate sclerite is situated praeostially forming the base of a very distinctive robust funnel-shaped prolongation of entire proximal subgenital plate margin narrowed tip of this funnel reaching more than half of apophyses length. Signum distinctive, sickle-shaped with broader base.

**Comments.** Despite its comparatively uniform pattern well preserved specimens might be recognized without genitalia dissection. Male genitalia show a clear relation to those of *Gnorimoschema epithymellum* (STAUDINGER 1859) and *Gnorimoschema nordlandicolellum* (STRAND 1902) reflected especially in form and relation between paired processes. These taxa represent possibly related species although their female genitalia are distinctly different.

***Gnorimoschema spinosum* sp.n. (Fig. 18, Photo 13)**

**Material studied:** Holotype ♂, SW Sask. (atchewan), The Great Sand Hills, 60 km NE Tompkins, prairie, ad luc., M. Ahola & L. Kaila leg (slide no. Hk 5547).

A comparatively big but slender-winged moth, forewing cinereous with distinctive black stigmata. Male genitalia very stout, with prominent rounded saccus, robust paired processes and slender aedeagus provided with a striking long and erect curved subterminal spine. Head, thorax and tegula covered by cinereous whitish scales, frons slightly paler; prominent labial palpus deeply grey, whitish on interior side, third segment blackish with a whitish ringlet. Forewing ground coloration uniformly cinereous whitish with a very distinct triad of oblongate



black stigmata, first at 1/3 near dorsal forewing fold, second axially near forewing centre and third in discal area; groups of black scales indicate submarginal spots in forewing apex; forewing cilia cinereous. Hindwing grey with dense grey cilia. Legs deeply grey with comparatively broad whitish annuli. Forewing length 7.2 mm.

**Male genitalia.** Robust and strong. Tegumen comparatively slender as well as its continuation - uncus, which has its narrow tip and is provided with a striking central spine; gnathos is a short, robust, spatulate spine; paired sacculus process with a convergent tip, not very deep medial excision, paired process short but very broad with somewhat oblique, haired, moderately rugose marginal edge and distinctly shorter than striking parabasal process showing broadly crescent shape with spiny and acute tip medioapically; valva shortly parallel-sided with spatulate, broadening and rounded tip; sacculus wall strengthened by a paired, narrow and slender, moderately curved ledge; sacculus robust, broadly nail-shaped to unguate, parallel-sided and with a broadly rounded tip; teguminal edges robust but shorter than sacculus tip; aedeagus with ovate or subovate caecum, aedeagus corpus (trunk) very slender, tip obtuse but provided with an extremely long, concavely curved subterminal spine

### ***Gnorimoschema reichli* sp.n. (Fig. 19, 20, 21, 22, 23, Photo 14)**

**Material studied:** Holotype ♂, S. Yukon Carcross, sand dunes, 12.7.1994, 5 - 6 p.m. L. Kaila leg. Paratypes, 9 ♂♂, ♀♀, S. Yukon, Carcross, sand dunes, 12.7.1994, 5 - 6 p.m. and swept from vegetation (incl. slides No. Hk. 5548a, Hk. 5548b, Hk. 5549b, Hk. 5552, Hk. 5557, Hk. 5558).

A slender-winged, medium-sized to small species, greyish to brownish with nondescript forewing pattern. Male genitalia with delicate paired sacculus process, short and robust parabasal process, and very short, thin saccus; subgenital plate simple with a paired sclerotized ledge; signum is a strong spine. Head, thorax and tegula covered by a mixture of pale grey to deeply grey scales sometimes with brownish hue; frons only near labial palpus base somewhat paler; labial palpus nearly uniformly pale to dark grey, occasionally with blackish tips. Forewing ground coloration grey or brownish with indistinct pattern or nearly patternless; indication of dark stigmata or of other spots present only in paler or in brownish individuals; characteristic central triad of stigmata (first at about 1/4 of forewing length in its dorsal fold, second at about wing centre, third in discal area) and indication of additional blackish stigmata (e.g. near wing base or along costal margin) poorly visible or fusing to form darker areas; external (subterminal) transverse band occasionally indicated; this variable coloration and pattern indications are difficult to describe; females generally paler, cinereous grey and more narrow-winged; forewing cilia grey; hindwing grey of various hues, base sometimes paler, cilia grey; forewing length 6.5-7.2 mm.

**Male genitalia.** Uncus comparatively broad and moderately convex, with a minor but very distinctive tip centrally; paired sacculus process distinctly smaller than robust parabasal process of valva, rather delicate, not very protruding, with a shortly rounded tip; parabasal process rather broad with convexly arched tip and an obliquely truncate or acute mediobasal edge with base approaching a narrow oblique saccular ledge enforcing sacculus wall; upper edge of sacculus wall between medial and parabasal process is a crescent, finely but distinctly haired sclerite. Valva nearly parallel-sided, tip distinctly wider, its exterior edge rounded and with an acute tip tapering towards lateral edge of sacculus. Saccus short subtriangulate and running out to form a very short and slender delicate tip contrasting with broadly lobate vinculum edges. Aedeagus moderately exceeding half of genitalia length with caecum ovate inflated, aedeagus trunk slender and nearly parallel-sided with a short but acute subterminal spine.

**Female genitalia.** Subgenital plate moderately longer than broad or same breadth as length, apophyses slender and moderately prolongate. Plate proper essentially membranous but with a paired sclerotized ledge reinforcing it longitudinally; this ledge arises from apophysis base to form an elongate crescent sclerite, this crescent-shaped dilatation is situated either basally or more distally. A paired, more or less distinct funnel with sclerotized sides tapers

towards ostium bursae which protrudes shortly. Colliculum is a sclerotized irregular annulus with rugose walls. Proximal plate margin distinctly excised and convexly rounded. Signum is a robust, moderately curved sickle-shaped spine. Sclerotization of subgenital plate varies similarly as its reinforcing sclerites.

**Comments.** The external variation of moths contrasts with the constant genitalia characters so that genitalia dissection appears to be necessary to identify this taxon.

This species is dedicated to the memory of Professor Ernst Rudolf Reichl.

### ***Gnorimoschema tunicatum* sp.n. (Fig. 24, Photo 15)**

**Material studied:** Holotype ♂, S. Sask. (atchewan), grasslands, Nat. p., 15 km. SE Val Marle, prairie, 25.6.1994, evening L. Kaila leg. (slide no. Hk. 5539). Paratype ♂, S. Sask.(atchewan), Grasslands Nat. p., 15 km SE Val Marle, prairie, 25.6.1994, evening L. Kaila leg. (slide no. Hk. 5538).

A medium-sized, comparatively slender-winged species with pale cinereous forewing ground coloration and with two blackish stigmata in forewing axis. Male genitalia with an extremely deep and narrow medial excision, and with long and robust aedeagus. Head, thorax and tegula pale cinereous with slight brownish hue, frons whitish; second segment of labial palpus outside with erect scales of darker tips, whitish interior, third segment slender, whitish with blackish tips and with a black annulus. Forewing ground coloration rather uniformly pale cinereous with slight chocolate hue; two delicate, moderately elongate blackish stigmata situated in forewing axis, first near wing centre, second in discal cell, and a next indication of an elongate blackish stigma is present centrally in elongate wing forewing fold near its hind margin, oblique to first axial stigma; forewing costa with interrupted linear groups of delicate black scales concentrating in forewing apex which is slightly mixed with individual blackish scales; cilia cinereous whitish. Hindwing grey whitish, moderately lustrous with grey to whitish cilia. Legs pale with distinct admixture of blackish scales. Forewing length about 7 mm.

**Male genitalia.** Generally robust, elongate; paired sacculus process very striking being centrally deeply separated, this excision dividing entire sacculus wall and reaching base of saccus; sacculus process with shortly protruding tip and with a doubled edge, and laterally fusing with slender elongate, moderately longer parabaasal process showing obtuse tip; tips of both paired processes more or less distinctly haired; sacculus fold rather tall and broad, forming essential part of genitalia; valva basally concealed behind sacculus, slender, with moderately dilated and curved tips tapering towards lateral edges of uncus; uncus broad with moderately convex edge showing obtuse tip centrally; gnathos is a shortly parallel-sided hooklet; saccus subtriangulate, longer than distinctively rounded vinculum edges and basally reinforced by a paired narrow but distinct ledge indicating half of a ring (interrupted centrally) and strengthening saccus base. Aedeagus striking by short ovate caecum, and a thick, long aedeagus trunk of its corpus running out to form a more slender elongate acute tip.

### ***Gnorimoschema gallaesolidaginis* (RILEY 1869) (Fig. 27, 28)**

RILEY 1869 - Rep. Natn. Inst. Missouri 1:173 (*Gelechia*).

**Material studied:** 1♂, 1♀, Ontario, 45°15'N, 76°12'W, 5 km NNE Almereta alvar, at light, 13.8.1985, K. Mikkola leg. (slide Hk. 5501), male not genitalized; 1♂, Ontario 44°00'N, 77°45'W. Presque le P.P., at light, 31.8.1985, K. Mikkola leg. (slide Hk. 5502); 1♂, Ontario Nepean, Pinhesfor., Stoney Swamp, at light, 14.8.1985, K. Mikkola leg, slide Hk. 5509); 1♂, Prov. Quebec, 45°50'N, 76°25'N, Otter Lake, at light, 17.8.1985, K. Mikkola leg. (not genitalized).

This stout and striking species (coloured figure by MEYRICK 1925, pl, 2, fig. 36) has a wide distribution in (southern ?) Canada and in the East of the U.S.A., but its more detailed distributional limits remain unknown. It produces galls on *Solidago* (and possibly on other Asteraceae).

### ***Gnorimoschema herbichi* (NOWICKI 1864) (Fig. 29, 30)**

NOWICKI 1864 - Microlepid. Spec. Nov. 1864: 17 (*Gelechia*).

**Material studied:** 1♀, Ontario, 44°00'N, 77°45'W, Peosqui le P.P., at light, 29.7.1985, K. Mikkola leg. (slide Hk. 5508); 3♂♂, dtto, 27.7.1985 (slides Hk. 5516, Hk. 5519, Hk. 5522); 1♂, dtto, 25.5.1985, (slide Hk. 5517).

This species has a wide distribution in the Palaearctic Region, with locally rather limited populations tending towards geographic subspeciation (POVOLNÝ 1992). The specimens from Ontario show dark forewing coloration with partly well marked pattern and certain similarity to the specimens from Mongolia and Kamchatka. This is the first series of moths of this taxon known from the Nearctic Region and it seems to have a wider distribution especially in steppe-like habitats of Canada. The subspecific status of the Nearctic populations remains open.

### ***Gnorimoschema nordlandicoellum* (STRAND 1902) (Fig. 31, 32, 33, 34)**

STRAND 1902, Ent. Ztschr. Guben, 1902: 21 (*Lita*).

**Material studied:** 1♂, Yukon T., 60°45'N, 134°40'W, 20 km W. White horse, light trap, 16.7.1985, K. Mikkola leg (slide Hk. 5504); 1♂, S. Yukon, Carcross sand dunes, 12.7.1995, M. Ahola & L. Kaila leg. (slide Hk. 5531); 3♂♂, dtto, 12.7.1994, 5-6 p. m., L. Kaila leg., (slide Hk. 5547, Hk. 5553, Hk. 5556); 1♂ dtto, not genitalized; 1♂, S. Yukon, 16 km SE Whitehorse, *P. contorta*, sandy meadow, 11.7.1994, L. Kaila leg. (Hk. 5336); 1♂, Yukon, 24 km N. Whitehorse airport, *P. contorta*, sandy meadow, 9.7.1994, 11 p. m. - 01.00 a.m., L. Kaila leg. (slide Hk. 5537); 1♂, Yukon T., 64°05'N, 139°05'W. Klondike Campground, 11. - 12.7.1985, K. Mikkola leg. (slide Hk. 5555).

This representative series of moths offers a variegated picture of both forewing ground coloration and pattern. Some individuals show nearly blackish forewing with obscure pattern, others are brownish or cinereous with distinctive pattern, although all belong obviously to a widely distributed South Yukon population of this holarctic taxon. No females were collected as in several other situations. This is a holarctic species (POVOLNÝ 1992, 1994a) showing distinct arcto-alpine disjunctions. Its recent discovery in Hohe Tauern (Ost-Tirol) (HUEMER 1996) confirms this well known fact. The coloured figures of this species (see POVOLNÝ 1992, plate II, fig. 3; POVOLNÝ 1994a Fig. 5; HUEMER 1996, Abb. 1) show minor differences in the hue of the ground coloration and in the distinctness of the forewing pattern similarly as small differences in numerous figures of the male genitalia. This is a phenomenon well known especially in taxa showing similar vast distributional pattern, especially when combined with scattered and isolated population characteristic of arcto-alpine pattern. Compared with the clear cut qualitative morphological differences in discrete specific taxa of this genus (visible at a first sight), these differences show fluctuation variability (HUEMER 1996 expresses them with terms like: „Stark zugespitzt-schwächer zugespitzt; lang, sehr breit - kürzer, viel schmaler; distal stark verbreitet - distal schwächer verbreitet; tief eingeschnitten - schwach eingeschnitten“ etc., clearly reflecting the purely subjective approach to such characters). The same variability is reflected also in the male genitalia (figs. 33, 34), but the differences observed show the same purely quantitative degrees of the same character contrasting with distinctly qualitative differences in discrete specific taxa of this genus. The descriptions of such populations as different taxa should be avoided, since they obscure and confuse the known distributional pattern of this clearly holarctic taxon and they multiply its cleared synonyms (POVOLNÝ 1992). The females of this species are very rare, and they are absent both in the material studied and in the European alpine population recently described by HUEMER (1996). The foodplant of this species remains unknown.

### ***Gnorimoschema siskiyouense* POVOLNÝ 1985 (Fig. 25, 26, 40)**

POVOLNÝ 1985 - Acta Univ. Agric. Brno 33: 111-114.

**Material studied:** 1♂, 1♀, California, Fresno County, grade W of Portal Forbay, 8300, 4 air mi. W. Mono Hot Spr., I.IX.1971, light trap, H. G. Leech collector (slide no. CA.1130 ♀, CA.1131 ♂); 1♂, Utah, Garfield County, Kings Cr. campgr., 15 km SW Bryce (slide no. Pw.1014); 1♂, Oregon, Klamath County, Mazama Campground, Crater Lk. Natl. Park, 6000, VIII-21/22-75 J. Powellat light, slide no. 1060

This species was described from a male misidentified as *Gnorimoschema baccharisella* BUSCK 1903 and preserved in the Natural History Museum, London. As I have discovered additional material of this species (see above) the redescription of this striking taxon including its unknown female follows. A very stout species of *Gnorimoschema* showing a distinctive forewing pattern with honey yellow base bordered by a black transverse stripe, otherwise cinereous with black stigmata. These black stigmata are less distinct in females having also somewhat shorter forewing with more rounded apex. Head, thorax and tegula covered by dense, deeply grey to blackish scales, frons paler, honey-brownish; labial palpus very stout and thick, distinctly bicolorous, deeply grey to blackish, especially third segment with broad bright brownish medial fascia; forewing ground coloration essentially cinereous grey, but base broadly honey-brownish to yellowish and limited by a distinct black transverse band or stripe, this basal brownish spot may occasionally expand along hind (dorsal) forewing margin; 2/3 of forewing covered by a mixture of cinereous scales with blackish tips, but also pale brownish scale groups are admixed before apex indicating an indistinct transverse stripe; at least two deeply black stigmata surrounded by brownish scales, first in wing centre, second in discal area are present in male, but they are surrounded by diffuse brownish scales in female being less distinct; additional less distinct blackish stigmata are indicated at 1/2 of forewing length near its dorsal fold or elsewhere, apex shows a more or less distinct group of blackish stigmata or scales submarginally; forewing cilia grey; hindwing grey or thinly blackish, cilia grey; legs deeply grey to blackish with pale or whitish annuli. Forewing length 8.9 (♀) to 9.6 (♂) mm.

**Male genitalia.** Extremely stout and long, saccus very narrow, long ligulate with truncate tip, aedeagus long and slender, medial sacculus excision very deep and broad. For details see POVOLNÝ (1985) and fig. 25.

**Female genitalia.** Subgenital plate subquadrate, centrally membraneous with a delicate but distinct narrow crescent-shaped sclerotized ledge near apophysis base; proximal plate margin broadly protruding to form a short but stout periostial cylinder, and continued by a long heavily sclerotized funnel of colliculum; apophyses longer than subgenital plate; signum of corpus bursae is a very stout, but only moderately curved and smooth spine.

**Comments.** The species is outside similar to the moths of *Gnorimoschema coquillettelum* (BUSCK 1902) - *G. ericameriae* KEIFER 1933 - complex of species, but also to the *Gnorimoschema baccharisella* BUSCK 1903 species group, both producing gall-like deformities (on *Ericameria*) or hard stem galls (on *Baccharis*); the male genitalia show certain affinities to both species-groups, but the female genitalia (subgenital plate) indicate a comparatively clear relationship to *G. baccharisella*. The forewing pattern elements are similar in all these taxa, and it is characteristic of this situation that the holotype male of *G. siskiyouense* was misidentified as "*Gnorimoschema baccharisella* BUSCK". *G. siskiyouense* is probably a gall-producing species, but its biology is not known, possibly also due to the late description and recent rediscovery of this striking taxon. This species is probably distributed in the xeromontane habitats of Rocky Mountains (California, Oregon, Utah).

### ***Gnorimoschema valesiellum* (STAUDINGER 1877) (Fig. 35)**

STAUDINGER 1877 - Stettin. Entomol. Ztg. 28: 205 (*Lita*).

**Material studied:** 1♀, S. Yukon, Carcross, sand dunes, 12.7.1994, L. Kaila leg (slide Hk. 5561).

This single female corroborates the presence of this species (originally described from Wallis, southwestern Switzerland) in the northern part of America and its holarctic distribution combined with arcto-alpine disjunctions (POVOLNÝ 1992). Habitually the individual populations show some variance, but this situation is essentially very similar to the holarctic distribution of *Gnorimoschema nordlandicolellum*.

### ***Scrobipalopsis arnicella* (CLARKE 1942) (Photo 16)**

CLARKE 1942 - Proc. U.S.Natn. Mus. 92: 268 (*Gnorimoschema*).

**Material studied:** 1♂, Shasta Retreat, Siskiyou Co., Cal., "probably a *Gnorimoschema*", *Gnorimoschema arnicella* CLARKE, Paratype.

The valid generic status of this species was recognized by POVOLNÝ (1967) who also figured (fig. 120) the male genitalia of the paratype. The moth was preserved in the collections of the

California Academy of Sciences, San Francisco, and I used the opportunity to study this rare taxon and to photograph it. The comparatively broad-winged paratype moth is well preserved and it shows some typical gnorimoschemine characters: the two distinctive black stigmata situated axially at forewing centre, an indication of the pale subterminal transverse band and the general "gnorimoschemoid" pattern. It seems that a species inhabiting mountain elevations is involved.

***Ilseopsis (Euscrobipalpa) artemisiella* (TREITSCHKE 1833) (Fig. 36)**

TREITSCHKE 1833 - Schmett. Eur. 9(2): 97 (*Lita*).

Material studied: 1♀, S. Sask. (atchewan), Val Marie, grazed prairie, 24.6.1994, evening L. Kaila leg. (slide Hk.5584).

This female is undoubtedly conspecific with this transpalaeartic taxon which shows obvious trends towards subspeciation. The moth has, however, pale brownish forewing with an indication of a bright subterminal transverse band and usually two (of the usual triad) striking black stigmata in forewing axis centrally, never seen like this in the Palearctic specimens. Some authors believe that *Thymus* is the only foodplant of *I. (E.) artemisiella*, but it is likely that *Artemisia* is also its foodplant (POVOLNÝ 1990). Professor J. A. Powell, University of California, Berkeley, has reared a series of moths of this species from *Artemisia douglasiana* in coastal dunes of California (POWELL & POVOLNÝ 1998), and *Thymus* is practically absent from Canada.

***Ilseopsis (Euscrobipalpa) atriplicella* (FISCHER von ROESLERSTAMM 1839) (Fig. 37,38)**

FISCHER von ROESLERSTAMM 1839 - Schmetterlingskunde 1839: 223 (*Gelechia*).

Material studied: 1♂, S. Yukon, 16 km SE Whitehorse, *P. contorta*, sandy meadow, 11.7.1994, L. Kaila leg. (slide Hk. 5534); 1♀, S. Yukon, Carcross, sand dunes, 12.7.1994, ad luc., M. Ahola & L. Kaila (slide H.k. 5560).

The forewing pattern of the big male (forewing length 9.2 mm) consists of cinereous and brownish radiate veins with a characteristic triad of minor blackish stigmata and with a line of blackish submarginal spots. This is an unusual coloration and pattern for this taxon (having transpalaeartic distribution). The species was obviously introduced to the U.S.A. (POVOLNÝ 1967) being a feeder of ruderal Chenopodiaceae. The above material, mainly the male, indicates also that autochthonous nearctic populations of this species should be taken into consideration.

***Ilseopsis (Euscrobipalpa) instabilella* (DOUGLAS 1846) (Fig. 39)**

DOUGLAS 1846 - Zoologist 1846: 1270 (*Gelechia*).

Material studied: 1♂, 1♀, SW Sask.(atchewan), The Great Sand Hills, 60 km NE Tompkins, prairie, 28.6.1994, ad luc., M. Ahola & L. Kaila leg., (slide Hk. 5559b, Hk. 5561).

This male shows genitalia and pattern typical of this taxon and I have identified specimens of *I. (E.) instabilella* collected in coastal dunes of California, where I believe it was introduced. *I. (E.) instabilella* and the related *Ilseopsis (Euscrobipalpa) salinella* (ZELLER 1847) represent a continuum of halophile miners of Chenopodiaceae from European sea coasts but also saline habitats of the Palearctic Region (Europe and Asia up to Mongolia). The above male might be the next evidence that this halophile complex represents another holarctic gnorimoschemine taxon.

***Scrobipalpulopsis lutescella* (CLARKE 1934)**

CLARKE 1934 - Canad. Ent. 66:172 (*Gnorimoschema*).

Material studied: 1♂, Yukon Territory, 63°25'N, 136°40'W, Klondike Highway, Stewart Cross, *Artemisia* slope, 15.7.1985, K. Mikkola leg. (slide Hk. 5507); 2♂♂, Ontario Nepean Pinhey Forest, Stoney Swamp, 22.5.1985, K. Mikkola leg. (slide Hk.5562).

The above two collecting data confirm the distributional pattern of this species which extends from the coast of central California to eastern Washington up to Yukon Territory. Its foodplants are various species of *Castilleja*, the caterpillars feeding on their inflorescence. The species of the genus *Scrobipalpus* are essentially Neotropical (POVOLNÝ 1994) *S. lutescella* representing the only Nearctic species of this genus.

### *Scrobipalpa psilella* (HERRICH-SCHÄFFER 1855)

HERRICH-SCHÄFFER 1855 - Schmett. Eur. 5: 171 (*Gelechia*).

**Material studied:** 4♂♂, Ontario Nepean Pinhey Forest, Stoney Swamp, 22.5.1985, K. Mikkola leg., (slides Hk. 5511, Hk. 5514, Hk. 5520, Hk. 5526). 1♂, Quebec, Masham, Lake Duncan, 11.6.1985, ad luc., K. Mikkola leg. (slide Hk. 5512); 1♂, Prov. Quebec, 45°34'N, 76°06'W, Parc de la Gatineau Ramsay Lake, at light, 21.6.1985, K. Mikkola leg. (slide 5518); 1♀, Ontario, 40 km SW Perth, Bob's Lake, 24.5.1985, ad luc., K. Mikkola leg. (slide Hk. 5529).

The above material (but I have also seen specimens of this taxon from sandy habitats in Alberta at elevations above 1000 m a.s.l.) belongs to a group of moths known to be distributed throughout the immense territories of the Palaearctic Region. This is a species complex comprising forms of Neotropical and Holarctic distribution and feeding on a considerable number of foodplants (POVOLNÝ 1990). These forms show genitalia of both sexes differing only in quantitative terms, but showing no specific features. The moths may show numerous habitual characters simulating distinctive specific taxa, but these characters reflect usually various foodplants and possibly also differences in voltinism due to their immense ecological plasticity. It seems to be impossible to understand this complex without rearings of the individual forms from their various foodplants and environments, because valid taxonomical conclusions cannot be based on specimens collected in the field, where no biological data are available.

## Zusammenfassung

Es werden die folgenden dreizehn neuen Arten der Gattung *Gnorimoschema* in die Literatur eingeführt: *G. brachiatum* sp. n., *G. clavatum* sp. n., *G. ligulatum* sp. n., *G. lobatum* sp. n., *G. nanulum* sp. n., *G. obscurior* sp. n., *G. petiolatum* sp. n., *G. powelli* sp. n., *G. rotundatum* sp. n., *G. segregatum* sp. n., *G. spinosum* sp. n., *G. reichli* sp. n. und *G. tunicatum* sp. n. Mit Ausnahme von *G. powelli* sp. n. einer offenbar kalifornisch-endemischen Art (gezüchtet von Professor Dr. J.A. Powell, University of California, Berkeley, aus Gallen an *Baccharis sarothroides*), wurden alle Arten meist in den sandigen Habitaten Kanadas von einem finnischen Team unter der Leitung von Dr. Kauri Mikkola, Helsinki, gesammelt. *Gnorimoschema siskiyouense* POV. Wird nach der Neuentdeckung dieser Art ausführlich beschrieben und entsprechend abgebildet. *Ilseopsis (Euscrobipalpa) artemisiella* (TRTSCH.) wurde erneut in Nordamerika erbeutet, so daß sie nicht nur als ein holarktisches Element eingeschätzt werden sollte, sondern es werden auch Ansichten mancher Autoren, daß *Thymus* die einzige Nahrungspflanze dieser Art ist, nachgeprüft werden müssen, weil *Thymus* in Kanada kaum verbreitet ist. Die Art wurde übrigens auch in Kalifornien aus *Artemisia* gezüchtet. Als holarktisch verbreitet gelten auch *Ilseopsis (Euscrobipalpa) instabilella* (DOUGL.) und *Gnorimoschema herbichi* (NOW.). Die Artberechtigung von *Gnorimoschema nilsi* HUEMER 1966 wird angezweifelt, da es sich offenbar um eine hochalpine Population der holarktischen arкто-alpinen Art *Gnorimoschema nordlandicoellum* (STRAND) handelt, die wiederholt in den Sandsteppen Nordkanadas gesammelt wurde. Weitere ausführliche Angaben als auch entsprechende Abbildungen sind im englischen Text zu finden.

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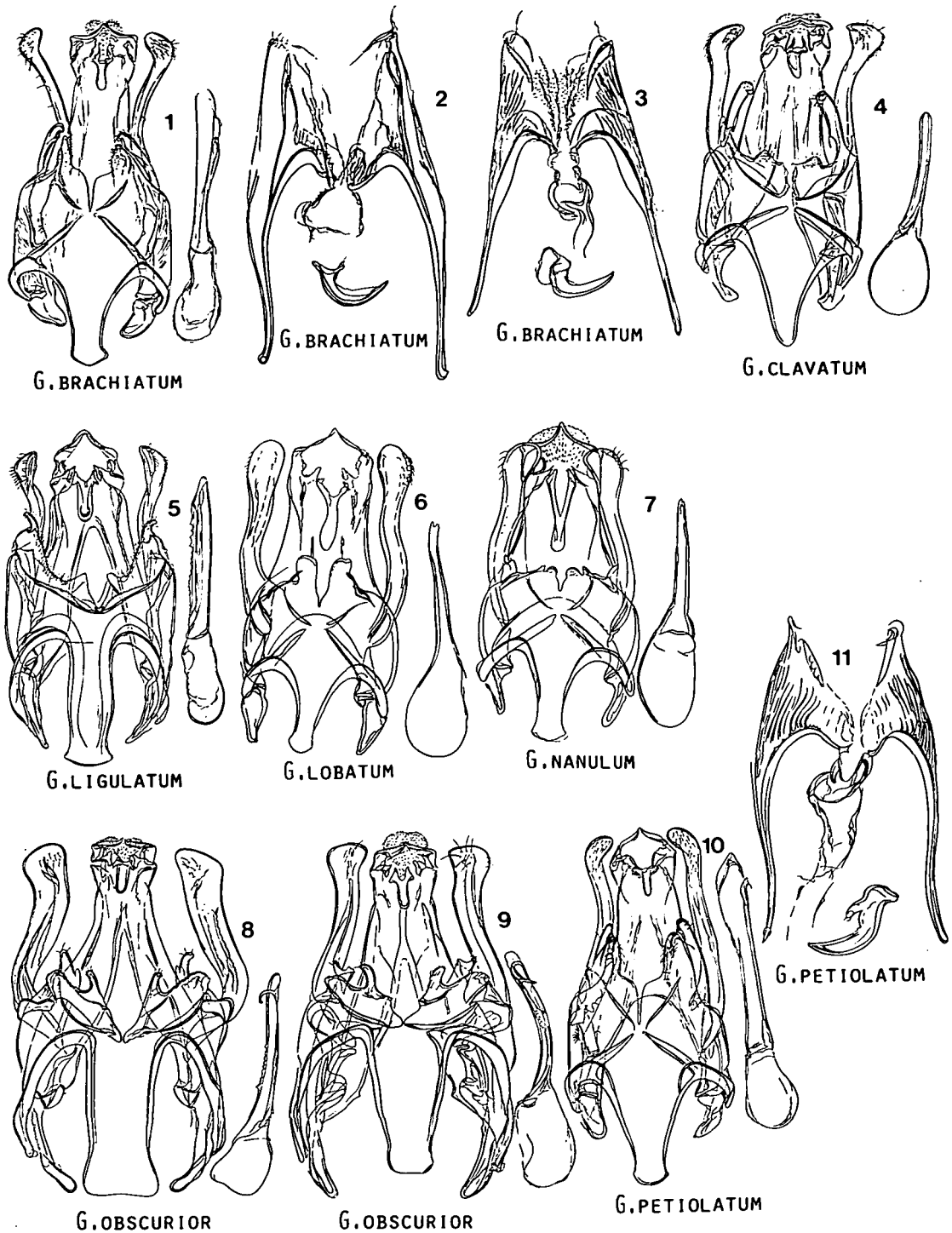


Fig.1 *Gnorimoschema brachiatum*, male, Hk.5541; Fig.2 *Gnorimoschema brachiatum*, female, Hk.5542; Fig.3 *Gnorimoschema brachiatum*, female, Hk.5544; Fig.4 *Gnorimoschema clavatum*, male, Hk.5545; Fig.5 *Gnorimoschema ligulatum*, male, Hk.5554; Fig.6 *Gnorimoschema lobatum*, male, Hk.5530; Fig.7 *Gnorimoschema nanulum*, male, Hk.5521; Fig.8 *Gnorimoschema obscurior*, male, Hk.5540; Fig.9 *Gnorimoschema obscurior*, male, Hk.5551; Fig.10 *Gnorimoschema petiolatum*, male, Hk.5545; Fig.11 *Gnorimoschema petiolatum*, female, Hk.5532



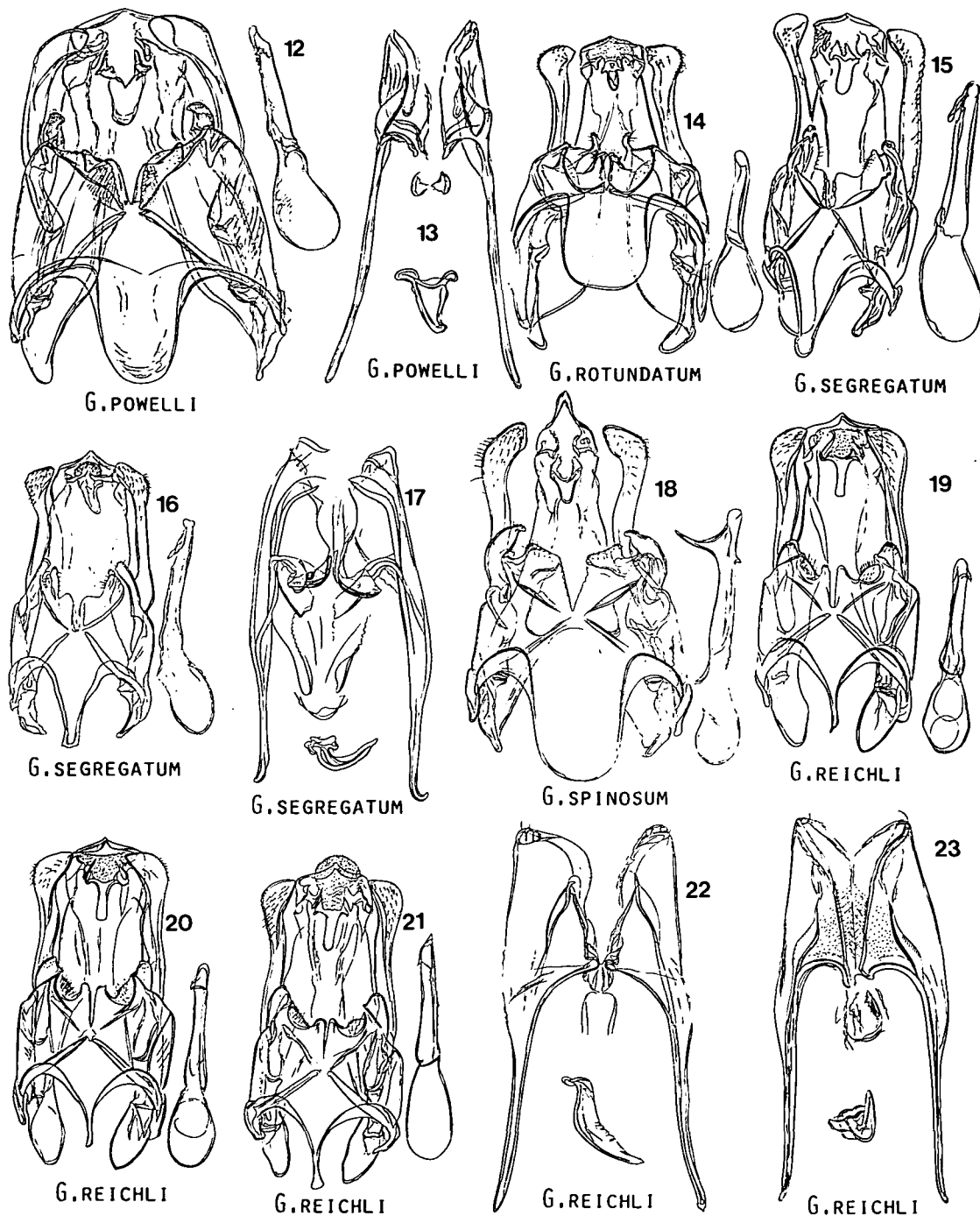


Fig.12 *Gnoringoschema powelli*, male, JAP 7446; Fig.13 *Gnoringoschema powelli*, female, JAP 7454;  
 Fig.14 *Gnoringoschema rotundatum*, male, Hk.5505; Fig.15 *Gnoringoschema segregatum*, male, Hk.5553;  
 Fig.16 *Gnoringoschema segregatum*, male, Hk.5567; Fig.17 *Gnoringoschema segregatum*, female, Hk.5546;  
 Fig.18 *Gnoringoschema spinosum*, male, Hk.5547; Fig.19 *Gnoringoschema reichli*, male, Hk.5548;  
 Fig.20 *Gnoringoschema reichli*, male, Hk.5548a; Fig.21 *Gnoringoschema reichli*, male, Hk.5549;  
 Fig.22 *Gnoringoschema reichli*, female, Hk.5549a; Fig.23 *Gnoringoschema reichli*, female, Hk.5552

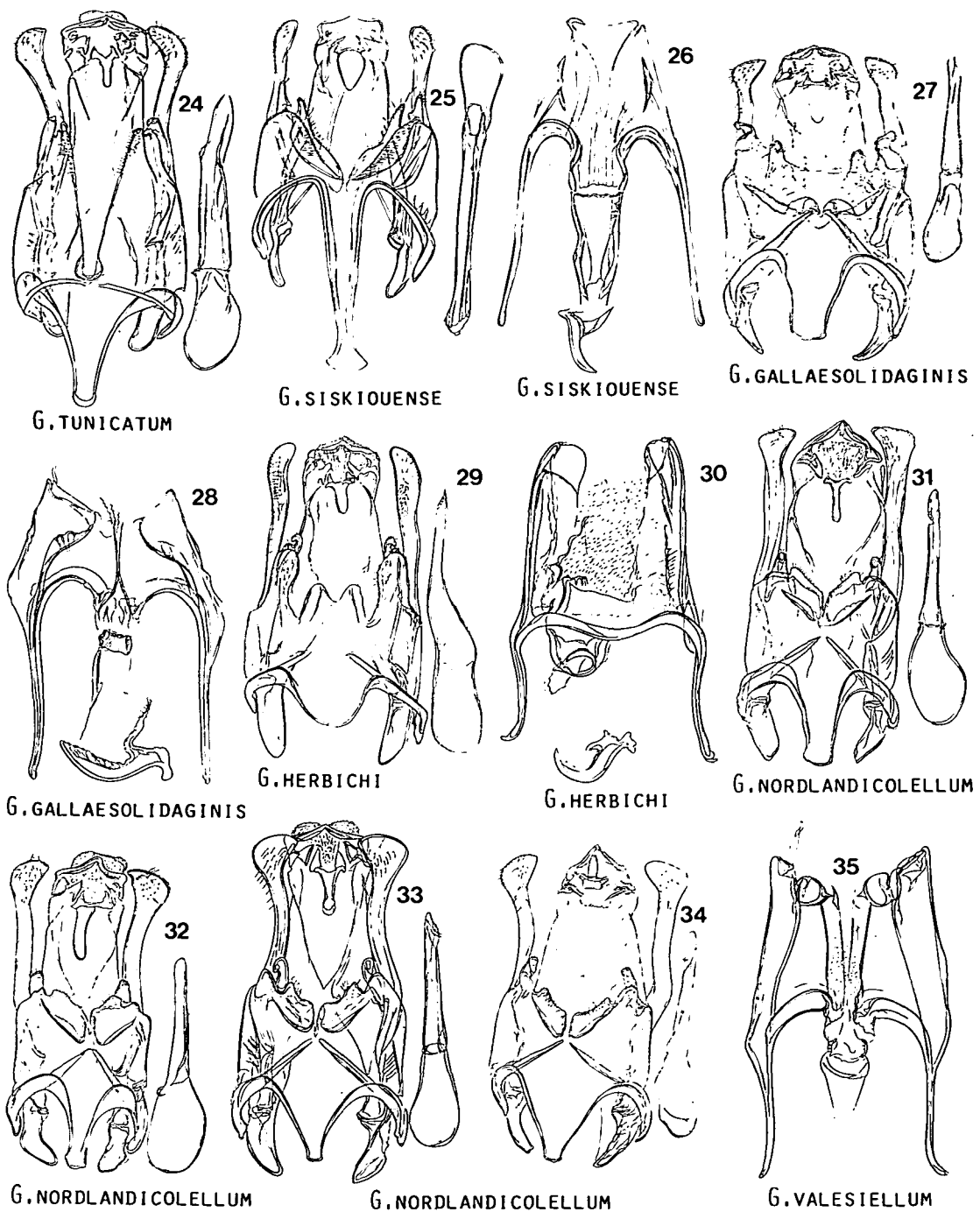


Fig.24 *Gnorimoschema tunicatum*, male, Hk.5539; Fig.25 *Gnorimoschema siskiyouense*, male, Pw.1060; Fig.26 *Gnorimoschema siskiyouense*, male, Pw.1130; Fig.27 *Gnorimoschema gallaesolidaginis*, male, Hk.5502; Fig.28 *Gnorimoschema gallaesolidaginis*, female, Hk.5501; Fig.29 *Gnorimoschema herbichi*, male, Hk.5519; Fig.30 *Gnorimoschema herbichi*, female, Hk.5508; Fig.31 *Gnorimoschema nordlandicolella*, male, Hk.5531; Fig.32 *Gnorimoschema nordlandicolella*, male, Hk.5536; Fig.33 *Gnorimoschema nordlandicolella*, male, Hk.5537; Fig.34 *Gnorimoschema nordlandicolella*, male, Hk.5555; Fig.35 *Gnorimoschema valesiellum*, female, Hk.5561

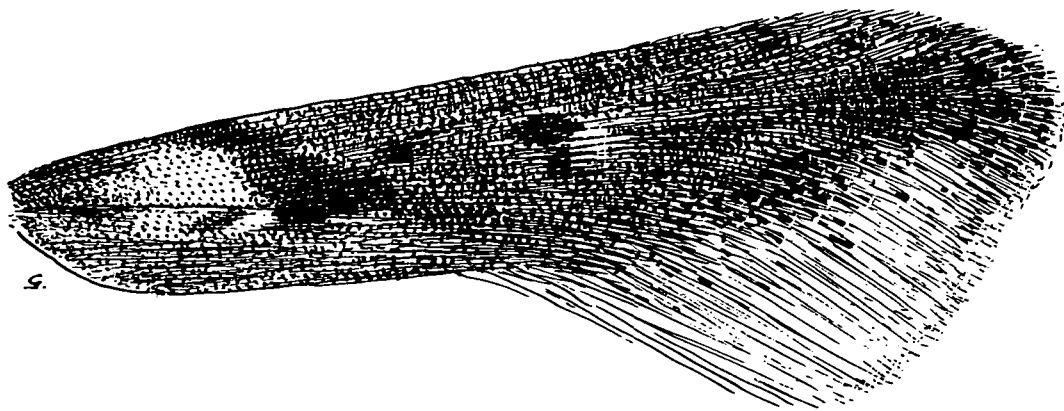
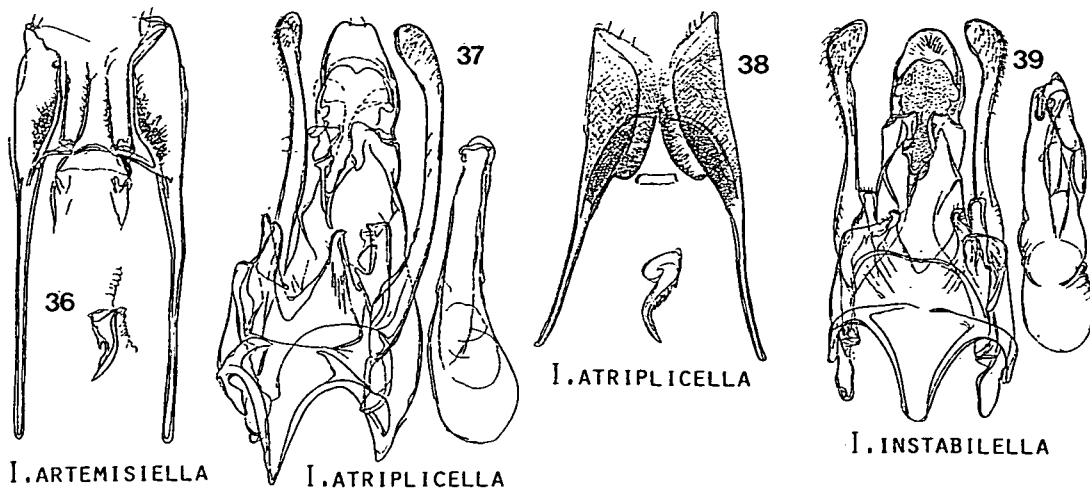
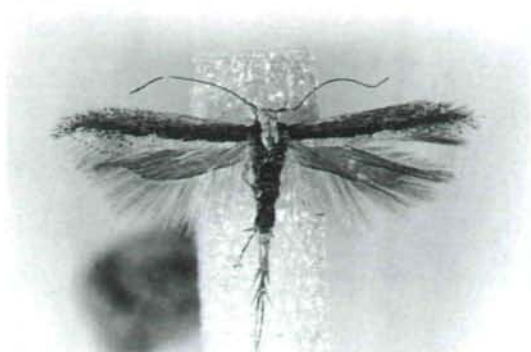


Fig.36 *Euscrobipalpa artemisiella*, female, Hk.5548; Fig.37 *Euscrobipalpa atriplicella*, male, Hk.5534; Fig.38 *Euscrobipalpa atriplicella*, female, Hk.5560; Fig.39 *Euscrobipalpa instabilella*, male, Hk.5559; Fig.40 Forewing of *Gnorimoschema siskiouense*



**Photo 1** *Gnorimoschema brachiatum*, male paratype;



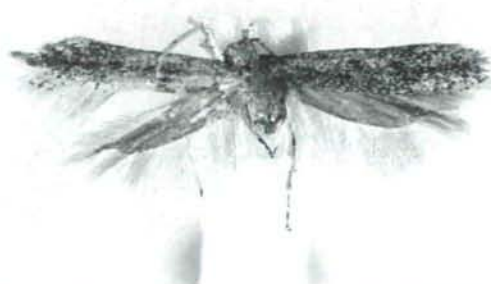
**Photo 2** *Gnorimoschema clavatum*, male holotype;



**Photo 3** *Gnorimoschema ligulatum*, male holotype;



**Photo 4** *Gnorimoschema lobatum*, male holotype



**Photo 5** *Gnorimoschema nanulum*, male holotype;



**Photo 6** *Gnorimoschema obscurior*, male holotype



**Photo 7** *Gnorimoschema obscurior*, male paratype;



**Photo 8** *Gnorimoschema petiolatum*, male paratype



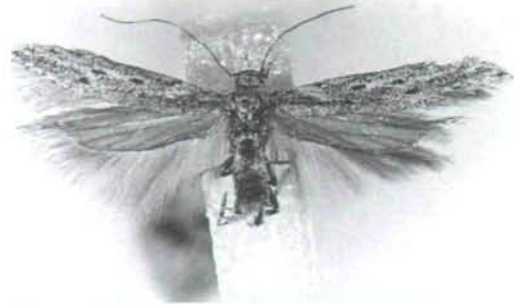
**Photo 9** *Gnorimoschema powelli*, male paratype



**Photo 10** *Gnorimoschema powelli*, female paratype



**Photo 11** *Gnorimoschema rotundatum*, male holotype



**Photo 12** *Gnorimoschema segregatum*, male paratype



**Photo 13** *Gnorimoschema spinosum*, male holotype



**Photo 14** *Gnorimoschema reichli*, male paratype



**Photo 15** *Gnorimoschema tunicatum*, male paratype



**Photo 16** *Scrobipalopsis arnicella*, male paratype

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