

IDENTITY OF *MOMPHA SEXSTRIGELLA* (BRAUN), WITH TWO NEW NEARCTIC SPECIES (LEPIDOPTERA: MOMPHIDAE)

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ABSTRACT.— We resolve a potentially confusing species-level problem involving *Mompha sexstrigella* (Braun) and two undescribed *Mompha* species that are externally similar to *M. sexstrigella*. The new western North American moths are described as *Mompha achlyognoma* n. sp. (California) and *Mompha cleidarotrypa* n. sp. (Arizona); we provide illustrations and diagnoses for separating the three. We also reassign *Mompha complexa* Svensson as a junior synonym of *M. sexstrigella*.

SAMENVATTING.— Er wordt een oplossing geleverd voor een mogelijk verwarrend soortenprobleem betreffende *Mompha sexstrigella* (Braun); twee nieuwe soorten die uiterlijk gelijken op *M. sexstrigella* worden beschreven: *Mompha achlyognoma* sp. n. (California) en *Mompha cleidarotrypa* sp. n. (Arizona). Illustraties en diagnoses om de drie soorten te onderscheiden worden gegeven. Ook wordt *Mompha complexa* Svensson als junior synoniem van *M. sexstrigella* aangewezen.

KEYWORDS: Arizona, biology, California, Colorado, distribution, Europe, Finland, hostplants, *Mompha achlyognoma* n. sp., *Mompha cleidarotrypa* n. sp., Montana, New Mexico, North America, Onagraceae, Oregon, Russia, Sweden, synonymy, taxonomy, USA, Washington.

Mompha sexstrigella (Braun, 1921) was described from specimens reared from leaf mines on *Chamaenerion angustifolium* (Linnaeus) Scopoli (Onagraceae) in Montana, USA. During the course of our study of North American Momphidae preparatory to our covering the family for the series, *Moths of America North of Mexico*, we became aware of two *M. sexstrigella*-like species: one was collected at light in Arizona, USA, the other was reared from larvae feeding on *Epilobium brachycarpum* Presl (Onagraceae) in California, USA. We determined both species to be distinct from *M. sexstrigella* (by comparison with the holotype), and both were undescribed. Dissection of several specimens identified as *M. sexstrigella* revealed that the series contained both *M. sexstrigella* and the California species. Considering that superficial similarity among these species has led to misdetermination of *M. "sexstrigella"* in collections, and because the present nomenclatural confusion will affect western USA microlepidoptera checklists (at least one of which we know to be in progress), we submit the following information to clarify the identities of these three moths and to provide names for two new species.

Mompha sexstrigella (Braun)

(Fig. 1, 4, 7)

Psacaphora sexstrigella Braun 1921. Proc. Acad. Nat. Sci. Phila., 73: 5.

Mompha complexa Svensson 1982. Ent. Scand., 13 (3): 297. **New Synonymy.**

Mompha sexstrigella Hodges 1983. Check List Lepid. Am. North Mex.: 17.

Redescription.— Sexes similar. Forewing length 4.5-5.0mm. *Head.* Frons ochreous white with copper reflection toward clypeus; vertex shining gray with irrorated dark gray anteriorly, shining blackish brown posteriorly; collar shining dark grayish brown; labial palpus light gray,

first segment very short, second segment more than 1.5x as long as third, both irrorated dark gray; antenna with scape shining dark brown dorsally, light gray ventrally; remainder of antenna shining dark gray. *Thorax.* Shining blackish brown, lighter posteriorly; legs blackish brown, foreleg with white apical band on tibia, and with white apical bands on first, second, and fourth tarsal segments; middle leg with white subbasal and medial streaks on tibia, and with white apical bands on first four tarsal segments; spurs dark gray basally, white apically. Forewing shining leaden gray, strongly irrorated blackish, especially at base; a white costal spot at 0.75 wing length, an orange spot below fold at 0.20; two tufts of raised blackish scales, the inner on fold before 0.50, the outer on posterior margin opposite the white costal spot; a small orange subcostal spot just beyond the inner scale tuft, and a similar tuft, larger and very indistinct, before the white costal spot; apical area orange brown, divided and outwardly edged by dark brown streaks; four to six white spots around apex, sometimes a small white spot on inner edge of outer scale tuft; two distinct cilia lines, cilia shining leaden gray around apex, ochreous gray posteriorly. Hindwing shining light gray, cilia ochreous gray. Underside of forewing shining grayish brown with white costal and apical spots indistinctly visible, cilia dark brown around apex; hindwing shining brownish gray in anterior half, shining gray in posterior half. *Abdomen.* Shining gray dorsally, segments with brown spots anteriorly; shining dark gray ventrally, segments with pale bands posteriorly; genital tuft ochreous white.

Male genitalia (Fig. 4). Cucullus with widest part subbasally, gradually tapering distally, apex rounded; sacculus as long as cucullus, rather abruptly curving to a blunt and curved apex, dorsal margin heavily sclerotized from base to 0.67, apically bifurcate; uncus slender and pointed; transtilla membranous, apparently absent; aedeagus slender with a large hook-shaped cornutus and several minute spines; juxta lobes long and pointed.



Fig. 1-3. Adult moths: 1. *Mompha sexstrigella*. 2. *M. achlyognoma*. 3. *M. cleidarotrypa* (illustrations by J. C. Koster).

Female genitalia (Fig. 7). Seventh sternite rather heavily sclerotized, rugose laterally, posterior margin pronouncedly concave on either side of ostium bursae so that the lateral margins appear to be produced posterad; sterigma of two tapering lobes, united posteriorly; ostium bursae slightly bowl-shaped; posterior half of ductus bursae bottle-shaped and sclerotized with an unsclerotized band in widest part, anterior half unsclerotized, narrowing towards the corpus bursae and with a wide inception of the ductus seminalis at 0.33; corpus bursae with two sickle-shaped signa.

Material examined.— **Holotype** ♂: bears the following five labels: (1) "Glacier Nat. Pk/iss. viii.14.20 Mont./Annette F. Braun" (printed, with issue date hand written); (2) "B.1056" (hand written); (3) "TYPE/collection of Annette F. Braun" (red, printed); (4) "Psacaphora/sexstrigella/Type Braun" (hand written); (5) "Collection of /THE ACADEMY OF/NATURAL SCIENCES/of Philadelphia (ANSP)" (printed); cleared abdomen in glycerin vial on specimen pin (ANSP).

Other USA records: COLORADO: 1 ♂, Chaffe Co., Cottonwood Pass Rd., 10200ft 16 Jul 1982, Ronald W. Hodges; genitalia slide TH-USNM-67 (USNM). NEW MEXICO: 1 ♀, Sangre de Cristo Mts., nr. Cowles, 1 Aug 1939, AFB (rearing lot) B.1794; genitalia slide TH-USNM-34 (USNM).

EUROPE: Paratype ♀ of "*M. complexa*": SWEDEN: Suecia, TO, Karmaspakte, UTM 34W DA 1128, 22 Jun 1978, Ingvar Svensson; genitalia slide 6005 (MZLU). **Other European records:** FINLAND: 9 ♂, 671:53EK:Virolathi Errikkala, 27-28 Jul 1986, J-P. Kaitila leg. (JCK); Ka 671:53, Virolathi, 5-17 Jul 1975, J. Jalava leg; genitalia slide 3407 (ZMUH); Ka: Virolathi, 671:53, 15-28 Jun 1976, 16-25 Jul 1986 (genitalia slide 3490), 23-5 Aug 1986, E. Laasonen leg.; genitalia slide 3406 (EL); Ka: Virolathi, 671:54, 20-27 Jul 1983 (two specimens), 13-22 Aug 1985, E. Laasonen leg. (EL); N: Helsinki, 66:3, 21-27 Jul 1980, E. Laasonen leg. (EL). RUSSIA: 1 ♂, Murmansk area, Luostari, 15 Jun 1980, leg. S. Yu. Sinev (ZMAS).

Diagnosis.— Differs from *Mompha achlyognoma* (described below) in the more somber color of the forewing, in which the light-yellow tornal spot is absent and the orange spot below fold at 0.20 does not reach the posterior margin; forewing of *Mompha cleidarotrypa* (described below) differs from that of both other species by the white costal spot at 0.50 and by the strong coppery reflections. In male genitalia of *M. sexstrigella*, the transtilla is apparently absent and there is a heavily-sclerotized bifurcate projection on the dorsal margin of the sacculus; in female genitalia of *M. sexstrigella*, posterior margin of seventh sternite is concave, and the ductus bursae is bottle-shaped in its posterior half. With exception of the concave seventh sternite, these characters separate *M. sexstrigella* from *M. cleidarotrypa*.

Biology.— The larva of *M. sexstrigella* mines leaves of *Chamaenerion angustifolium* (Onagraceae) in August (Europe and USA); the mine begins as a gallery, ends as a blotch; pupation occurs within the mine. Probably univoltine.

Distribution.— Known from the western USA and from northern Europe. The host plant is native to both of these localities; therefore, *M. sexstrigella* appears to be a Holarctic species.

Remarks.— *Mompha complexa* was described from specimens collected in Savolaks, Imatra, Finland; in the description, it was also listed from California and Montana, USA. Genitalia of a female paratype of *M. complexa* match the holotype of *M. sexstrigella*; likewise, there are no differences in male genitalia between the two.

***Mompha achlyognoma* Koster & Harrison, new sp.**

(Fig. 2, 5, 8)

Description.— Sexes similar. Forewing length 3.5mm. *Head.* Frons ochreous white, shining gray toward clypeus, vertex shining gray with dark gray irrorations anteriorly; collar shining dark gray; labial palpus dark gray irrorated white, first segment very short, white, second about 1.5x as long as third and with white apical ring, third segment with white basal ring and apex; scape dark gray, mottled white dorsally, light gray ventrally, remainder of antenna shining dark gray. *Thorax.* Shining dark gray, tegulae lighter posteriorly. Legs dark gray, foreleg with white apical band on tibia and on tarsal segments one, two, and four; middle leg with white subbasal and medial streaks on tibia; hindleg with white medial and apical bands on tibia; spurs white. Forewing shining leaden gray and orange brown, strongly irrorated blackish, especially at base; a white costal spot at 0.75 wing length, below this a yellow-orange spot, a square yellow-orange spot from fold to posterior margin at 0.20, two small yellow-orange spots before and beyond middle, a light yellow spot, more basal than the white costal spot, on tornus, and an often indistinct yellow-orange streak in the apical area. Two tufts of raised blackish scales, the inner one before 0.50 wing length and below fold, the outer one on posterior margin opposite the white costal spot; four to six indistinct white streaks around apex; two distinct cilia lines; cilia grayish brown around apex, ochreous gray posteriorly. Hindwing shining light gray; cilia ochreous gray. Underside of forewing shining grayish brown, white costal and apical spots indistinctly visible; cilia speckled light gray at costa and with two dark-brown lines around apex; underside of hindwing shining brownish gray in anterior half, shining gray in posterior half, apex pale, almost white. *Abdomen.* Shining dark gray, segments speckled light gray midventrally; genital tuft ochreous white.

Male genitalia (Fig. 5). Cucullus widest at base, gradually tapering distally, apex rounded; sacculus as long as cucullus, gradually tapering to a curved and pointed apex, a transverse peglike projection on the dorsal margin at 0.50; uncus pointed and hooked; transtilla present, divided in the middle, aedeagus slender with a large hook-shaped cornutus; juxta lobes long and pointed.

Female genitalia (Fig. 8). Seventh sternite unmodified; sterigma two lobes, rounded distally, tapering anteriorly; ostium bursae funnel-shaped and slightly sclerotized; ductus bursae narrowing towards corpus bursae, inception of ductus seminalis at 0.33; corpus bursae with two sickle-shaped signa.

Holotype ♂: Collected as larva in leaf mine on *Epilobium brachycarpum* (Onagraceae), USA: California, Contra Costa Co., Richmond Field Station, 16 Sep 1994, Y.-F. Hsu; iss. 26 Mar 1995; genitalia slide TH-USNM-187 (USNM). **Allotype** ♀: Same data as for holotype, genitalia slide TH-USNM-188 (USNM). **Paratypes**: 3 ♂, same collection data as for holotype; iss. 10 Oct 1994, 14 Oct 1994, 26 Mar 1995 (USNM). 7 ♂, 1 ♀, OREGON, Wallowa Co., Hell's Canyon, 1800m, Buckthorn Overlook, 5-6 Aug 1992, leg H. W. v. d. Wolf; genitalia slides 4002 (♂), 4003 (♀) (VdW; JCK). 1 ♂, CALIFORNIA, Modoc Co., 13km W. Cedarville, 1900m, 10-11 Aug 1992, leg. H. W. v. d. Wolf (JCK).

Additional material examined: CALIFORNIA: 1 ♀, Cedar Pass Cpgd., Modoc Co., 23 Jul 1968, 5900ft P. Opler, J. Powell & J. A. Scott; genitalia slide TH-USNM-182 (USNM); 1 ♂, Navarro, 21 Jun 1937, E. C. Johnston; genitalia slide TH-USNM-176 (USNM); 2 ♀, Contra Costa Co., Richmond, 22 Jul 1959, C. D. MacNeill coll.; genitalia slides TH-USNM-185, 186 (USNM). COLORADO: 1 ♂, Chaffee Co., 4 mi SW Buena Vista, 8700ft 10 Jul 1982, Ronald W. Hodges; genitalia slide TH-USNM-119 (USNM); 1 ♀, same locality and collector, 15 Jul 1982; genitalia slide TH-USNM-121 (USNM). WASHINGTON: 1 ♂, Yakima Ind. Res., 10 mi SW White Swan, Mill Creek, 2000' 2 Aug 1962, J. F. G. Clarke; genitalia slide TH-USNM-122 (USNM); 1 ♀, Pullman, J. F. Clarke, 6 Aug 1930. OREGON: 1 ♂, Baker, Spring Creek, 3 Aug 1962,

J. H. Baker coll.; genitalia slide TH-USNM-32 (USNM).

Etymology.— From Greek, *αχλυσ* "gloom, darkness"; and *γωμη* "a mark, judgement"; in reference to the rather somber vestiture of this species, which is typical for momphid moths of this color-group.

Diagnosis.— Differs from the other two species discussed in this paper by presence of a transverse peglike projection on dorsal margin of sacculus, and by the funnel-shaped ostium bursae.

Biology.— The larva is a leaf miner on *Epilobium brachycarpum*, the mines occurring in September in Contra Costa Co., California. Phenology and voltinism largely unknown (see field-collection dates and rearing emergence dates above).

Distribution.— Known from several states in the western USA.

***Mompha cleidarotrypa* Koster & Harrison, new sp.**

(Fig. 3, 6, 9)

Description.— Sexes similar. Forewing length 4.0mm. *Head.* Frons ochreous white, shining light gray toward clypeus, vertex and collar shining bronze gray; labial palpus clear white dorsally and medially, rather heavily dusted with brown ventrally and laterally, first segment very short, second segment 1.5x as long as third; scape of antenna dark gray dorsally, white ventrally, remainder of antenna dark gray with faint violet reflections, with a series of three or four paler segments, each alternating with a dark gray segment, beginning about seven segments from apex of antenna. *Thorax and tegulae.* Shining bronze gray dorsally, silvery white ventrally; foreleg gray dorsally, white ventrally, with white apical bands on tarsal segments one, two, and four; coxa of middle leg whitish with central gray blotch, remainder of leg whitish dorsally, gray and finely speckled with white ventrally, tibia with medial and apical white bands, spurs white, tarsus as in anterior leg; hindleg colored as in middle leg, tibial spurs whitish, a dorsal ridge of hairlike scales on tibia, length of these scales less than width of tibia, scales of white apical band on tibia forming a small brushlike tuft, each of the basal four tarsal segments with a white apical band. Forewing clear shining gray in basal sixth, somewhat speckled with pale bluish gray in apical half; entire wing with strong coppery reflections in some angles of light; an orange patch at 0.20 wing length, extending from posterior margin to fold, sometimes continuing toward apex as a narrow orange posterior margin; beyond the orange patch is a clear shining-gray area followed by a raised tuft of blackish scales at 0.40 wing length; beyond the tuft, the orange posterior margin sometimes widens to reach the fold; directly anterior to this orange area is a white costal spot at 0.50 wing length; another slightly larger white costal spot lies at 0.80 wing length; on posterior margin of wing at level between the two white costal patches is a small blackish tuft of raised scales, followed by a few orange scales; fringe from apex to tornus with distinct, pale bluish-gray line followed by a blackish line; two pale bluish-gray lines, both rather faint, occur in this same area of the fringe; fringe otherwise uniformly gray; underside shining grayish brown, inner white costal spot hardly, outer distinctly visible, fringe with two dark lines around apex. Hindwing and its fringe brownish gray, underside shining brownish gray in anterior part, shining gray in posterior part. *Abdomen.* Dorsally, shining gray brown with many purple and green reflections; ventrally shining whitish; genital tuft whitish in male; female with a whitish apical ring.

Male genitalia (Fig. 6). Cucullus achieving greatest width at 0.33 length, narrowing to rounded apex; sacculus subequal to cucullus, 2x as long as its own greatest width, tapering to point at apex; uncus long and pointed, slightly curved ventrad near apex; each half of transtilla consisting of dorsal, triangular element and a ventral, transverse bar, each bar tapered to an acute apex and not meeting the opposing bar at the midline; aedeagus subcylindrical with two elongate cornuti, each of which terminates in a curved point near apex of aedeagus; juxta lobes prominent, each approximately half as long as uncus.

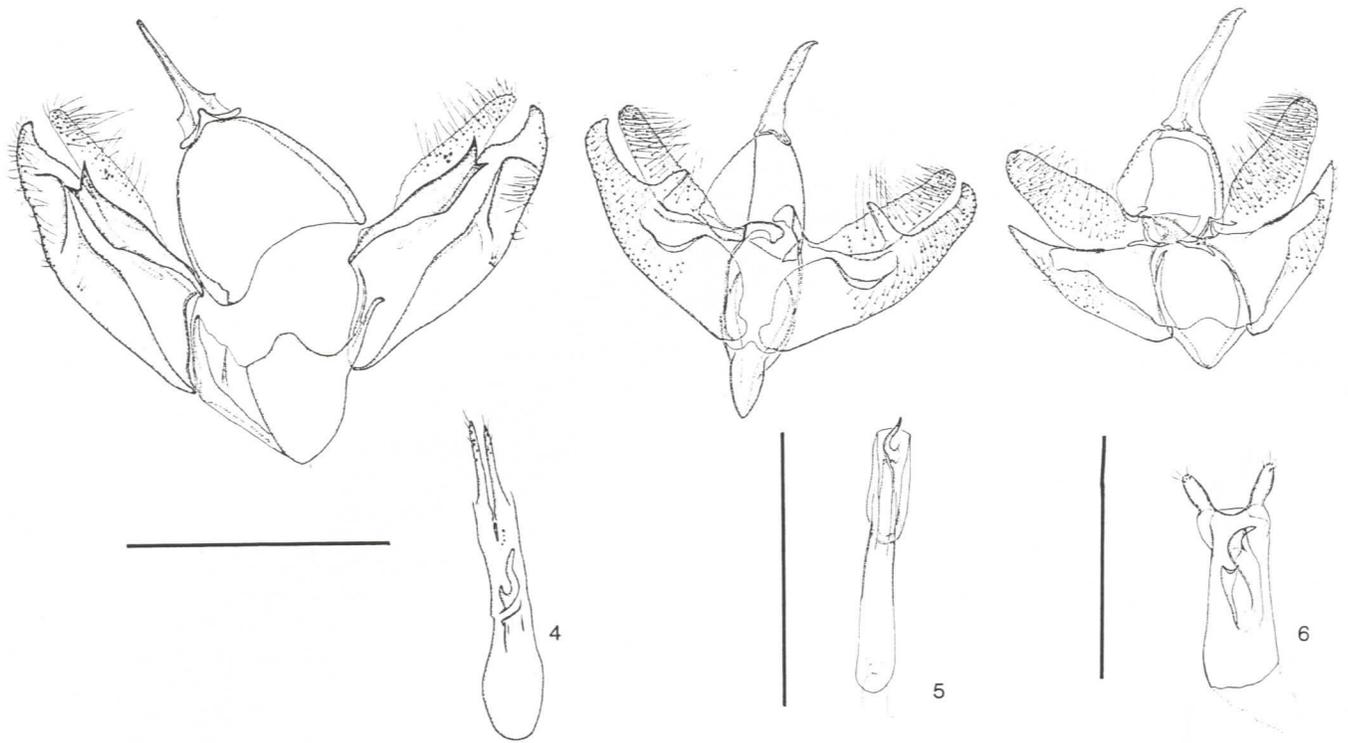


Fig. 4-6. Male genitalia: 4) *Mompha sexstrigella*. 5) *M. achlyognoma*. 6) *M. cleidarotrypa* (scale bar = 0.5mm) (illustrations by J. C. Koster).

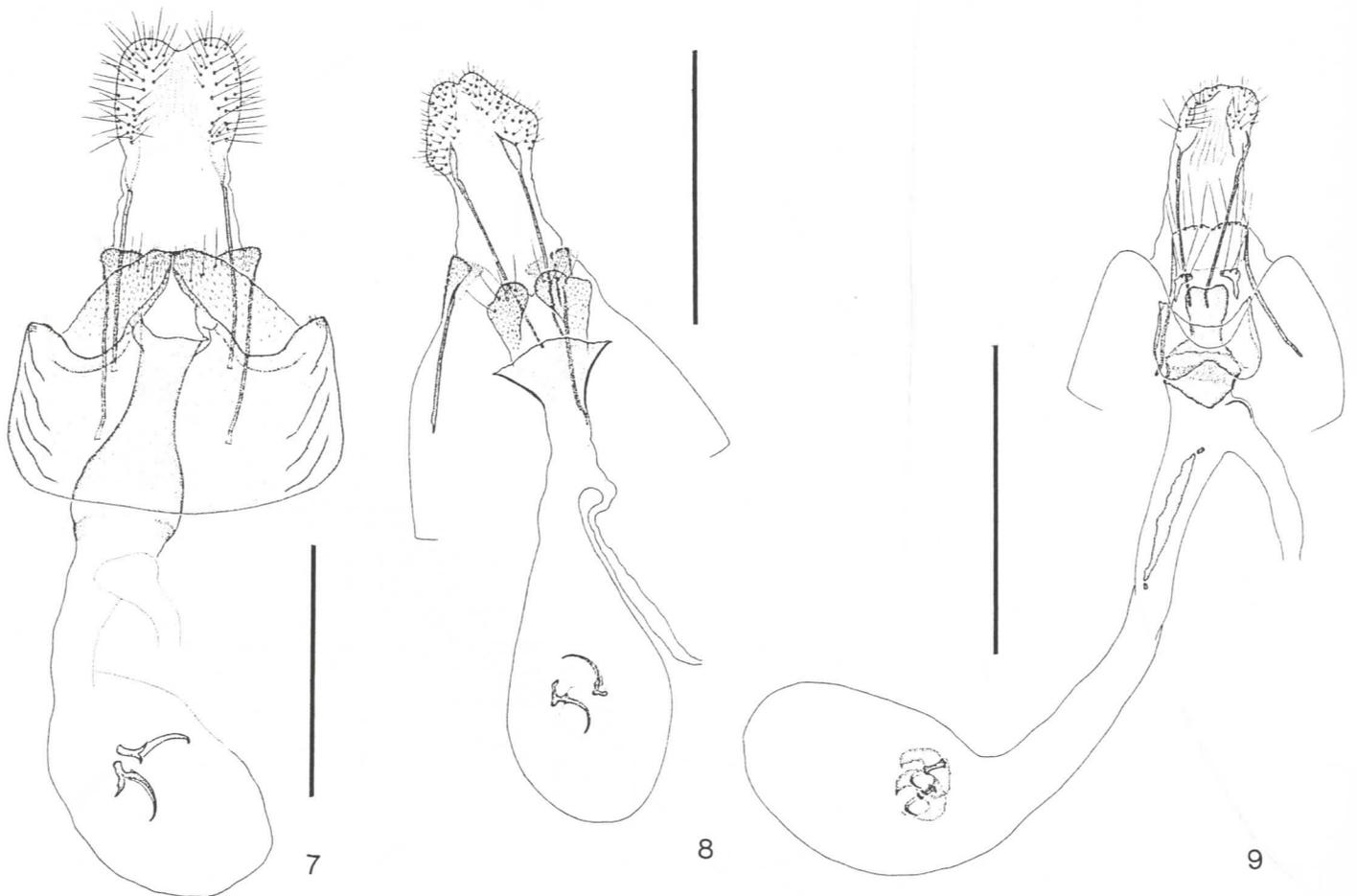


Fig. 7-9. Female genitalia: 7) *Mompha sexstrigella*. 8) *M. achlyognoma*. 9) *M. cleidarotrypa* (scale bar = 0.5mm) (illustrations by J. C. Koster).

Female genitalia (Fig. 9). Seventh sternite sclerotized in posterior third, its posterior margin in ventral view deeply U-shaped so that the lateral margins appear to be produced posterad; lamella antevaginalis with anterior margin deeply bilobed, 0.33 as wide as seventh sternite, extending from posterior margin to 0.33 length of seventh sternite; lamella postvaginalis with posterior end at 0.50 length of eighth sternite, where it is shallowly bilobed and approximately half as wide as lamella antevaginalis, narrowing slightly as it runs anteriorly until, at 0.50 length of lamella antevaginalis, it expands abruptly into a circular region that extends anterad to 0.50 length of seventh sternite; ductus bursae membranous, narrowest at about 0.50 its length, broadening slightly and gradually until meeting the large corpus bursae; a small, dome-shaped sclerite lies immediately to the right of midline near inception of ductus seminalis; two sickle-shaped signa, each with a curved, hook-like element and an I-shaped element, the latter embedded transversely in the middle of a crescent-shaped sclerite.

Holotype ♂: ARIZONA: Fort Valley, 7350ft 7 ½ mi NW Flagstaff, Coconino Co., 15 Jul 1961, Ronald W. Hodges; genitalia slide TH-USNM-118 (USNM). **Allotype** ♀: Same data as for holotype, but collected 17 Jul 1961; genitalia slide TH-USNM-116 (USNM). **Paratype** ♂: ARIZONA, West Fork, 6500ft 16 mi SW. Flagstaff, Coconino Co., 8 Jul 1961, Ronald W. Hodges; genitalia slide TH-USNM-115 (USNM).

Etymology.— From Greek, κλειδαροτρύπα "keyhole"; in reference to the shape of the lamella postvaginalis, which roughly resembles an old-fashioned door keyhole when the genitalia are viewed inversely from the aspect in Fig. 9.

Diagnosis.—The male differs from *M. sexstrigella* and *M. achlyognoma* in having a relatively short, broad valve with no accessory modifications; the female differs by presence of a large, anteriorly-bilobed lamella antevaginalis and a keyhole-shaped lamella postvaginalis.

Biology.— Known only from flown adults; immature stages unknown.

Distribution.— The species has been collected only in Arizona, USA.

Abbreviations of Institution Names

ANSP	Academy of Natural Sciences of Philadelphia, PA, USA
EL	Collection of E. Laasonen, Helsinki, Finland
JCK	Collection of J. C. Koster, Callantssoog, Netherlands
MZLU	Department of Zoology, Lund University, Sweden
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
VdW	Collection of H. W. van der Wolf, Nuenen, Netherlands
ZMAS	Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia
ZMUH	Zoological Museum, University of Helsinki, Helsinki, Finland

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