TWO NEW SPECIES OF ASTERACEAE-FEEDING
BUCCULATRIX (BUCCULATRICIDAE) FROM CALIFORNIA

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ABSTRACT. Bucculatrix tetradyminiae, new species and Bucculatrix dominatrix,
new species are described and illustrated. Bucculatrix tetradyminiae feeds on Tetradyminia
axillaris (Strother) (Asteraceae) and Bucculatrix dominatrix feeds on Baccharis pilularis
(de Candolle) (Asteraceae) and can be distinguished from sympatric, Baccharis-feeding
Bucculatrix variabilis (Braun) and Bucculatrix separabilis (Braun) by its larger size, dist-
tinct forewing pattern, and genitalia.

Additional key words: Tetradyminia, Baccharis, leaf miner, Lyonetiidae, microlepi-
doptera.

Zimmerman (1978) resurrected the family Bucculaticidae (Bucculatricidae) from Lyonetiidae, a move first proposed by Fracker (1915). The family is easily discerned, being characterized by an “elongate pointed
face, tufted head, basal eye-cap of the antenna and, in the male, the
notched first segment of the flagellum . . .” (Braun 1963). The larvae
typically are leaf miners in the early instars, and then become external
feeders, although a few species mature in the mine and some are gall-
makers. For a complete description of the family refer to Braun (1963).
The family is cosmopolitan with 222 species described from all land
forms except New Zealand (Heppner 1991). More than 100 occur in
North America, mostly in arid regions (Braun 1963). Larvae of many
western species feed on Asteraceae, including the two species we de-
scribe here.

On 12 April 1993 in the western margin of the Mojave desert, Cali-
fornia, we collected cocoons affixed to stems of the spiny shrub Tetradyminia
axillaris. Cut branches with attached cocoons were immersed in buckets
of water and transported to our homes in central California and so main-
tained. Adult Bucculatrix emerged during late April and early May.

David Wagner, John De Benedictis and Jerry Powell collected a new
Bucculatrix on Mt. San Bruno (San Mateo Co.), where it is sympatric
with the Baccharis-feeding Bucculatrix variabilis and Bucculatrix sepa-
rabiliis; De Benedictis et al. (1990:p.20) briefly described the adult co-
coon and larval biology of this species without naming it. This species
has also been reared from Marin County and Sonoma County by Jerry
Powell and David Wagner, respectively. Both new species were sexed on the basis of frenulum morphology and external genitalia.

*Bucculatrix tetradyminiae* Osborne and Rubinoff, new species
(Figs. 1, 5–8)

**Description.** *Head.* White; antenna white with white basal eye-cap and dark brown annulations. *Thorax.* White. *Forewing.* Length: mean 3.4mm (range 3.2–3.8mm, n = 29). Dorsal surface lustrous white with distal half dominated by roughly equal-sized postmedial and submarginal blotches partially separated by white at anal angle and costa. Blotches, ochreous brown, tipped with dark brown. Postmedial blotch often bisected by diffuse longitudinal white or light brown. Occasionally blotches greatly reduced. Below fold, in proximal extreme of postmedial blotch, a very dark patch of completely and partially dark brown scales. Series of white, dark-tipped scales running dorsally from apex along margin to merge with distal edge of dark field. Usually a small patch of several dark brown tipped scales on costa at 1/3 from base to apex. Cilia brown above brown field on costa, white subapically, brown in streak at apex on apical end of marginal chain of brown scales, all white along margin. Ventral surface of forewing gray-brown. *Hindwing.* Gray dorsally, gray-brown ventrally with gray cilia. *Leg.* White with dark brown annulations on distal ends of tarsal segments. Metathoracic *tibiae* with long white cilia. *Abdomen.* Gray. Terminal scales elongate and dark gray dorsally in females.

**Male genitalia** (Figs. 5, 6 drawn from YFH prep no. 0911). Valva elongate, slightly curved medially with fine distal setation. Socii divergent, elongate, with long setae on dis-
tal third. Gnathos absent. Vinculum narrow, well sclerotized. Aedeagus straight, gradually tapering to slender apex.

Female genitalia (Fig. 7 drawn from YFH prep no. 0905, Fig. 8 drawn from YFH prep no. 0906). Ductus bursae not sclerotized. Margins of ostium bursae weakly sclerotized. Ostium in anterior margin of abdominal segment eight. Ninth tergum with transverse row of long, stout setae at mid-segment. Posterior apophyses about length of abdominal segment eight, well sclerotized. Anterior apophyses absent. Ductus seminalis arising on corpus bursae near base of ductus bursae. Signum strong, nearly encircling posterior half of bursa, ribbed with long aciculae; converging toward base of ductus bursae.

Type specimens. Holotype ♂, California: San Bernardino Co.: Oro Grande Wash, 5 mi. W. of Hesperia, 12 April 1993 (Rubinoff and Osborne), reared from cocoon on Tetradymia axillaris, ex pupa 20 April 1993. Paratypes (n = 49): California: San Bernardino Co.: Oro Grande Wash, 5 mi. W. of Hesperia, 1 ♀, 1 ♀, 12 April 1993 (Rubinoff and Osborne), reared from cocoons on Tetradymia axillaris, ex pupa 20 April 1993; also 2 ♂, 6 ♀, 25 April 1993 (Rubinoff and Osborne) reared from cocoons on Tetradymia axillaris, ex pupa 1–3 May 1993 (JAP 93D45); also 17 ♂, 1♀, 27 April 1996 (Osborne); also 18 ♂, 3 ♀, 29 April 1996 (Osborne). The holotype and 26 paratypes are deposited at the Essig Museum of Entomology, University of California, Berkeley (UCB); 4 paratypes are deposited in the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C.
join corpus bursae. Posterior end of corpus bursae just anterior of where ductus seminalis and ductus bursae of ductus seminalis apparent. Signum narrow, forming densely well-sclerotized, cup-shaped chamber.

B. on corpus bursae just dorsal to junction of ductus bursae and corpus bursae, no expansion inwards at the setose distal ends.

illary spine in sequence along a stem, then crawling or sometimes flying to a Dew still. An jutting at acute angle towards costal margin. Just below face iridescent brown.

small, very dark patch of scales, just below (fold) vein. Distally, mottling becoming lighter, ending nearly while and surrounded by fuscous-tipped apical scales.

Description. Head. Grayish white, tuft brown and white hairs, eye-caps gray; antenna black and white banded. Thorax. grayish-white with scattered brown-tipped scales. Forewing. Length: mean: 5.5 mm (range: 4.0–6.1 mm, n = 32), mottled brown, prominent longitudinal white streak extending above Cu from base along the discal cell, then abruptly jutting at acute angle towards costal margin. Just below Cu at acute angle in white streak, small, very dark patch of scales, just below (fold) vein. Distally, motting becoming lighter, ending nearly white and surrounded by fuscous-tipped apical scales. Cilia gray. Ventral surface iridescent brown. Hindwing. Pale gray, ventral surface iridescent brown. Leg. Gray with distal end of tibia turning black. Tarsi banded with black and white. Abdomen. Silvery gray.

Male genitalia (Figs. 9, 10 drawn from YFH prep no. 0903). Valva elongate, pointing inwards at the setose distal ends. Soci divergent, very broad, more setose apically, and fused with tegumen. Saccus absent. Vinculum well-sclerotized band. Uncus poorly sclerotized with distal end obtuse. Aedeagus arising from tapered annellus. Distinguished from male genitalia of B. variabilis by much shorter, stout socii; very similar to male genitalia of B. separabilis.

Female genitalia (Figs. 11, 12 drawn from YFH prep no. 0907). Ostium in deep, well-sclerotized, cup-shaped chamber. Corpus bursae ovoid. Ductus seminalis originating on corpus bursae just dorsal to junction of ductus bursae and corpus bursae, no expansion of ductus seminalis apparent. Signum narrow, forming densely spined band of ribs at the posterior end of corpus bursae just anterior of where ductus seminalis and ductus bursae join corpus bursae.

Type specimens. Holotype ♀, California: Marin Co.: Ring Mountain, 19 April 1991

(J. A. Powell), reared from cocoon on Baccharis pilularis, ex pupa 1–2 May 1991 (JAP 91D16). Paratypes (n = 42): California: Marin Co.: Ring Mountain, 6 ♂, 5 ♀, 11 April 1994 (J. A. Powell), reared from cocoons on Baccharis pilularis, ex pupa 20–26 April 1994 (JAP 94D53); also, 6 ♂, 2 ♀ 19 April 1991 (J. A. Powell), reared from cocoons on Baccharis pilularis, ex pupa 1–5 May 1991 (JAP 91D16); San Mateo Co.: Mt. San Bruno County Park, 3 ♂, 2 ♀, 19 April 1988 (J. A. DeBenedictis) at b.l., also 3 ♂, 4 ♀, 21 April 1983 (J. A. DeBenedictis), reared from cocoons on Baccharis pilularis, ex pupa 11–17 May 1983 (JADeB 83111-E), also 1 ♀, 14 April 1983 (J. B. Whitfield), reared from cocoon on Baccharis pilularis, ex pupa 3 May 1983 (JAP 83D70); Alameda Co.: Strawberry Canyon, UCB campus, 1 ♂, b.l. trap, 1 July 1991 (J. A. Powell), also 1 ♂, 20 June 1990 (J. A. Powell); Sonoma Co.: 1 mi. SE Bodega Bay, 4 ♂, 4 ♀, 20 April 1983 (D. L. Wagner), reared from cocoons on Baccharis pilularis, ex pupa 3–24 May 1983 (JAP 83D110). The holotype and 20 paratypes are deposited in the Essig Museum of Entomology at the University of California, Berkeley (UCB); 3 paratypes are deposited in the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM); 11 paratypes are deposited in the University of Connecticut collection at Storrs (UCONN); 2 paratypes are deposited in the Canadian National Collection of Insects (CNCI); 2 paratypes are deposited in the Los Angeles County Museum (LACM); 2 paratypes are deposited in the California Academy of Sciences (CASC); 1 paratype remains in the collection of Kendall Osborne and 1 paratype in the collection of Daniel Rubinoff.

Diagnosis and discussion. Bucculatrix dominatrix is relatively large and distinguishable by a prominent white streak on the upper part of the discal cell, extending two-
thirds the length of the wing. B. dominatrix is probably a close relative of both Bucculatrix variabilis (Fig. 3) and B. separabilis (Fig. 4) and phenotypically resembles the former. The new species is 1.5 to 2 times larger than B. variabilis. The forewing pattern is diagnostic: B. variabilis has two transverse white bands whereas B. dominatrix has a single, longitudinal white streak. There is also a tuft of dark scales below the longitudinal band that is not present in B. variabilis. B. dominatrix is larger and much darker than B. separabilis but the genitalia are nearly identical, indicating a probable sister species relationship between the taxa. Phenotypic and genitalic similarities to the two aforementioned species merit its placement in Section II, subsection A, of Braun (1963). Average cocoon length is 8.1 mm (range: 6.5–11.5 mm, n = 20). They are strongly ribbed and pinkish when occupied (DeBenedictis et al. 1990) turning white after emergence.

Bucculatrix dominatrix may be widely distributed in coastal central California, where the hostplant is found. It feeds on Baccharis pilularis and can be found feeding on the same plants as both Bucculatrix variabilis and B. separabilis.

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