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A new species of *Biclonuncaria* Razowski and Becker, 1993 (Lepidoptera: Tortricidae: Polyorthini) from Costa Rica

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Abstract. *Biclonuncaria recurvana*, **new species** (Lepidoptera: Tortricidae: Polyorthini), is described and illustrated from Area de Conservación Guanacaste in northwestern Costa Rica. It is most similar to *B. conica* Razowski, 1993, from Mexico, but the two are easily distinguished by features of the male genitalia. *Biclonuncaria recurvana* has been reared (n = 12 specimens) from field-collected larvae feeding on the leaves of *Dalbergia glomerata* Hemsley (Fabaceae), consistent with the previously reported host plant for *B. dalbergiae* Razowski and Becker, 1993, which has been reared from *Dalbergia* in Brazil.

Key words. Chlidanotinae, *Dalbergia*, Fabaceae, host plant, Neotropics.

ZooBank registration. urn:lsid:zoobank.org:pub:22EAB34E-0619-4B44-A595-701F8E0FCB24

Introduction

Biclonuncaria Razowski and Becker, 1993 was proposed for a group of small neotropical tortricid moths that exhibit unusual male genital morphology. Although the male genitalia deviate considerably from those of other Polyorthini (Chlidanotinae), the assignment of the genus to this tribe is supported by morphological features of the female genitalia and by the presence of raised scales on the forewing of both sexes (Razowski and Becker 1993). Razowski (1999) provided a hypothesis of phylogenetic relationships among *Biclonuncaria*, *Clonuncaria* Razowski, 1999, and *Pseuduncaria* Razowski, 1999 based on morphological characters of adult moths. As currently defined, *Biclonuncaria* includes 13 described species distributed in the Neotropics from Mexico (n = 2 species) to Bolivia (n = 1 species), and throughout much of Brazil (10 species) (Razowski and Becker 1993; Brown 2005; Gilligan et al. 2018). The purpose of this contribution is to describe a new species from Costa Rica and report its larval host plant.

Materials and Methods

The specimens examined (n = 13) are from the comprehensive rearing project of Daniel Janzen and Winnie Hallwachs in the Área de Conservación Guanacaste in northwestern Costa Rica (Janzen and Hallwachs 2009). All specimens are deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM). Dissection methods followed those summarized by Brown and Powell (1991). Terms for morphological structures follow Razowski and Becker (1993), except "phallus" is used instead of "aedeagus." Forewing measurements include the fringe. In the specimens examined section, "emerged" (from the pupa) is abbreviated as "em."

Slide-mounted genitalia were examined using a Leica MZ12 stereomicroscope and a Nikon E500 compound microscope. Images of adults and genitalia were captured using a Canon EOS 40D digital SLR camera (Canon U.S.A., Lake Success, NY) mounted on a Visionary Digital BK Lab System (Visionary Digital, Palmyra, VA). Multiple images were stacked using Helicon Focus software and subsequently enhanced using GIMP software.

Tissue samples from a leg of adult moths were used to amplify a ~650 bp region of the mitochondrial gene cytochrome oxidase subunit I (COI) commonly referred to as the DNA barcode, using standard procedures at the Biodiversity Institute of Ontario, University of Guelph (Hebert et al. 2003, 2013; Craft et al. 2010) with the primers LepF1, MLepF1, LepR1 and MLepR2 (Hajibabaei et al. 2006). The sequence data were clustered using the Kimura2 parameter, a commonly used algorithm for clustering COI data that is available on the BOLD website

(https://www.boldsystems.org). Statistics for barcode data (i.e., average distance among members of a BIN and distance to nearest neighbor) are from BOLD (boldsystems.org).

Results

Biclonuncaria recurvana Brown, new species

Fig. 1–3

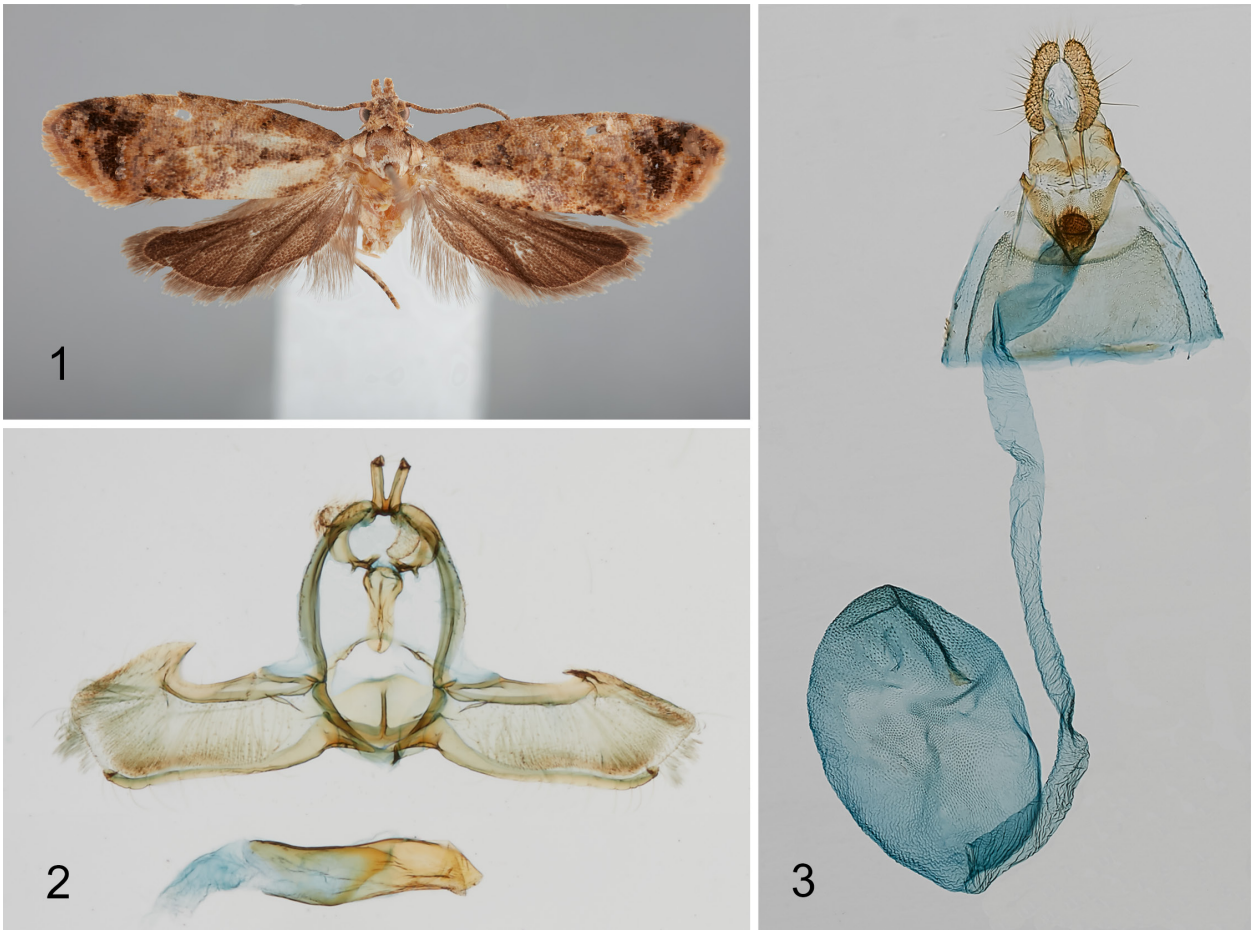
Diagnosis. *Biclonuncaria recurvana* is superficially similar to other species in the genus, with an ill-defined brownish forewing pattern characterized by small patches of raised scales (Fig. 1). The male genitalia (Fig. 2) are most similar to those of *B. conica* Razowski and Becker, 1993 from Veracruz, Mexico, but they can be distinguished by the distinct subapical "hump" on the costa of the valva that is more pronounced, sclerotized, and recurved than in *B. conica*, and by the uncus arms, which are uniform in width throughout (versus broadened distally in *B. conica*). Assignment of *B. recurvana* to *Biclonuncaria* is based on numerous similarities in the male genitalia to those of congeners and in particular, the basal bifurcation of the uncus (Razowski 1999).

Description. Head: Vertex rough scaled, pale tawny brown; frons with small appressed cream-colored scales; labial palpus short, length ca. 1.0 times diameter of compound eye, pale tawny brown with a few darker scales distally on venter; antennal scaling pale tawny brown, sensory setae short, inconspicuous in both sexes. **Thorax**: Mostly pale tawny brown with black W-shaped marking on prothorax and weakly developed pale orange-brown tuft on metathorax. Legs without hairpencil or scale tufts. Forewing length 4.5–5.5 mm (mean = 5.0 mm; n = 8); forewing (Fig. 1) pale tawny brown with faint, small, irregular dots and/or dashes of pale orange, brown, and black, some represented by upraised scale patches; a broad subapical blotch bordered basally by linear tuft of raised, pale tawny scales; three conspicuous, somewhat linear, interrupted, scales tufts (fascia-like) – subbasal, median, and preterminal; fringe tawny orange brown. Hindwing nearly uniform brown, with pale grayish-brown fringe; frenulum with one spine in male, two to four in female. **Abdomen**: Covered with shiny bronzy gray scales. Male genitalia (Fig. 2) (n = 4) with uncus arms divided basally, relatively short compared to congeners, uniform in width throughout, weakly hooked apically; gnathos with relatively short, broad lateral arms with a pair of thorns immediately before terminal plate, terminal plate weakly hourglass-shaped, with dorsal lobe slightly larger than ventral lobe; transtilla a narrow bridge with a tiny subbasal lobe bearing 2–3 small setae; valva narrowest at base, gradually broadening distally, costa abruptly bent dorsad and recurved at about 0.65 length from base to apex, creating rounded hump before apex; sacculus slender, restricted to ventral edge of valva, ending in a small, free, terminal spine. Phallus large, ca. 0.85 times length of valva, weakly undulate, with a small rounded-triangular lobe near phallobase and two tiny thorns distally; vesica without cornuti. Female genitalia (Fig. 3) (n = 2) with papillae anales slender throughout, unmodified; sterigma broadly V-shaped with sclerotized circular area at ostium bearing microtrichia; ductus bursae long (ca. 2.5 times length of corpus), ribbon-like, slightly broader in posterior 0.35, lacking sclerotized antrum; corpus bursae ovoid, densely punctate throughout, lacking signum, ductus seminalis from anterior 0.25.

DNA Barcodes. Because this is the first species of *Biclonuncaria* to be sequenced, DNA barcode data say little in regard to divergence from congeners. The 14 sequenced specimens (one not examined) form a BIN (BOLD:AAY4668) with a single outlier 0.94% distance from the main cluster. Together the specimens have an average distance of 0.22% among them, with 6.41% distance to the nearest neighbor, an unidentified tortricid from Costa Rica.

Types. Holotype, ♂, Costa Rica, Alajuela, Área de Conservación Guanacaste, Sector Rincon Rain Forest, Llano Conostegia, 430 m, 10.89492, –85.26671, 18 May 2011, larva on *Dalbergia glomerata*, P. Umaña, em: 29 May 2011, 11-SRNP-42406, USNM slide 142,279 (USNM).

Paratypes (7♂, 5♀). COSTA RICA: Alajuela: Área de Conservación Guanacaste, Sector Rincon Rain Forest, Llano Conostegia, 430 m, 10.89492, –85.26671, 18 May 2011, larva on *Dalbergia glomerata*, P. Umaña, em: 27 May 2011 (1♀), 11-SRNP-42409, USNM slide 142,278; em: 30 May 2011 (1♂), 11-SRNP-42408; em: 2 Jun 2011 (1♂), 11-SRNP-42412, USNM slide 154,151; em: 29 May 2011 (1♂), 11-SRNP-42407; em: 7 June 2011 (1♀),



Figures 1–3. *Biclonuncaria recurvana*. **1)** Holotype male. **2)** Paratype male genitalia, USNM slide 145,533. **3)** Paratype female genitalia, USNM slide 142,278.

11-SRNP-42414. Guanacaste: Area de Conservación Guanacaste, Sector Del Oro, Guacimos, 380 m, 11.01454, –85.47492, 23 Aug 2010 (1♀), pupa on *Dalbergia glomerata*, E. Cantillano, 10-SRNP-21906; 23 Aug 2010, larva on *Dalbergia glomerata*, E. Cantillano, em: 6 Sep 2010 (2♂), 10-SRNP-21903, USNM slide 145,553, USNM slide ; 25 Aug 2010, larva on *Dalbergia glomerata*, E. Cantillano, em: 6 Sep 2010 (1♂), 10-SRNP-21898, USNM slide 154,152, 12 Sep 2010 (1♂), 10-SRNP-21937; 25 Aug 2010, larva on *Dalbergia glomerata*, E. Cantillano, em: 16 Sep 2010 (2♀), 10-SRNP-21942, 10-SRNP-21934, USNM slide 145,534.

Biology and distribution. *Biclonuncaria recurvana* is recorded from lower elevations (380–430 m) at two sites in northwestern Costa Rica, one in Alajuela Province and the other in Guanacaste Province. All congeners have been recorded below 1000 m.

All specimens of *B. recurvana* were reared from *Dalbergia glomerata* Hemsley (Fabaceae). Razowski and Becker (1993) reported that *B. dalbergiae* Razowski and Becker, from Brazil, was reared from the "leaves of *Dalbergia variabilis* Vog., Fabaceae." However, under the specimens examined for that species, they list "*Dalbergia violacea* Vog." *Dalbergia variabilis* is now recognized as a junior synonym of *D. frutescens* (Vell.) Britton (WCVP 2022), and *Dalbergia violacea* as a junior synonym of *D. miscolobium* Benth. (Govaerts 2000). Hence, although the specific identity of the host plant in Brazil remains unclear, there is little doubt that *Biclonuncaria* is associated with the plant genus *Dalbergia* L.f. The only other reported host plant is for *Biclonuncaria deutera* Razowski and Becker, 1993; Moller and Pavarini (2020) recently reported it as a pest of peanut grass (*Arachis repens* Handro; Fabaceae), on which it causes damage to leaves.

While food plants are somewhat poorly known for Polyorthini, no other genus in the tribe has been reported from Fabaceae. Documented hosts for *Histura* Razowski, *Histurodes* Razowski, and *Lopharcha* Diakonoff are all Lauraceae; those for *Pseudatteria* Walsingham are Monimiaceae; those for *Polylopha* Lower are Lauraceae and Annonaceae; those for *Lypothora* Razowski are Piperaceae; and those for *Isotrias* Meyrick, *Olindia* Guenée, and *Polyortha* Dognin encompass multiple families (Brown et al. 2008).

Etymology. The specific epithet refers to the recurved apex of the costa of the valva in the male genitalia.

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