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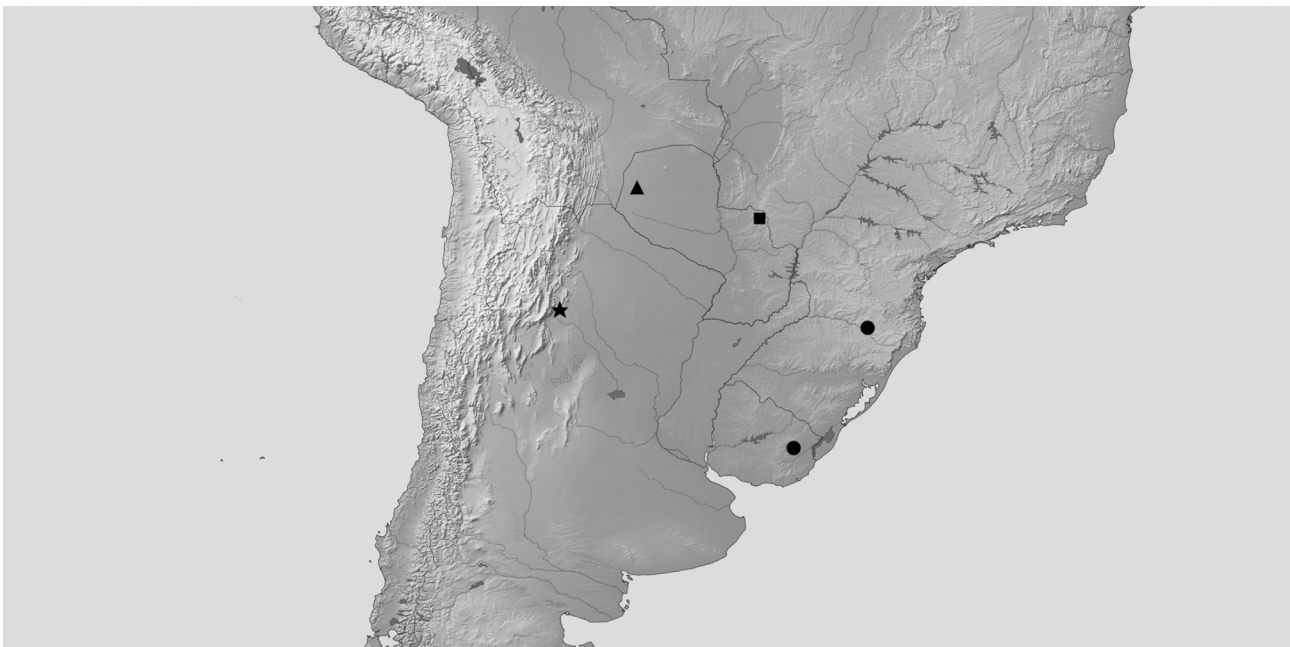
### Review of the enigmatic genus *Boalda* with transfer of *pulcherrima* Köhler from *Nephelistis* and description of two new species (Lepidoptera: Noctuidae)

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Schaus (1929: 49) described *Boalda gyona* in a monobasic genus known only from the holotype taken in Santa Catarina, Brazil. Biezanko *et al.* (1957) reported the species from Uruguay. A number of specimens of *Boalda* similar to *gyona* were collected recently in Paraguay, at least two of which match the anomalous Argentinian taxon *Nephelistis pulcherrima* Köhler (1947: 77–78). Herein the genus *Boalda* is reviewed, with one new species described from the Paraguayan samples, and with *N. pulcherrima* transferred *Boalda*. A singleton specimen from Parque Nacional Cerro Corá, Dpto. Amambay, Paraguay, is figured but not described as a distinct species because of a lack of additional specimens.

Genitalic dissections were stained with chlorazol black or Eosin-Y and mounted in euparaol, with methods and terminology after Lafontaine (1998, 2004) and Clarke (1941). Digital images were generated using Microptics and Visionary Digital imaging systems, and subsequently edited in Adobe Photoshop. Measurements were made with the aid of an ocular micrometer. Forewing length was measured from the center of the axillary area up to the apex of the forewing. Institutional repositories are as follows: USNM = National Museum of Natural History (Washington, DC, USA); ZSM = Zoologische Staatssammlung München (Munich, Germany); SEL = Systematic Entomology Laboratory, United States Department of Agriculture (Washington, DC, USA).



**FIGURE 1.** Distribution of recorded and reported *Boalda* species. ● *B. gyona*: Santa Catarina, Brazil (type locality); Quebrada de los Cuervos, Uruguay, reported by Biezanko *et al.* (1957) ★ San Miguel de Tucumán, Argentina, type locality of *Nephelistis pulcherrima* ▲ Parque Nacional Teniente Enciso, Dpto. Boquerón, Paraguay, type locality of *Boalda poguei*. ■ Parque Nacional Cerro Corá, Dpto. Amambay, Paraguay, collection locality of *Boalda* sp.

### ***Boalda Schaus, 1929***

**Type species.** *Boalda gyona* Schaus, 1929: 49, by monotypy; type locality: Santa Catarina, Brazil.

**Diagnosis.** *Boalda* species occur east of the Andes between circa -20° and -33° latitude (Fig. 1), and are recognizable by the following combination of characters: antennae scaled, bipectinate, with secondary sensillae on each segment; eyes hairy; widening of the white outer postmedial line toward the forewing costa, coupled with characteristic pinkish or russet patterning of the forewing and U-shaped marking in the median area; valves of male genitalia rounded, mitten-like, with secondary lobe arising ventrally from costa and projecting anterolaterally, and a medial thorn-like clasper; juxta rhomboidal; vesica with a sclerotized basal cap-shaped plate with denticles. The immature stages and biology of the included species remain unknown.

### ***Boalda gyona* Schaus, 1929**

Figs 2 (cf. Schaus 1929: 49, pl. 2, Fig. 27), 10a, 10b

**Material examined.** 19♂, 10♀, 1 sex undetermined, including the following: holotype (♂, USNM): Santa Catharina [sic], Brazil, USNM Genitalic Slide m 51499 E. L. Todd; ♂ genitalia on slide July 1961 E.L.T. 1338; *Boalda gyona* Types Schs; [RED LABEL] USNM Type No. 33557; E. D. Jones Donor; Santa Catharina Brazil 28 III '22 E. D. Jones.

**Diagnosis.** *Boalda gyona* is readily distinguished from its congeners by the mottled appearance, dark russet coloration, larger size (forewing length 10.5 mm), and robustness of the male clasper and the expansiveness of the secondary lobe deriving from the costa.

**Description** (Figs 10a, b; cf. Todd, 1961: 261, Fig. 1). *Male genitalia.* Valves expanded apically, with secondary nearly cordate flap on ventral surface overlapping valve for more than 75 percent of the area between the base of the clasper to its apex; inner margin of valve produced posteromedially towards juxta; juxta rhomboidal; valves setose apically; pronounced thorn-like clasper arising medially; wispy tuft of setae arising from margin at base of clasper; saccus blunt; pleural sclerite S-shaped; uncus of uniform width; phallus simple, without cornuti but vesica with sclerotized basal cap-shaped plate bearing 8 to 10 denticles.

**Distribution.** Brazil, Uruguay.

### ***Boalda pulcherrima* (Köhler, 1947) NEW COMBINATION**

Figs 3–5, 11a, 11b

**Material examined.** 1♂, 1♀, representing the types: Tucumán, Argentina, R. Schreiter Coll., USNM Slide 148042 ♀ (USNMENT 00151333); Tucumán, Dognin Collection, Phuphena, July 15.3.13, 148043 ♂ (USNMENT 00151332).

**Diagnosis.** *B. pulcherrima* is most similar to the new species *B. poguei* and *B. solisae* (see below), but differs from both in the configuration of the male valves and shading of the hindwing.

**Description.** Forewing length 10.0 mm; two pairs of hind tibial spurs; dorsal tuft of dark scales on first abdominal segment; abdominal scales pinkish with white apical banding. *Male genitalia* (Figs 11a, b). Valves expanded apically with secondary flap on ventral surface overlapping valve for less than 75 percent of the valve area between the base of the clasper to its apex; inner margins of valves with lobes produced posteromedially towards juxta; valves setose apically, setae short; clasper finger-like, arising medially, as long as the width of the valve at its narrowest point; lateral margin of valve sparsely setose, setae longer than those at apex; saccus blunt; pleural sclerite S-shaped; uncus of uniform width; vesica with sclerotized basal cap-shaped plate bearing ~8 denticles. *Female genitalia* (Fig. 14). Papillae anales separate, oblong; ductus bursae faintly sclerotized posteriad in wide collicular band, ductus roughly as long as the distance from the tip of the papillae to the antrum; corpus bursae without signa; a single appendix bursae arising from below the attachment to the ductus.

**Distribution.** Paraguay: Asunción.

### ***Boalda poguei* Goldstein, sp. n.**

Figs 6–8, 12a, b

**Material examined.** 3♂, representing the type series: holotype male, USNM (Fig. 6), Paraguay, Depto. Nueva Asuncion, Parq. Nac. Tte. Enciso, 21°13' S 61°19' W, 26–28 March 1986, M. Pogue & M. Solis, Barcode of Life DNA voucher specimen SampleID CCDB-28971-A12, BOLD Proc ID LNAUU1141-15 (USNMENT 01201538); paratype male, USNM, same data as holotype (USNMENT 01061133, USNM Dissection 136075); paratype male, same data as holotype (USNMENT 01061134).



2



3



4



5



6



7



8



9

**FIGURE 2.** *Boalda gyona*, holotype male.

**FIGURE 3.** *Boalda pulcherrima*, cotype.

**FIGURE 4.** *Boalda pulcherrima*, male. USNM Dissection 148023.

**FIGURE 5.** *Boalda pulcherrima*, female. USNM Dissection 148042.

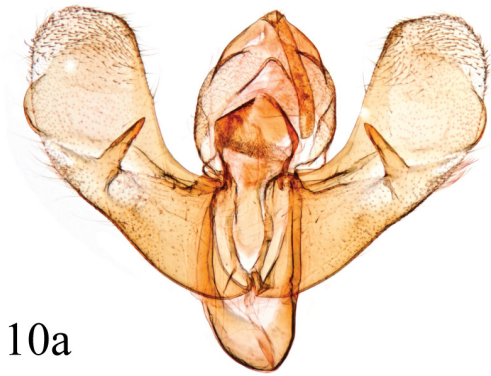
**FIGURE 6.** *Boalda poguei*, holotype male.

**FIGURE 7.** *Boalda poguei*, paratype, male.

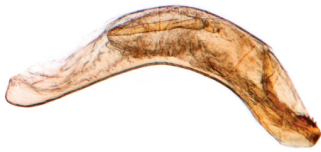
**FIGURE 8.** *Boalda poguei*, paratype, male. USNM Dissection 136075. Scalebar 1.0 cm.

**FIGURE 9.** *Boalda* sp., male. USNM Dissection 148041.

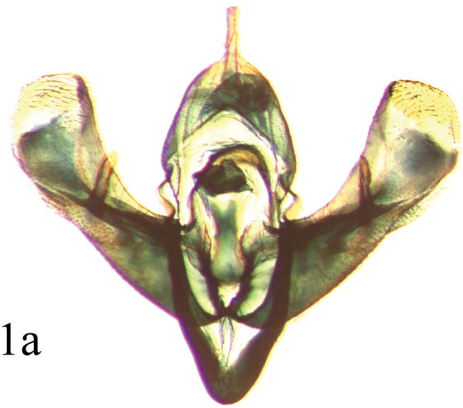
Scalebar Figs 2–9 1.0 cm



10a



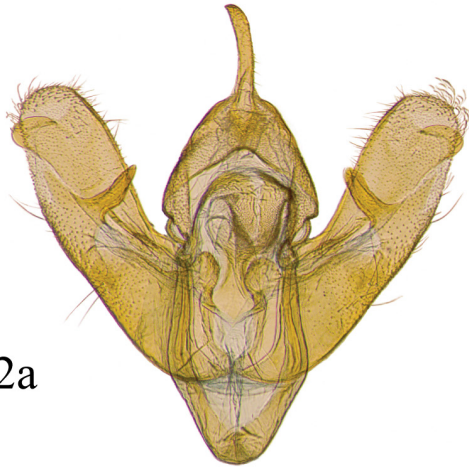
10b



11a



11b



12a



12b



13a



13b



**FIGURE 10.** Male genitalia, *Boalda gyona* holotype male. Brazil: Santa Catarina. USNM Slide 51499. a, valves; b, phallus.

**FIGURE 11.** Male genitalia, *Boalda pulcherrima* male. Argentina: Tucumán. USNM Slide 148043. a, valves; b, phallus.

**FIGURE 12.** Male genitalia, *Boalda* sp., male. Paraguay: Amambay. USNM Slide 148041. a, valves; b, phallus with vesica everted.

**FIGURE 13.** Male genitalia, *Boalda poguei* paratype male. Paraguay: Asunción USNM Slide 136075. a, valves; b, phallus.





**FIGURE 14.** Female genitalia, *Boalda pulcherrima*. Scalebar 1.0 mm.  
Scalebar Figs 10–14 1.0 mm.

**Diagnosis.** Most readily distinguished from *B. gyona* and *B. pulcherrima* by its smaller size (orewing length 8.0 mm) and uniform width of the male valves, which are not expanded apically; and from *B. solisae* by having its hindwings tinged with russet towards the outer margin (cf. white in *B. solisae*).

**Description.** Labial palpi upturned, dark russet, fading at third segment; thoracic collar dark; legs predominantly scaled pinkish, with greater proportion of white scaling on tibiae; one pair of mid-tibial and two pairs of hind-tibial spurs; abdominal scales pinkish, white at posterior margin of each segment. *Forewing.* Basal and medial areas deep russet in ground color; antemedial and postmedial areas pinkish with veins overlaid with white scales. Antemedial and postmedial lines tricolored towards inner margin, the white inner line fading towards costa, flanked by dark lines adjacent to the medial area and pinkish lines adjacent to basal and postmedial areas. Postmedian line incomplete, appearing to partially

enclose cup-shaped wedge in medial area (cf. "una V" of Köhler 1947: 78). Postmarginal area similar to antemedial: predominantly pinkish, veins overlaid with white scales. *Hindwing*. Marginal area russet fading to white inwardly; subterminal band absent or not sharply defined. *Male genitalia* (Figs 13a, b). Valves of uniform width, neither constricted medially nor expanded apically; secondary projection from ventral surface less than half the width of the valve; inner margins of valves with lobes produced posteromedially towards juxta; valves setose apically, setae short; clasper finger-like, arising medially, slightly over half the width of the valve; saccus rounded; pleural sclerite S-shaped; uncus of uniform width; phallus simple, without cornuti, vesica with sclerotized basal cap bearing bearing ca. 7 denticles.

**Distribution.** Paraguay: Asunción.

**Etymology.** Named for Michael G. Pogue, who collected the types with M. Alma Solis.

### **Additional Material: *Boalda* sp.**

Figs 9, 12a, b.

Male, Paraguay, Depto. Amambay, Parc. Nac. Cerro Cora, 20°39' S 56°01' W, 7–10 April 1986, M. Pogue & M. Solis, USNM Dissection 148041 (USNMENT 01061132). This specimen differs from those of *B. poguei* (above) in that the the hindwings are uniformly white and the sclerotized vesical plate bears fewer denticles.

Schaus did not assign *Boalda* to a noctuid subfamily, and Biezanko *et al.* (1957) placed it without explanation in the "Acronyctinae" (=Acronictinae Heinemann, 1859). Todd (1961) referred *Boalda* to the Hadeninae based on the presence of hairy eyes (which neither Schaus nor Köhler included in their accounts of *Boalda* and *Nephelistis*). However, this subfamily character has been called into question in recent treatments (e.g., Fibiger & Lafontaine 2005; Lafontaine & Fibiger 2006; Lafontaine & Schmidt 2010), as hairy eyes occur in various disparate noctuid genera (e.g., *Chytonidia*, *Lophomyra*, *Hampsonodes*) as well as in Eriopinae. No DNA barcode data were recovered from the holotype of *B. poguei*, but the barcode of a *Nephelistis pulcherrima* cotype suggests affinities with *Callopietria* (Eriopinae). Moreover, the genus *Hyperepia* Barnes & Lindsey 1922 (Eriopygini) also bears morphological similarities to *Boalda*. Hence, more precise placement of *Boalda* awaits further study.

### **Acknowledgments**

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