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# An illustrated key to male *Actinote* from Southeastern Brazil (Lepidoptera, Nymphalidae)

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Biota Neotropica v6 (n1) – <http://www.biotaneotropica.org.br/v6n1/pt/abstract?identification-key+bn00606012006>

Date Received 06/06/2005

Revised 10/20/2005

Accepted 01/01/2006

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## Abstract

Francini, R.B. and Penz, C.M. **An illustrated key to male *Actinote* from Southeastern Brazil (Lepidoptera, Nymphalidae).** *Biota Neotrop.* Jan/Abr 2006, vol. 6, no. 1 <http://www.biotaneotropica.org.br/v6n1/pt/abstract?identification-key+bn00606012006>. ISSN 1676-0603

In certain times of the year, *Actinote* butterflies can be vastly abundant in Southeastern Brazil, thus representing conspicuous denizens of our fauna. Their wing coloration allows for the recognition of five major patterns, which probably resulted from mimicry. Furthermore, examination of series of field-collected and reared specimens clearly demonstrates a high intra-specific variation in wing color pattern. In concert, inter-specific resemblance (mimicry) and intra-specific variation make it difficult to discriminate *Actinote* species from each other. This key aims at providing a tool for identification of male *Actinote*. To that effect, we provide diagnostic characters and illustrations of wings and male genitalia for 22 species. We hope that the clear identification of these species will lead to the discovery of species yet unrecognized in Southeastern Brazil.

**Key words:** butterfly, identification, genitalia, mimicry.

## Resumo

Francini, R.B. and Penz, C.M. **Chave ilustrada para machos de *Actinote* do sudeste do Brasil (Lepidoptera, Nymphalidae).** *Biota Neotrop.* Jan/Abr 2006, vol. 6, no. 1 <http://www.biotaneotropica.org.br/v6n1/pt/abstract?identification-key+bn00606012006>. ISSN 1676-0603

Em certas épocas do ano, as borboletas do gênero *Actinote* podem ser muito abundantes no sudeste do Brasil, constituindo, então, elementos conspicuos da nossa fauna. Sua coloração alar permite a separação em cinco padrões básicos, provavelmente relacionados com o mimetismo. Além disso, séries de exemplares coletados no campo ou criados em laboratório demonstram claramente que existe uma grande variabilidade intra-específica na coloração alar destas borboletas. Em conjunto, a semelhança entre as espécies (mimetismo) e variação intra-específica dificultam o reconhecimento das espécies de *Actinote*. Esta chave tem como objetivo auxiliar a identificação dos machos destas borboletas e, para tanto, são apresentados caracteres diagnósticos, ilustrações das asas e genitália de 22 espécies. Esperamos que a clara identificação destas espécies possa revelar a presença de espécies ainda não reconhecidas no sudeste do Brasil.

**Palavras-chave:** borboleta, identificação, genitalia, mimetismo.

## Introduction

The butterfly tribe Acraeini (Nymphalidae, Heliconiinae) currently holds the African genera *Pardopsis* Trimen, 1887, *Acraea* Fabricius, 1807 and *Bematistes* Hemming, 1935, plus the Neotropical *Actinote* Hübner, [1819], *Abananote* Potts, 1943 and *Altinote* Potts, 1943 (Ackery 1984, 1988, Penz & Djunijanti 2003, Lamas 2004). Ehrlich (1958), Van Son (1963), and Penz & Djunijanti (2003) provided several characters to define this group, including the closed hindwing cells, stalking of the forewing radial veins, morphology of dorsal forewing scales, forelegs, genitalia, and first instar larvae. Independently of the continent one happens to visit, or color pattern details, acraeines can be easily recognized in the field by their elongated wings and flight behavior - the butterfly equivalent of recognizing 'robins' or 'figs' as natural groups of organisms.

As a taxonomic unit, the generic status of *Actinote* is uncertain. In a comprehensive phylogenetic study of Acraeini, Pierre (1987) suggested that *Actinote* nests within and should be regarded a subgenus of *Acraea*. Although Pierre's hypothesis has been recently supported with a small sample of species (Penz & Djunijanti 2003), from a practical standpoint it is unclear if *Actinote* and other Neotropical genera should be subsumed within *Acraea* (Pierre's approach) or if the speciose *Acraea* should be divided into smaller monophyletic units (*Actinote* being one of them, according to Pierre). Therefore, the generic rank of *Actinote* has been maintained here for tradition and convenience, despite the fact that these Neotropical butterflies are likely closely related to a discrete subset of African *Acraea*.

Several natural history characteristics distinguish *Actinote* from other Neotropical heliconiines. Males produce a mating plug, which they attach to the females after copulation (Ehrlich & Ehrlich 1978, Paluch et al. 2003). Eggs are always laid in clusters, and larval cycles are usually long, with some species being univoltine and spending part of the year in diapause as early instar larvae (Francini 1989, 1992 and unpublished. obs.). Adults can reach high abundances in SE Brazil in late Spring (October-November) and early Fall (March-April), but some univoltine species can be quite rare in collections because of their short adult life and limited geographic distribution (e.g., *A. zikani*; Francini 1992). While several heliconiine species prosper inside the Amazon forest, *Actinote* species often prefer open habitats where their Asteraceae host plants also thrive. In southeastern Brazil, they collectively inhabit an altitudinal range from sea level to 2400 m.

Species of *Actinote* use toxic chemical compounds and mimicry as protection against predation (e.g., Müller 1879, Brown & Benson 1974, Francini 1989, 1992). Cyanogenic glycosides and pyrrolizidine alkaloids are present in all life stages (Francini 1989, Brown & Francini 1990). Their lethargic flight, elongated abdomen and often aposematic coloration are characteristic of chemically protected butterflies (e.g., Bates 1862, Poulton 1902, Chai 1986, 1996, Srygley 1994). The 22 *Actinote* species in SE Brazil considered here are members of five different mimicry rings (Francini 1989, 1992, Brown & Francini 1990), and wing coloration for any given species is probably a result from the combined history of their phylogenetic and mimetic associations.

The dynamics of mimicry groups within *Actinote* strongly contrasts their relatives in the genus *Heliconius* Kluk, 1780. In southeastern Brazil, *Actinote* species from different mimicry groups usually fly together in the same area, and broadly overlap in adult resource use (nectaring plants, basking spots) and activity patterns. Furthermore, conspecific individuals may vary considerably in the size and color of their forewing markings both within and between sexes. At a community level, therefore, the end result potentially includes a mixed group of individuals that show a range of forewing patterns from dark-orange to white to semi-translucent in random proportions. This commonly seen *Actinote* mishmash greatly contrasts Müllerian mimicry rings of *Heliconius*, where both field observations and theory suggest that Müllerian mimics should, and do, resemble one another as closely as possible (e.g., Turner 1987). Nothing is known about how potential predators perceive and react to color variation in *Actinote*.

Although as a group *Actinote* butterflies constitute an instantly recognizable component of the butterfly fauna in Southeastern Brazil, species identification is often problematic (e.g., Hayward 1931). This difficulty is due to the interaction between two factors: some *Actinote* species share extremely similar wing patterns; and all species have a high level of intraspecific variation. Furthermore, females of several species are nearly indistinguishable from one another (D'Almeida 1935a, Francini 1989). As a result, the often-incomplete series of specimens available in early collections, abbreviated descriptions, and limited illustrations led to much confusion regarding species identification (e.g., see synonymy for *A. pyrrha* (Fabricius), below).

Here we present an illustrated key for the identification of male *Actinote* from southeastern Brazil based on 25 years of fieldwork and comparative morphology. The São Paulo region has the highest species richness for *Actinote* due to habitat diversity and overlapping species distributions. Therefore, our geographical focal point is São Paulo and surrounding states, where the 'Mata Atlântica' (Atlantic forest) vegetation ranges from open 'restinga' (sea level, shrubby vegetation neighboring the ocean), to cloud forest (2000 m). We provide synonymy, a brief diagnosis for males of each species included in the key, geographical distribution of the species, and illustrations of male genitalia.

## Material and Methods

We attempted to study *Actinote* populations both in the field and in the laboratory. Because females lay eggs in clusters, sib groups are useful for evaluating intraspecific variation and for matching males and females of the same species - which gave us particularly valuable insight to variation and overlap between *A. pellenae* Hübner and *carycina* Jordan. There is a cost, however, to studying organisms that flourish in second growth or naturally open habitats. Although *Actinote carycina* larvae are common in second growth and roadsides where their Asteraceae host plants grow in abundance, their populations (and our samples) were often decimated by road clearings. Furthermore, some species are difficult to maintain in culture. For example, *Actinote morio* Oberthür is univoltine, has a long life cycle and feeds on a single Asteraceae host plant that can only be found 300 km from the laboratory. Despite these difficulties, we examined male external and internal morphology of both field-collected and laboratory reared adults to provide characters for species identifications.

Color variation in *Actinote* gave rise to the description of numerous subspecies and varieties. Although some of the described subspecies may represent legitimate divergence (see Species Accounts section), many of the names that have been proposed to define geographic races actually correspond to variation that can be found within a single population and are, thus, biologically meaningless. Here, therefore, our focus is to define and identify *Actinote* butterflies to the species level, and we defer the study of subspecific divergence to future workers.

Our long-term experience with series of specimens demonstrates that positive identification of certain species can only be achieved through genitalic examination, which can sometimes be done without dissection even in the field using a good magnifying lens. Dissection of male genitalia followed standard methods of soaking the abdomen in 10% KOH, and permanent storage in a vial filled with glycerol. For the key, illustrations of the male right valva simply consist of an outline in dorsal, ventral, or lateral views, flattened to a uni-dimensional plane, and devoid of setae, and with the valval base positioned to the left. This was done purposefully for ease of visualization of characters, and detailed drawings of the complete male genitalia are given in the plates that accompany the species accounts. Most, but not all species, are used as examples in the illustrations of characters in the key.

For the species accounts, taxa are listed in the order that they appear in the key, which does not imply phylogenetic relationships. Because the authorities that designated each taxon name are listed in the species accounts, we do not include their names in the key or figure legends. We give the synonymy, diagnosis, geographical distribution, and brief remarks when applicable. The synonymy is as complete as possible, barring records that were dubious, unclear, or unavailable to us. The diagnosis is based on specimens from SE Brazil, and therefore may not reflect the complete color variation found across species ranges. Distributions were based on collection specimens. Each species is illustrated in a plate by pictures of the wings (dorsal) and scales (ventral hindwing, basal area), and drawings of male genitalia (dorsal, ventral and lateral views; anterior portion to the left). Further information about nomenclature, type specimen deposition, synonymy and distribution can be found in Lamas (1996, 2004).

We examined specimens in the following collections: RBF (Ronaldo Francini's personal collection, currently at the Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil), UFPR (Universidade Federal do Paraná, Curitiba, Brazil), MAPA (Museu Anchieta, Porto Alegre, Brazil), MPM (Milwaukee Public Museum, Milwaukee, USA). Most fieldwork was done in São Paulo and Rio Grande do Sul states, Brazil, but RBF also visited Paraná, Minas Gerais, Rio de Janeiro, Espírito Santo and Bahia states.

**Illustrated key to male *Actinote* from southeastern Brazil based on wing pattern and genitalia**

- 1a. Wings completely opaque and predominantly iridescent-black except for forewing yellow markings [iridescent-black mimicry group, example in Figure 1A] ..... 3
- 1b. Certain wing areas translucent to some extent [black-yellow mimicry group, example in Figure 1B; greasy-orange mimicry group, example in Figure 1C] ..... 2
- 1c. Wings completely opaque but never iridescent-black [orange-yellow mimicry group, example in Figure 1D; red mimicry group, example in Figure 1E] ..... 8

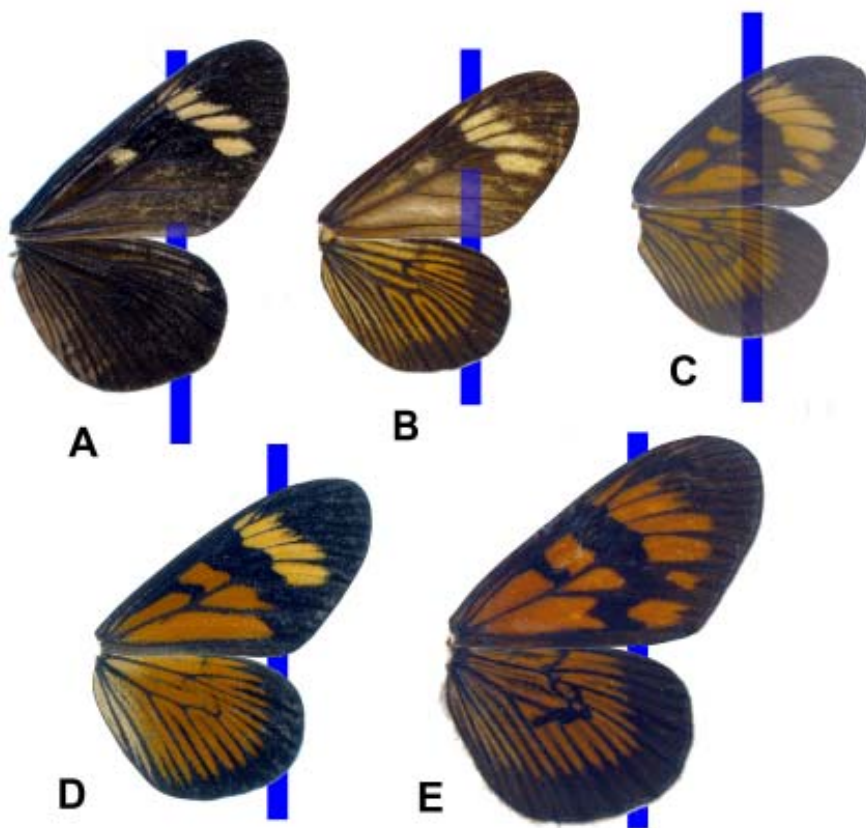


Figure 1. Vertical blue lines help to show the degree of wing transparency. (A) *A. zikani*; (B) *A. melanisans*; (C) *A. canutia*; (D) *A. brylla*; (E) *A. dalmeidai*.

- 2a. Fore- and hindwings largely translucent and with a greasy appearance ..... 4
- 2b. Forewing base translucent, remainder of the wings opaque ..... 5

- 3a. In ventral view, valva cylindrical; in dorsal view, base of valva narrower (Figure 2A) ..... *morio*
- 3b. In ventral view, valva triangular; in dorsal view, base of valva broader (Figure 2B) ..... *zikani*

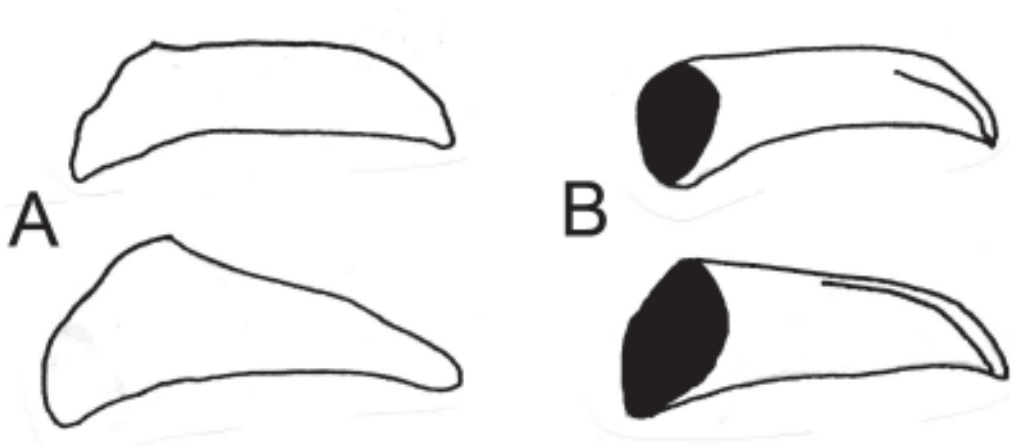


Figure 2. Dorsal and ventral views of the valva, setae omitted. (A) *Actinote morio*; (B) *A. zikani*.

- 4a. Hindwing comma-shaped mark well developed (indicated by the arrow in Figure 3A) ..... *mamita*
- 4b. Hindwing comma-shaped mark faded (Figure 3B) ..... *canutia*

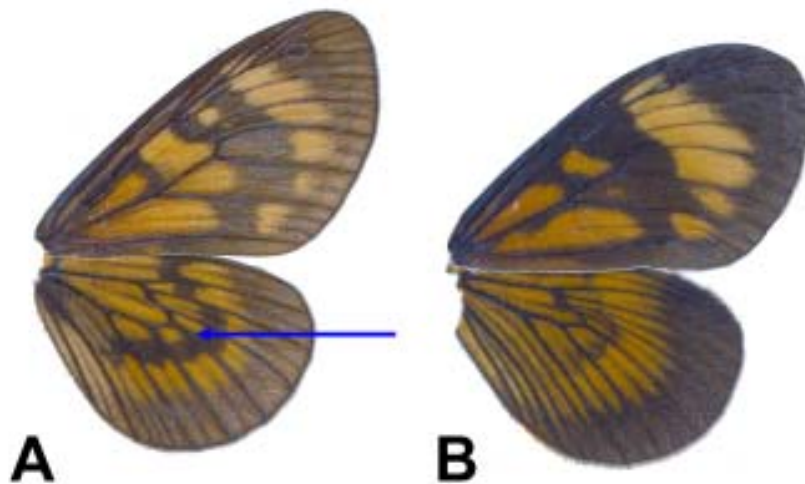


Figure 3. Fore- and hindwings; dorsal surface. (A) *A. mamita*, the arrow indicates the comma-shaped mark; (B) *A. canutia*.

- 5a. Valva much longer than broad (5x longer than the maximum width), with tube-like appearance and blunt apex (Figure 4A); forewing greasy and strongly translucent at base (Figure 4B) ..... *genitrix*
- 5b. Valva less than 3x as long as it is wide (maximum length/maximum width) ..... 6

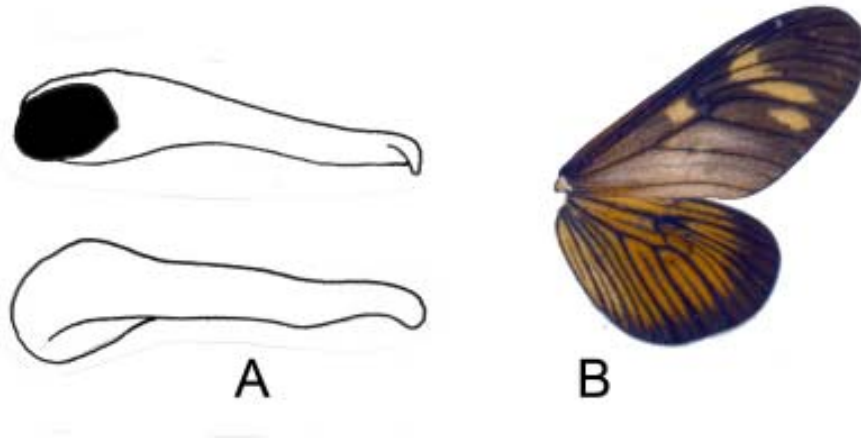


Figure 4. *Actinote genitrix*. (A) Dorsal and ventral views of the valva; (B) wings, dorsal surface.

- 6a. In ventral view, inner contour of valva bulging before apex, apex with a broad point (Figure 5A) ..... *discrepans*
- 6b. In ventral view, inner contour of valva a simple arch, apex blunt (Figure 5B) ..... *eberti*
- 6c. Valva apex pointed (example in Figure 5B) ..... 7

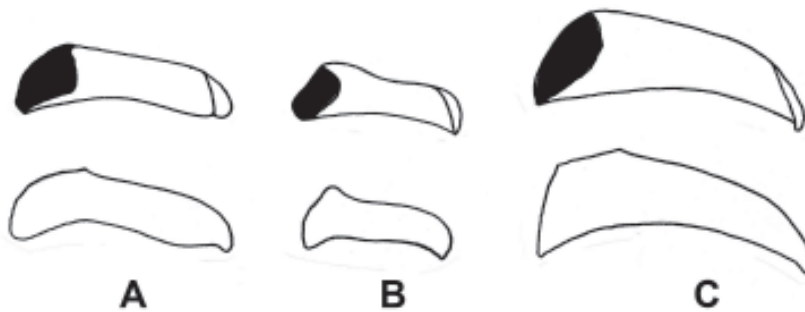


Figure 5. Dorsal (top) and ventral (bottom) views of the valva. (A) *A. discrepans*; (B) *A. eberti*; (C) *A. melanisans*.

- 7a. In ventral view, valva longer and somewhat arched (characters visible without dissection; Figure 6A) ..... *melanisans*
- 7b. In ventral view, valvae shorter, less arched, with a slight constriction before the apex and a more sharply pointed apex (characters visible without dissection; Figure 6B)..... *rhodope*

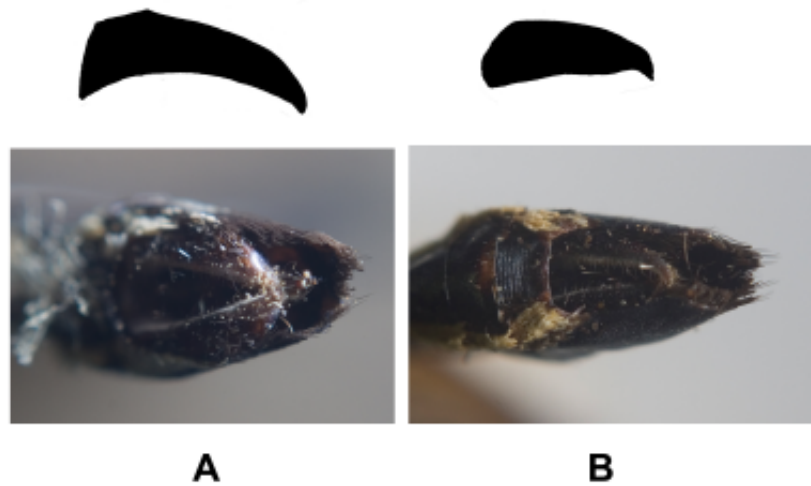


Figure 6. Ventral view of the valva and abdomen. (A) *A. melanisans*; (B) *A. rhodope*.

8a. In dorsal view, fore- and hindwing with orange stripes and spots, completely lacking yellow stripes or spots (example in Figure 7A) ..... 9

8b. In dorsal view, fore- and hindwing stripes and spots predominantly orange, but some yellow stripes and spots present (example in Figure 7C) ..... 13

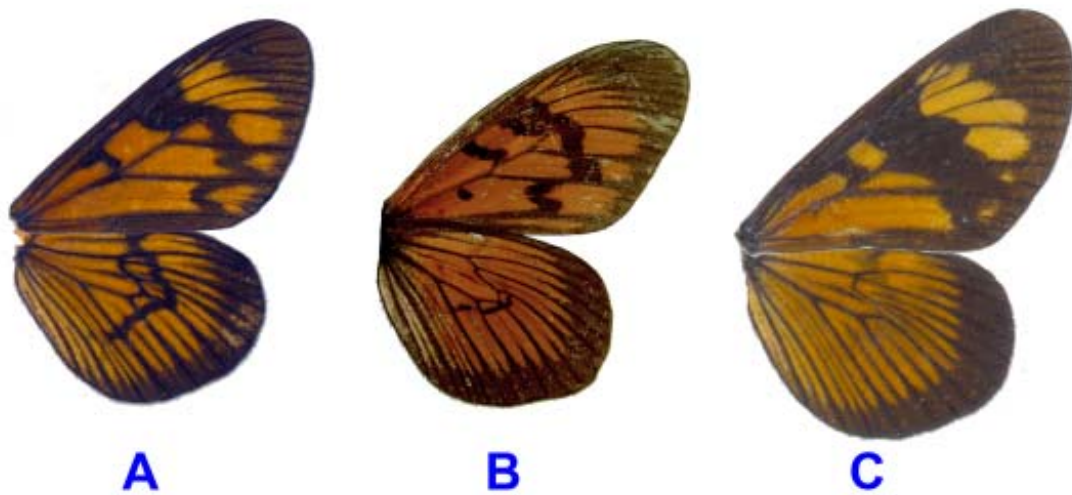


Figure 7. Dorsal view of fore- and hindwings. (A) *A. surima*; (B) *A. catarina*; (C) *A. pyrha*.

9a. In dorsal view, wing background nearly black, markings dark orange, forewing stripes and spots never fused; in ventral view, valva short and with a sharply pointed apex (Figures 7A, 8A) ..... *surima*

- 9b. In dorsal view, wing background brown, markings dark orange, forewing stripes and spots often fused (common in the discocellular markings); in ventral view, valva elongated, broad at base and with a pointed apex (Figures 7B, 8B) ..... *catarina*
- 9c. In ventral view, valva apex blunt (examples in Figure 8C-F) ..... 10



Figure 8. Ventral view of the valva. (A) *A. surima*; (B) *A. catarina*; (C) *A. alalia*; (D) *A. bonita*; (E) *A. dalmeidai*; (F) *A. conspicua*.

- 10a. Scales of the basal region of the hindwing with a prominent, broad mid-lobe - a pattern that differs from the typically serrate or dentate (Figure 9A) ..... *alalia*
- 10b. Scales of the basal region of the hindwing dentate (examples in Figure 9B-C) ..... 11



Figure 9. Scales of the basal region of the hindwing. (A) *A. alalia*; (B) *A. conspicua*; (C) *A. bonita*.

- 11a. Valva about 5x longer than wide (maximum length / maximum width; Figure 10A) ..... *conspicua*
- 11b. Valva 3x or less longer than wide (maximum length / maximum width; examples in Figure 10B-C) ..... 12



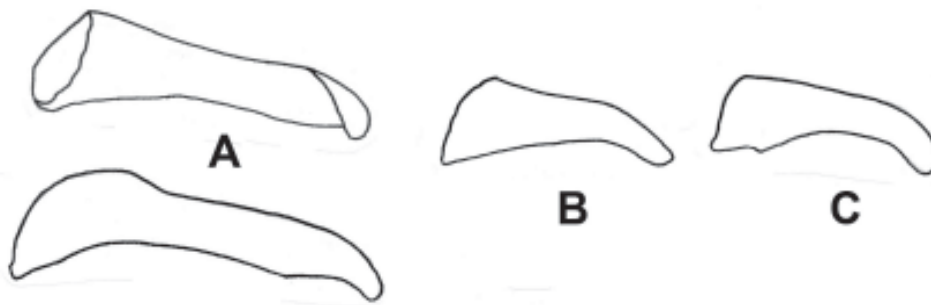


Figure 10. Valva. (A) *A. conspicua*, dorsal (top) and ventral (bottom) views; ventral view of (B) *A. bonita*; and (C) *A. dalmeidai*.

12a. In lateral view, valva sharply decrease in width from base to apex, apex narrower (Figure 11A) ..... *bonita*

12b. In lateral view, valva with a slight decrease in width from base to apex, apex broader (Figure 11B)  
 ..... *dalmeidai*



Figure 11. Lateral view of the valva; (A) *A. bonita*; (B) *A. dalmeidai*.

13a. Cell Cu2 with a thin black line across the yellow marks resembling an extra vein (blue arrow in Figure 12A); in ventral view, valvae strongly arched (Figure 12B) ..... *quadra*

13b. Cell Cu2 without a thin black line across the yellow marks (example in Figure 12C); in ventral view, valvae not strongly arched (example in Figure 12D) ..... 14

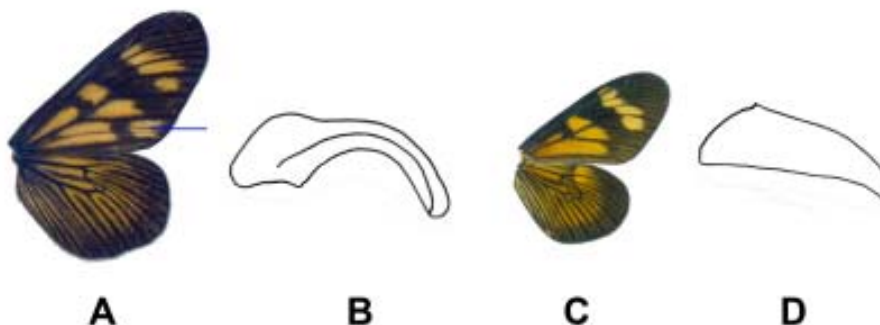


Figure 12. Dorsal view of the wings and ventral view of the valva. (A-B) *A. quadra*; (C-D) *A. pellenea*.

- 14a. Hindwing with reddish-orange markings on both dorsal (Figure 13A) and ventral surfaces (Figure 13B) ..... *parapheles*
- 14b. Hindwing without reddish-orange markings on dorsal and ventral surfaces ..... 15

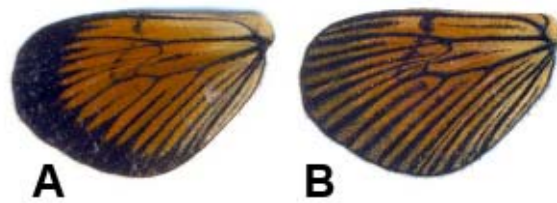


Figure 13. Dorsal (A) and ventral (B) views of the hindwing of *A. parapheles*.

- 15a. Scales of the basal region of the hindwing not dentate or serrate (examples in Figure 14A-B) ..... 16
- 15b. Scales of the basal region of the hindwing dentate or serrate (example in Figure 14C) ..... 17

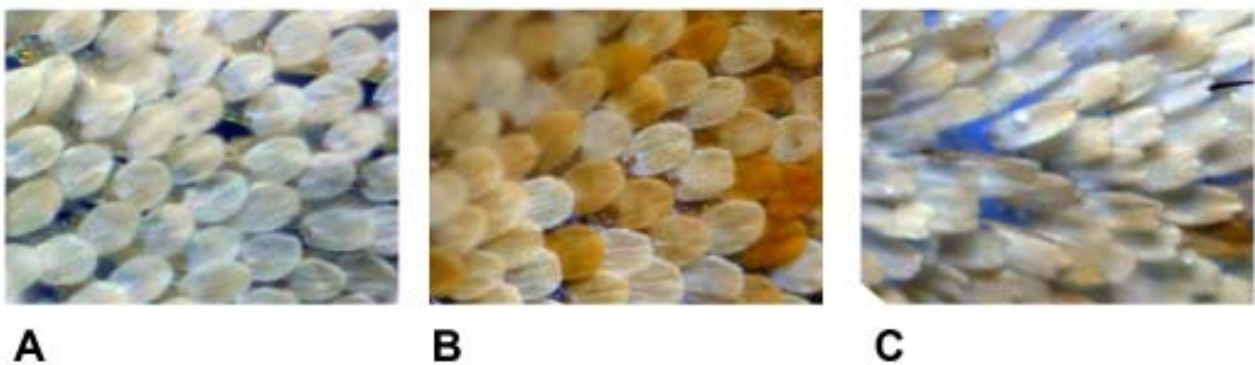


Figure 14. Scales of the basal region of the hindwing. (A) *A. carycina*; (B) *A. pellenea*; (C) *A. pyrtha*.

- 16a. Wing length generally smaller (1.8-3.0 cm, mean = 2.2 cm); basal dorsal forewing markings velvety orange, varying from darker to paler between individuals; basal dorsal forewing markings generally broad, but varying in width between individuals (Figure 15 A-B); this species is very similar to *carycina* ..... *pellenea*
- 16b. Wing length generally larger (2.2-2.9 cm, mean = 2.6 cm); dorsal background color orangish-brown; basal dorsal forewing markings more shiny than *pellenea*, colored orange to yellow and white, sometimes the orange basal markings with a tint of white; basal dorsal forewing markings generally narrower than *pellenea*, but varying in width between individuals from broad to a faint diffuse line (Figure 15 C-D); this species is very similar to *pellenea*; some individuals may be similar to *pyrra* or *pratensis* ..... *carycina*



Figure 15. Dorsal (right) and ventral (left) views of wings. (A-B) *A. pellenea*; (C-D) *A. carycina*.

17a. In ventral view, valva apex blunt (blue arrow in Figure 16A) ..... *pratensis*

17b. In ventral view, valva apex more pointed (example in Figure 16B) ..... 18



Figure 16. Ventral view of the valva. (A) *A. pratensis*; (B) *A. brylla*.

18a. In ventral view, inner and outer edges of valva nearly parallel (blue arrows in Figure 17A); dorsal forewing base markings predominantly shiny orange (Figure 16B) ..... *pyrrha*

18b. In ventral view, inner and outer edges of valva converging toward apex (blue arrows in Figure 17C); dorsal forewing base markings predominantly yellow (Figure 17D) ..... *brylla*

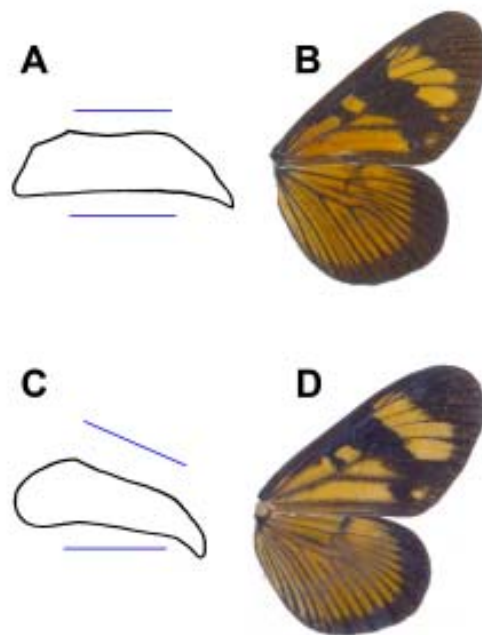


Figure 17. Ventral view of the valva and dorsal view of the wings. (A-B) *A. pyrtha*; (C-D) *A. brylla*.

## Species accounts

### *Actinote morio* Oberthür, 1917

(Plate 1)

*Actinote morio* Oberthür 1917:112, 123; D'Almeida 1951:5; D'Abrera 1987:444; Brown 1988:36; Francini 1989:41, 53, 198; Brown 1992:158-159; Lamas 2004:263

*Actinote mario* [sic] D'Abrera 1987:444

**Diagnosis:** Wings opaque, iridescent black; dorsal basal forewing markings faint and diffuse, dirty yellow; post medial dorsal forewing markings dirty yellow; hindwing markings dirty yellow. Valva broad, slightly flattened dorso ventrally, somewhat uniform in width and lacking constrictions or terminal indentations; apex robust, pointed. Similar to, but distinguished from *zikani* by the darker wings and the shape of the valva.

**Distribution:** Brazil – Rio de Janeiro, Minas Gerais, Distrito Federal. Approximate altitude range: 700-1400 m.

**Remarks:** Iridescent-black mimicry group. Bivoltine. Relatively rare in collections.

### *Actinote zikani* D'Almeida, 1951

(Plate 2)

*Actinote zikani* D'Almeida 1951:3-5; Lamas 1973:180; Mielke & Casagrande 1986:151; Brown 1987:41; Francini 1989:41-43, 198; Fernandes, Machado & Rylands 1990:60; Brown 1991:389; Lamas 2004:264

*Actinote mikani* [sic] D'Almeida 1951:4

*Actinote zakani* [sic] Brown 1988:36

*Actinote morio* D'Almeida 1943:107-109

**Diagnosis:** Wings opaque, iridescent black; dorsal basal forewing markings faint and diffuse, dirty yellow; post medial dorsal forewing markings dirty yellow; hindwing markings dirty orange. Valva broad at the base, decreasing in width towards apex to produce a triangular shape in ventral view; apex robust, blunt. Similar to, but distinguished from *morio* by the lighter wing colors and the shape of the valva.

**Distribution:** Brazil – São Paulo, Rio de Janeiro. Approximate altitude range: 600-1200 m.

**Remarks:** Iridescent-black mimicry group. Bivoltine. Relatively rare in collections.

### *Actinote mamita* (Burmeister, 1861)

(Plate 3)

*Acraea* [sic] *mamita* Burmeister 1861:168

*Actinote mamita* Lewis 1975:43, 227; Penz 1983:51-55; Penz 1985:51-53; Brown 1987:41; Brown 1988:36; Francini 1989:41, 43, 53-56, 61, 63, 65, 67-71, 74-75, 77, 79, 87, 89-96, 100, 102, 107-109, 113-114, 135, 137, 140, 143, 153, 198, 199, 217, 220, 223; Brown 1992:158-159

*Acraea mitama* Schaus 1902:391

*Actinote mamita mitama* Eltringham & Jordan 1913:12; Jordan 1913b:374; Jordan & Eltringham 1916:19; Lamas 2004:263

**Diagnosis:** Wings greasy, translucent; all forewing markings orange; hindwing comma-mark (Fig. 3A) always conspicuous. The subspecies from southeastern Brazil, *mamita mitama* (Schaus, 1902) seems to be more orange than *mamita mamita* found in Argentina. Valva cylindrical, somewhat narrow, and strongly arched dorso-ventrally. Distinguished from *canutia* by a larger marking on forewing cell Cu1, and all forewing markings being of the same color. Genitalia similar to *canutia*, but apex of valva more delicate in dorsal view.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais; Argentina; Uruguay?; Paraguay?. Approximate altitude range: 0-1600 m.

**Remarks:** Greasy-orange mimicry group. Lamas (2004) listed three subspecies of mamita (*m. mamita*, *m. elena* and *m. mitama*). We did not examine specimens of *mamita elena* (from Colombia; see Lamas 2004).

### *Actinote canutia* (Hopffer, 1874)

(Plate 4)

*Acraea canutia* Hopffer 1874:345-346

*Actinote canutia* Jordan 1913b:374; Eltringham & Jordan 1913:11; Jordan & Eltringham 1916:19; Lewis 1975:227; Smart 1976:265; Pierre 1983:72; Brown 1987:41; D'Abreu 1987:445; Brown 1988:36; Francini 1989:41, 43, 53-56, 58, 61, 63, 65, 67-71, 74-75, 77, 79, 88-96, 98, 100, 102, 107-109, 113-114, 136-138, 140, 143, 146-147, 157-159, 165, 168, 191, 193, 198-199, 216-217, 220, 223; Brown 1992:158-159; Lamas 2004:263

*Acraea (Actinote) canutia* Pierre 1987:27

*Actinote pellenea* Geyer 1832: fig. 741-742 (part.)

**Diagnosis:** Wings greasy, translucent; basal forewing markings darker orange than postmedial markings; hindwing comma-mark faint (Fig. 3B). Valva cylindrical, somewhat narrow, and strongly arched dorso-ventrally. Distinguished from *mamita* by having a smaller marking on forewing cell Cu1, and by the post-medial forewing markings being lighter than basal markings. Genitalia similar to *mamita*, but apex of valva more robust in dorsal view.

**Distribution:** Brazil – Rio Grande do Sul?, Santa Catarina, São Paulo, Rio de Janeiro, Espírito Santo, Minas Gerais. Approximate altitude range: 0-1600 m.

**Remarks:** Greasy-orange mimicry group.

### *Actinote genitrix* D'Almeida, 1922

(Plate 5)

*Actinote genitrix* D'Almeida 1922:143-145; D'Almeida 1925:335, 346-348, 352-353; ab. *moesa* D'Almeida 1925:348; ab. *subrubicunda* D'Almeida 1925:348; D'Almeida 1935a:71, 99-100, 102-103, 105, 109-110; var. a-f D'Almeida 1935a:99-

100; D'Almeida 1935b:487; Costa Lima 1936:136; D'Araujo e Silva et al. 1967:339; f. *moesa* Brown & Mielke 1968:152; Toledo 1980:87; Penz 1983:37, 40; Penz 1985:104; Mielke & Casagrande 1986:145-146, 148; ab. *moesa* Mielke & Casagrande 1986:147, 149; ab. *subrubicunda* Mielke & Casagrande 1986:147, 150; D'Abreu 1987:444; Brown 1987:41; Brown 1988:36; Francini 1989:41-43, 53, 55-56, 58, 61, 63, 65, 67-71, 74-75, 77-79, 87, 89-94, 100, 107-109, 114, 137-138, 140, 143, 157, 158-160, 165, 168, 191, 193, 198-199, 216-217, 220, 223; Brown 1992:158-159; Lamas 2004:263

*Actinote genitrix moesa* D'Almeida 1935a:100

*Actinote genitrix subrubicunda* D'Almeida 1935a:100

*Actinote genitrix* [sic] Ackery 1988:136

**Diagnosis:** Base of the forewings translucent, post-medial markings dirty white to creamy yellow. Valva very long (more than 5X longer than maximum width), broad at base and decreasing in width toward apex; straight for the most part, but with a small terminal arch. Similar to *melanisans*, *rhodope*, and *discrepans* (most often confused with *melanisans*). Forewings tend to be slightly more elongated at apex than in *melanisans*, *rhodope*, and *discrepans*. Easily distinguished from similar species by the length and shape of the valva.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 600-1600 m.

**Remarks:** Black-yellow mimicry group.

### *Actinote discrepans* D'Almeida, 1958

(Plate 6)

*Actinote parapeles* ab. *discrepans* D'Almeida 1935a:36-109; Mielke & Casagrande 1986:151

*Actinote discrepans* D'Almeida 1958:2-4; Penz 1983:36, 38-39; Penz 1985:104; Brown 1987:41; Brown 1988:36; Francini 1989:41, 43, 53-56, 58, 61, 63, 65, 67-71, 74-75, 77, 79, 85, 89-96, 100, 107-109, 114, 117, 136-137, 140, 143, 153, 155, 157-159, 194, 198, 217, 220, 223; Brown 1992:158-159; Lamas 2004:263

**Diagnosis:** Base of the forewings translucent, post-medial markings dirty white to creamy yellow. In fresh individuals, forewing discal markings often thin and sharp, resembling an exclamation point. Valva strongly arched dorso-ventrally, with a slight constriction before apex in ventral view. Similar to *genitrix*, *melanisans*, and *rhodope* (most often confused with *melanisans*), but distinguished from these species by the sharp forewing discal markings and by the length and arched shape of the valva.

**Distribution:** Brazil – Paraná, São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 600-1600 m.

**Remarks:** Black-yellow mimicry group.

### *Actinote eberti* Francini, Freitas & Penz, 2004

(Plate 7)

*Actinote eberti* Francini, Freitas & Penz 2004:2-5

**Diagnosis:** The wing color pattern of this species is intermediate between the darker *morio* and *zikani* (iridescent-black mimicry group) and the more colorful *melanisans* and *rhodope* (among other species in the black-yellow mimicry group). Wings with a greasy aspect, forewing translucent, colored areas faint but noticeable. Hindwing black margin broad, colored areas from faded orange to white. Males can be easily distinguished from similar species by the short arched valvae, broad tegumen, and small juxta.

**Distribution:** Brazil – São Paulo, but possibly including Rio de Janeiro and Minas Gerais (along Serra da Mantiqueira). Approximate altitude: 1500 m.

**Remarks:** Possibly included in the black-yellow mimicry group. This species is only known from nine collection specimens deposited in the Universidade Federal do Paraná.

### *Actinote melanisans* Oberthür, 1917

(Plate 8)

*Actinote bubona melanisans* Oberthür 1917:124

*Actinote melanisans* D'Almeida 1958:1-2, 6-7; Ebert 1969:35; Araujo & Valente 1981:1486; Penz 1985:104; Brown 1987:41; Brown 1988:36; Francini 1989:41, 43-44, 53-56, 58, 60, 62, 64, 67-71, 74-75, 77, 79, 84, 89-96, 99-103, 107-109, 113-114, 117, 136-138, 140, 141, 143, 146-147, 152-153, 155, 157-159, 161, 165-168, 187, 191, 193, 197-198, 215, 217, 220, 223; Lamas 2004:263

*Actinote* cf. *A. melanisans* Penz 1983:32-35

*Actinote* sp. B Penz 1983:38, 44, 45

*Actinote brasiliensis* var. *melanisans* D'Almeida 1925:339; ab. *fuliginosa* D'Almeida 1925:340; var. q D'Almeida 1935a:81; ab. *fuliginosa* D'Almeida 1935a:82; ab. *fuliginosa* Mielke & Casagrande 1986:147, 150

*Actinote carycina* D'Abreu 1987:444

*Actinote hyalina* Brown 1992:158-159

*Actinote morio* Hayward 1931:26-27; Hayward 1935:96-97; D'Almeida 1935b:488; Hayward 1951:208

*Actinote pyrrrha* D'Almeida 1935a:71, 86-87, 109-112; var. a-f D'Almeida 1935a:87-88; D'Almeida 1958:1-2, 4-5

*Actinote rhodope* Biezanko & Freitas 1938:7 (part.); Biezanko & Seta 1939:5 (part.); Biezanko, Ruffinelli & Carbonell 1957:127 (part.); D'Almeida & Silva et al. 1968:340 (part.)

*Actinote travassosi* D'Almeida 1934:90-92

**Diagnosis:** Base of the forewings translucent, post-medial markings creamy yellow. Forewing discal and Cu2 markings generally faint, but discal markings may resemble those of *discrepans* in some individuals (i.e., shaped as an exclamation point). In ventral view, valva broad and some-

what arched, and with a pointed apex. Similar to *genitrix*, *discrepans*, and *rhodope*, but distinguished from these species by the broad, arched and pointed valva.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 0-1600 m.

**Remarks:** Black-yellow mimicry group. This is the most locally common species in this mimicry group. In the plates of Volume 5 of Seitz' *Macrolepidoptera of the World*, an individual that closely resembles *melanisans* and *rhodope* is illustrated and named *hyalina*. This illustration does not seem to correspond to any known type specimens designated by K. Jordan. In an attempt to clear this issue, Lamas (1996) designated a female lectotype (although the illustration was said to be male; Jordan 1913b) and downranked *hyalina* to a subspecies of *A. pellenea*. This seems to have further confused the matter, and the true identity of Jordan's *hyalina* may remain forever unknown.

### *Actinote rhodope* D'Almeida, 1923

(Plate 9)

*Actinote rhodope* D'Almeida 1923:231-232; f. *lynsa* D'Almeida 1923:232; D'Almeida 1925:335-336, 342-345, 352-353; var. a-c D'Almeida 1925:345-346; ab. *lynsa* D'Almeida 1925:346; ab. *tenuilimbata* D'Almeida 1931:61; D'Almeida 1935a:71, 89-93, 103-105, 109-112; var. a-f D'Almeida 1935a:89-90; D'Almeida 1935b:487; Costa Lima 1936:136; Biezanko & Freitas 1938:7 (part.); Biezanko & Seta 1939:5 (part.); Biezanko, Ruffinelli & Carbonell 1957:127; Brown & Mielke 1968:152; D'Almeida & Silva et al. 1968:340; Toledo 1980:87; Penz 1985:104; Mielke & Casagrande 1986:147-148; f. *lynsa* Mielke & Casagrande 1986:147, 149; ab. *tenuilimbata* Mielke & Casagrande 1986:147, 149; Brown 1987:41; Ackery 1988:136; Francini 1989:41-43, 53-56, 58, 60, 62, 64, 67-71, 74-75, 77, 78, 86, 89-96, 100, 107-108, 114, 136-138, 140, 143, 157, 158, 191, 193, 198, 217, 220, 223; Brown 1992:158-159; Lamas 2004:264

*Actinote hyalina* D'Almeida 1922:143, 145

*Actinote rhodope fuscata* D'Almeida 1935a:90, 109; Mielke & Casagrande 1986:151

*Actinote rhodope lynsa* D'Almeida 1935a:90, 109

*Actinote rhodope tenuilimbata* D'Almeida 1935a:90, 109

*Actinote melanisans* Ebert 1969:35 (part.)

**Diagnosis:** Base of the forewings translucent, post-medial markings creamy yellow. Forewing discal and Cu2 markings faint. In ventral view, valva short, somewhat broad and straight, and with a slight constriction anterior to the pointed apex. Similar to *genitrix*, *discrepans*, and *melanisans* (most often confused with *melanisans*); distinguished from these species by the shorter, straight and pointed valva.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 600-1600 m.

**Remarks:** Black-yellow mimicry group. See also remarks for *melanisans*, above.

### *Actinote surima* (Schaus, 1902)

(Plate 10)

*Acraea surima* Schaus 1902:392

*Actinote surima* Eltringham & Jordan 1913:13; Jordan 1913b:374; Jordan & Eltringham 1916:19; Hayward 1931:29, 169; Monte 1934:19; Hayward 1935:97; D'Almeida 1935a:94; D'Almeida 1935b:488; Biezanko & Pitoñ 1941:9; Hayward 1951:209; f. *punctata* Hayward 1951:209; Biezanko, Ruffinelli & Carbonell 1957:127; Brown & Mielke 1967:95; Brown & Mielke 1968:151; D'Araujo Silva et al. 1968:340; Ebert 1969:35; Brown & Benson 1974:218; Smart 1976:191, 265; Penz 1983:46-50; Brown 1984:158; Penz 1985:109; Almeida, Souza & Marques 1986:33; D'Abreira 1987:445; Brown 1987:41; Brown 1988:36; Francini 1989:44, 53-56, 58, 61, 74-75, 77, 79, 88-96, 100, 102, 107-109, 113-114, 136-137, 140, 143, 153, 155, 157-159, 165, 191, 193, 198-199, 217, 220, 223; Brown 1992:158-159; Paluch, Casagrande & Mielke 1999:129-140; Lamas 2004:264

*Actinote surima punctata* Hayward 1935:97

*Acraea (Actinote) surima* Pierre 1987:22

**Diagnosis:** For the subspecies found in SE Brazil, *surima surima*: wings opaque, all markings dark orange, hindwing comma-mark well developed. Ventral hindwing uniform in color, and paler than dorsal hindwing. Valva short and broad, slightly compressed dorsoventrally, with a pointed apex.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais, Distrito Federal, Goiás; Paraguay; Argentina. Approximate altitude range: 0-1600 m.

**Remarks:** Red mimicry group. Lamas (2004) listed two subspecies of *surima* (*s. surima* from Brazil and *s. perisa* from Argentina).

### *Actinote catarina* Penz, 1996

(Plate 11)

*Actinote catarina* Penz & Francini 1996:311-315; Lamas 2004:263

*Actinote* cf. *A. alalia conspicua* Penz 1983:56

**Diagnosis:** In dorsal view, all forewing markings orange. Forewing orange discal markings often fused, other orange spots commonly fused. In ventral view, hindwing pale yellow with a blurry orange stain at the center. Valvae broad, compressed dorso-ventrally and slightly arched laterally; apex pointed.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná. The accurate altitude range of this species is not known. The type specimens were collected inside one of the canyons in the southern end of the Serra Geral in Rio Grande do Sul (Faxinal, located near the city of Camará do Sul, 1200 m). We do not know how far these butterflies go down these canyons.

**Remarks:** Red mimicry group.

### *Actinote alalia* (C. Felder & R. Felder, 1860)

(Plate 12)

*Acraea alalia* C. Felder & R. Felder 1860:105; Kirby 1871:136; Mabilde 1896:64 (part.); var. Jones & Moore 1883:36 (part.)

*Acraea eulalia* [sic] Müller 1878a:296 (part.)

*Actinote alalia* Jordan & Eltringham 1916:19 (part.); D'Almeida 1935a:93 (part.); Ebert 1969:35; Lewis 1975:43, 227 (part.); Smart 1976:265 (part.); D'Abreira 1987:445; Ackery 1988:136; Lamas 2004:263

*Actinote alalia alalia* Eltringham & Jordan 1913:10; Jordan 1913b:374 (part.)

*Acraea (Actinote) alalia* Pierre 1987:22 (part.)

**Diagnosis:** Wings opaque, all markings dark orange. Ventral hindwing paler than dorsal, ventral hindwing medial area darker orange than basal and post-medial areas. Valva cylindrical, moderately arched laterally and dorso-ventrally; in lateral view, similar in length to tegumen+uncus; apex robust and blunt. Similar to *dalmeidai*, but can be distinguished from this species by the longer and less laterally arched valva.

**Distribution:** Brazil – Rio Grande do Sul?, Santa Catarina, Paraná, São Paulo, Rio de Janeiro. Approximate altitude range: 1400-2000 m.

**Remarks:** Red mimicry group.

### *Actinote conspicua* Jordan, 1913

(Plate 13)

*Actinote alalia conspicua* Jordan 1913a:32; Jordan 1913b:374; Jordan & Eltringham 1916:18; D'Abreira 1987:445

*Actinote conspicua* Brown & Mielke 1968:151; Ebert 1969:35; Lamas 2004:263

**Diagnosis:** Large. Wings opaque, all markings dark orange. Ventral hindwing homogeneously dark orange. Valva cylindrical, long and narrow in lateral view, moderately arched dorso-ventrally; apex robust and blunt.

**Distribution:** Brazil – Paraná, São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 1600-2000 m.

**Remarks:** Red mimicry group.

### *Actinote bonita* Penz, 1996

(Plate 14)

*Actinote bonita* Penz & Francini 1996:311-313, 315; Lamas 2004:263

**Diagnosis:** Wings opaque, all markings orange. Ventral hindwing pale orange, homogeneous. Valva cylindrical; in lateral view, broad at base and decreasing in diameter toward apex; moderately arched dorso-ventrally; in ventral view, slightly bent before apex; apex blunt. Can be easily distinguished from *quadra* by the color of the ventral hindwing and less arched valva.

**Distribution:** Brazil – Minas Gerais, Rio de Janeiro. Approximate altitude range: 1600-2000 m.

**Remarks:** Red mimicry group.

### *Actinote dalmeidai* Francini, 1996

(Plate 15)

*Actinote dalmeidai* Penz & Francini 1996:310-313; Lamas 2004:263

*Actinote alalia* D'Almeida 1935a:71, 93 (part.); Brown 1987:41; Brown 1988:36; Francini 1989:41, 43, 53-56, 58, 61, 63, 65, 67-71, 74-75, 101, 107-109, 114, 135, 194, 198, 217, 220, 223

*Actinote* sp. near *alalia* Brown 1992:158-159

**Diagnosis:** Wings opaque, all markings dark orange. Ventral hindwing paler than dorsal hindwing, ventral hindwing medial area darker orange than basal and post-medial areas. Valva cylindrical, moderately arched dorso-ventrally, strongly arched laterally; in lateral view, valva shorter than tegumen+uncus; apex robust and blunt. Similar to, but distinguished from *alalia* by the shorter and more laterally arched valva.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 600-1800 m.

**Remarks:** Red mimicry group.

### *Actinote quadra* (Schaus, 1902)

(Plate 16)

*Acraea quadra* Schaus 1902:392

*Actinote quadra* Jordan 1913b:373; Eltringham & Jordan 1913:13; Jordan & Eltringham 1916:18; Lewis 1975:227; Smart 1976:265; D'Abrera 1987:445; Brown 1987:41; Brown 1988:36; Francini 1989:41, 53, 135, 198; Lamas 2004:263

*Acraea (Actinote) quadra* Pierre 1987:22

**Diagnosis:** Wings opaque, all markings orange. Ventral hindwing pale yellow, homogeneous. Valva cylindrical; strongly arched laterally; apex blunt. Similar to, but easily distinguished from *bonita* by the pale yellow ventral hindwing and the strongly arched valva.

**Distribution:** Brazil – São Paulo, Rio de Janeiro, Minas Gerais. Approximate altitude range: 1600-2000 m.

**Remarks:** Orange-yellow mimicry group.

### *Actinote parapehes* Jordan, 1913

(Plate 17)

*Acraea thalia* Müller 1882:263; Müller 1883b:216; Bönninghausen 1896:33

*Actinote parapehes* Eltringham & Jordan 1913:12; Jordan 1913a:33; Jordan 1913b:373; f. *pallescens* Jordan 1913b:373; Jordan & Eltringham 1916:18; D'Almeida 1925:335, 348-353; var. a-d D'Almeida 1925:351; var. *fumida* D'Almeida 1925:351; var. *hippea* D'Almeida 1925:354; Hayward 1931:27-28, 167-168; f. *ochreana* Hayward 1931:28, 179-180; Hayward 1935:96-97; f. *ochreana* Hayward 1935:97; D'Almeida 1935a:71, 94-99, 103-105, 109-112; Brown 1987:41; Ackery 1988:136; Brown 1988:36; Francini 1989:41-43, 53-55, 56, 58, 63, 65, 67-71, 74-75, 77, 79, 86, 89, 90-96, 98, 100-102, 107-109, 113-114, 117, 135-138, 140-141, 143, 153, 157, 158-159, 165, 168, 191, 193, 197-199, 217, 220, 223; Brown 1992:158-159; Lamas 2004:263

*Acraea (Actinote) parapehes* Pierre 1987:22

*Actinote alalia* Mabilde 1896:64

*Actinote distincta* D'Almeida 1922:141-142, 145

**Diagnosis:** Wings opaque; basal markings orange, post-medial yellow. Ventral hindwing dark orange, homogeneous. Valva cylindrical; in ventral view, long and straight; in lateral view, moderately arched dorso-ventrally; apex blunt.

**Distribution:** Brazil – Rio Grande do Sul?, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais; Argentina; Paraguay; Uruguay?. Approximate altitude range: 0-1600 m.

**Remarks:** Orange-yellow mimicry group.

### *Actinote pellenea* Hübner, [1821]

(Plate 18)

*Actinote pellenea* Hübner 1820-1824 [1821]:18 fig. 1-4; Eltringham & Jordan 1913:12; Müller 1915:366; D'Almeida 1922:130-135, 145; f. *euterpe* D'Almeida 1922:136; D'Almeida 1925:334, 336, 352-353; var. a-f D'Almeida 1925:337; var. *euterpe* D'Almeida 1925:336; Monte 1934:19; Ronna 1934:35; D'Almeida 1935a:71-72, 74-78, 103-105, 109-112; var. a-v D'Almeida 1935a:72-73; var. *carycinoides* D'Almeida 1935a:73; D'Almeida 1935b:487; Costa Lima 1936:362 (part.); Biezanko & Freitas 1938:7; Costa Lima 1950:291; Brown & Mielke 1967:96; D'Araujo Silva et al. 1968:339; Brown & Mielke 1968:151; Brown & Benson 1974:218; Lewis 1975:43, 227; Smart 1976:265; Toledo 1980:87; Penz 1983:23-26; D'Abrera 1984:223; var. *carycinoides* Mielke & Casagrande 1986:149-150; Brown 1987:41; D'Abrera 1987:443; Ackery 1988:136; Brown 1988:36; Francini 1989:24, 26, 41-44, 53-56,



58, 60, 62, 64, 67-71, 74-75, 77, 79-80, 89-97, 100-109, 112, 114, 118-122, 124-134, 136-153, 155-159, 162-168, 173-176, 180-182, 184-185, 187-192, 194-198, 200, 2002-203, 205-212, 215, 217, 219, 220, 222-223, 225

*Actinote pellenia* [sic] Ehrlich & Ehrlich 1978:694

*Actinote pellenia* [sic] Mabilde 1896:63

*Acraea pellenia* Kirby 1871:136; Hoppfer 1874:345 (part.); Capronnier 1874:24; Jones & Moore 1883:36, 73; Bönninghausen 1896:33; Müller 1886:424

*Acraea (Actinote) pellenia* Pierre 1987:22

*Actinote pellenia pellenia* Toledo 1980:87; Eltringham & Jordan 1913:12; Jordan 1913b:372; Jordan & Eltringham 1916:17; Brown 1984:158; Brown 1992:158-159; Lamas 2004:263-264

*Actinote pellenia nordestina* D'Almeida 1935a:74; Cardoso 1949:429; Mielke & Casagrande 1986:150

*Actinote pellenia euterpe* D'Almeida 1935a:74

*Actinote antea* Monte 1934:199; D'Araujo Silva et al. 1968:339

*Actinote auloeda* Oberthür 1917:113-114, 123

*Actinote brylla* [lorida] Oberthür 1917:113, 123

*Acraea euterpe* Kirby 1871:137

*Actinote thalia* Pritwittz 1865:137; Joseph 1911:9-12 (part.)

**Diagnosis:** The SE Brazilian subspecies *pellenia pellenia* can be recognized by basal forewing markings velvety orange, varying in color from paler to darker orange but never white. Basal markings of the forewing generally broad, occupying most of the cell height. *Actinote pellenia pellenia* is very similar to *carycina* both in wing pattern and male genitalia. Nonetheless, *pellenia* and *carycina* have distinct larvae, which grants support to their status as separate species.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo, Distrito Federal, Goiás, Bahia; Paraguay; Argentina; Uruguay. Approximate altitude range: 0-1200 m.

**Remarks:** orange-yellow mimicry group. Lamas (2004) listed 15 described and five undescribed subspecies for *pellenia*, of which *pellenia pellenia* is the only subspecies found in Brazil. Given the remarkable color variation and nondescript genitalic morphology of this species, a reassessment of the subspecies of *pellenia* is desirable.

*Actinote carycina* Jordan, 1913

(Plate 19)

*Actinote carycina* Jordan 1913b:373; Jordan & Eltringham 1916:18; f. *calchaqui* Hayward 1931:20-22, 175-177; D'Almeida 1935a:78-79, 109-112; var. a-l D'Almeida

1935a:79-80; var. *hoffmani* D'Almeida 1935a:79-80, 109; var. *differens* D'Almeida 1935a:80, 109; f. *calchaqui* D'Almeida 1935b:487; f. *calchaqui* Hayward 1935:95, 97; Costa Lima 1936:136; Biezanko & Pitoñ 1941:9; Biezanko & Ruffinelli 1957:36; Biezanko, Ruffinelli & Carbonell 1957:127; Ebert 1969:35; Brown & Benson 1974:218; Smart 1976:265; Penz 1983:14-22; Brown 1984:158; Penz 1985:104; Francini 1985:105; Almeida, Souza & Marques 1986:33; D'Abreu 1987:444; Francini 1989:5, 12, 36, 41-44, 53-56, 58, 60, 62, 64, 68-71, 74-75, 77-79, 81, 89-97, 100-102, 107-109, 113-114, 118, 135-138, 140, 143, 146-147, 152-153, 155-159, 165, 167-168, 186-188, 190-192, 197-198, 200, 213, 215-217, 220, 223; var. *hoffmani* Mielke & Casagrande 1986:148, 150; var. *differens* Mielke & Casagrande 1986:150; Brown 1992:158-159; Paluch, Casagrande & Mielke 2001:883-896; Lamas 2004:263

*Acraea (Actinote) carycina* Pierre 1987:22

*Actinote calchaqui* Toledo 1980:88-89

*Actinote pellenia* Hayward 1951:207

*Actinote pellenia pellenia* Orfila 1964:41-48

*Actinote pyrrha* Biezanko & Freitas 1938:7 (part.)

*Acraea thalia* Müller 1876:3, 5, 8-10; Müller 1877a:214-221; Müller 1877b:218-224; Burmeister 1878:126-127; var. a-b Burmeister 1878:127; Müller 1878a:296; Müller 1878b:54-55; Burmeister 1879:194; Müller 1879:2; Müller 1879c:106-107 (part.); Gosse 1880:197 (part.); Müller 1881-82:263 (part.); Müller 1883a:415-416; Müller 1883b:216 (part.); Müller 1883c:197-201; Mabilde 1896:64 (part.)

*Actinote thalia* Joseph 1911:9-18 (part.); Müller 1915:186, 191-193, 195, 325, 340, 365, 366, 377, 380, 429 (part.); Monte 1934:19; D'Araujo Silva et al. 1968:339-340; Ackery 1988:136

**Diagnosis:** Dorsal wing background color orangish-brown, basal forewing markings vary from orange to white, and from broad to narrow. In some specimens the orange basal markings have a tint of white. Very similar to *pellenia*, but despite the variation in wing color, it can generally be distinguished from *pellenia* by the narrower forewing basal markings and slightly larger wing size (the wing size range overlaps with that of *pellenia*, however). Some individuals may also have similar wing patterns to *pratensis*, but can be distinguished from this species by the genitalia. Genitalia very similar to *pellenia*. *Actinote carycina* and *pellenia* have distinct larvae, which grants support to their status as separate species.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Minas Gerais, Rio de Janeiro. Approximate altitude range: 0-1400 m.

**Remarks:** orange-yellow mimicry group.



Figure 18. Variation in wing color and markings in male *A. carycina* from a single sib group.

***Actinote pratensis* Francini, Freitas & Penz, 2004**

(Plate 20)

*Actinote pratensis* Francini, Freitas & Penz 2004:5-7

**Diagnosis:** Similar to *pyrrha* and *carycina*. Can be distinguished from these two and other species by the following combination of characters. Although their size range overlaps, in general male *pratensis* are larger than those of *pyrrha* and *carycina*. Basal markings of forewing orange, and those in cells  $Cu_1$  and  $Cu_2$  usually diffuse at the edges; sub-apical forewing markings dirty white, usually ranging from  $R_5$  to  $Cu_1$ . PD spot absent. The dark border of hindwing is generally broader in *pratensis* than in *pyrrha*, but the ranges of variation in this character fully overlap between these two species. Male valva bowed, nearly homogeneous in width in lateral view, with blunt apex. Aedeagus shorter than the length of the genitalic capsule and comparatively thicker than those of *pyrrha* and *carycina*.

**Distribution:** Brazil – São Paulo, but possibly expanding to Minas Gerais (populations of *pratensis* were recorded in Águas da Prata, Rio Claro, Campinas and Jundiá, all in São Paulo state). The altitude range for this species is unknown, but the known populations occur at ca. 600-800 m.

**Remarks:** Orange-yellow mimicry group.

***Actinote pyrrha* (Fabricius, 1775)**

(Plate 21)

*Papilio pyrrha* Fabricius 1775:464; Goeze 1779:107; Fabricius 1781-1782:33; Fabricius 1787:16; Gmellin 1790:2252; Fabricius 1793:176; Gabriel 1927:102

*Actinote pyrrha* Eltringham & Jordan 1913:13 (part.); Jordan 1913b:373; Jordan & Eltringham 1916:18; Hayward 1931:25-26; Hayward 1935:96-97; f. *illimnis* Hayward 1935:96-97; D'Almeida 1935b:488; Costa Lima 1936:136; Biezanko 1938:6; Biezanko & Freitas 1938:7 (part.); Biezanko 1939:39; Biezanko & Pitoñ 1941:9; Hayward 1951:209; Biezanko, Ruffinelli & Carbonell 1957:127; D'Almeida 1958:1-3, 5; Brown & Mielke 1967:96; Brown & Mielke 1968:151;

D'Araujo Silva et al. 1968:339; Ebert 1969:35; Brown & Mielke 1972:28-29 (part.); Brown & Benson 1974:218; Smart 1976:265; Penz 1983:27-31; Brown 1984:158; Penz 1985:104; D'Abbrera 1987:444; Brown 1987:41; Ackery 1988:136; Brown 1988:36; Francini 1989:41, 42-43, 53-56, 58, 60, 62, 64, 67-71, 74-75, 77, 79-80, 89-97, 100-102, 107-109, 113-114, 117, 136, 137-138, 141, 143, 146-147, 153, 155, 157-159, 168, 190-192, 197-198, 214-215, 217, 220, 223

*Acraea (Actinote) pyrrha* Pierre 1987:22

*Actinote pyrrha illimnis* Hayward 1951:209

*Acraea antea* Gosse 1880:197; Staudinger 1884-1888:81; var. Müller 1886:426; Bönninghausen 1896:33

*Actinote antea* Costa Lima 1936:136

*Actinote brasiliensis* D'Almeida 1922:136-139, 145; f. *pyrrha* D'Almeida 1922:140; var. b D'Almeida 1922:140; D'Almeida 1925:334-335, 338-339, 341-342, 352, 353; var. a-c D'Almeida 1925:340; D'Almeida 1935a:71, 80, 83-86, 103, 105, 109-112; var. a-z and aa D'Almeida 1935a:80; var. *discolora* D'Almeida 1935a:81; D'Almeida 1935b:487; Costa Lima 1936:136; Biezanko & Freitas 1938:7; D'Araujo Silva et al. 1968:339; Toledo 1980:87; Mielke & Casagrande 1986:145, 148; var. *discolora* Mielke & Casagrande 1986:149, 151

*Actinote bubona* Oberthür 1917:117-118, 124; D'Abbrera 1987:444

*Actinote diaguia* Toledo 1980:87-93

*Acraea euterpe* C. Felder 1862:475

*Acraea pellenea* Gosse 1880:197; Costa Lima 1950:291; f. *diaguia* Hayward 1935:95, 97; f. *diaguia* D'Almeida 1935b:488; f. *diaguia* Hayward 1951:208; f. *diaguia* Hayward 1968:350

*Actinote pellenea diaguia* Hayward 1931:22-23, 177-178

*Acraea thalia* Aurivilius 1882:47 (part.); Godart 1819-1824:240; Lucas 1835:101 (part.); Butler 1870:128 (part.); Kirby 1871:135 (part.); Capronnier 1874:24; Müller 1878a:296 (part.); Burmeister 1878:126-127 (part.); Gosse 1880:197; Müller 1883a:415; Staudinger 1884-1888:81; Haase 1893:54

*Actinote thalia* Weymer 1894:321; Joseph 1911:9-18

*Actinote thalia pyrrha* Brown 1992:158-159; Lamas 2004:264

**Diagnosis:** Dorsal forewing basal markings generally broad, occupying the entire height of the cells, and predominantly shiny orange. In ventral view, inner and outer edges of valva nearly parallel.

**Distribution:** Brazil – Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais; Paraguay; Argentina. Approximate altitude range: 0-1600 m.

**Remarks:** Orange-yellow mimicry group. Brown (1992) and Lamas (1996, 2004) considered *pyrrha* a subspecies of *Actinote thalia*—the type species of *Actinote* (Hemming 1967). We maintain the species status and name *pyrrha* for two reasons. First, no characters or justification have been provided to unite the types of *thalia* (a male from “Indiis” = South America, probably Surinam) and *pyrrha* (a worn female from ‘Brazil’), and it is thus unclear why these two taxa were considered conspecific by Brown (1992) and Lamas (1996, 2004). Second, inasmuch as the name *pyrrha* has been traditionally used for the taxon portrayed here, we conservatively consider *Actinote pyrrha* as separate species. We note, however, that a comparative study of both adult and larval morphology is needed to confirm the taxonomic status of *pyrrha* and verify the proposed subspecific classification of *thalia*.

### *Actinote brylla* Oberthür, 1917

(Plate 22)

*Actinote brylla* Oberthür 1917:116-117, 124; Lamas 2004:263

*Actinote brasiliensis* var. j, p, a-c D’Almeida 1935a:81; var. *jordani* D’Almeida 1935a:82, 109; var. *notabilis* D’Almeida 1935a:82, 109-110; var. *notabilis* Mielke & Casagrande 1986:151

*Actinote jordani* D’Almeida 1922:141, 145; D’Almeida 1958:4; Mielke & Casagrande 1986:145, 148

*Actinote notabilis* D’Almeida 1958:4; Brown 1988:36; Francini 1989: 41, 43, 53-56, 58, 60, 62, 64, 67-71, 74-77, 79, 83, 89-97, 100, 102-104, 106-109, 112, 114, 119-120, 123-125, 132, 134, 136-138, 140, 143, 146-147, 153, 155, 157, 159, 168, 191-192, 198, 217, 220, 223

**Diagnosis:** Male forewing length 2.8-3.4 cm (mean=3.1 cm). Dorsal forewing base markings predominantly yellow (predominantly orange in *pyrrha*). Hindwing comma-shaped mark always present. In ventral view, inner and outer edges of valva converging toward apex (Fig. 17C).

**Distribution:** Brazil – São Paulo, Rio de Janeiro, Espírito Santo, Bahia. Approximate altitude range: 0-500 m.

**Remarks:** Orange-yellow mimicry group. *Actinote brylla* can only be found below 500 m altitude in latitudes

above 22°S (although it is possible that it exists in higher altitudes in Espírito Santo state). This species appears to be closely related to, and rarely sympatric with *pyrrha*. D’Almeida (1922a, 1935a) initially used two names for this species, later recognizing it as distinct under the name *notabilis* (D’Almeida 1958). Figures by Oberthür (1917), however, allow accurate identification of *brylla*, and were probably overlooked by D’Almeida.

### Concluding remarks

All *Actinote* species of southeastern Brazil show intra-specific variation in wing color pattern so that, in some cases, there is a high degree of overlap between species. This variation can make species identification difficult, and we used sib groups to document some of the ranges of color and size of markings on the wings of several species (Fig. 15). Examples of species that overlap in both their geographical distributions and wing patterns are: (1) *melanisans*, *genitrix*, *discrepans* and *rhodope*; (2) *alalia* and *dalmeidai*; (3) *carycina*, *pellenea*, *pyrrha* and *pratensis*. All of these species, however, can be distinguished from one another by the male valva, often without dissection (e.g., Fig. 6 in the key, above). From experience, we note that having large series of specimens greatly facilitates identification.

Examination of large series of specimens indicates that, in addition to wing color variation, genital morphology can also vary in all *Actinote* species in southeastern Brazil. The parts that showed strongest variation were the saccus and tegumen+uncus, and some variation was also found in the phallobase (unpublished obs.). Variation in the valva morphology and proportions (length/width) was smaller, and this part of the male genitalia provided reliable characters for species identification.

Female identification still remains a challenge for many *Actinote* species. Similarly to what was noted here for males, rearing of sib-groups and examination of large series of specimens will help our understanding of female wing pattern variation and the discovery of diagnostic characters. Furthermore, examination of the sphragis and sterigma (e.g., Penz & Francini 1996) will bring useful characters for identification of specimens in the field and collections. Future work will hopefully provide a key for female identification.

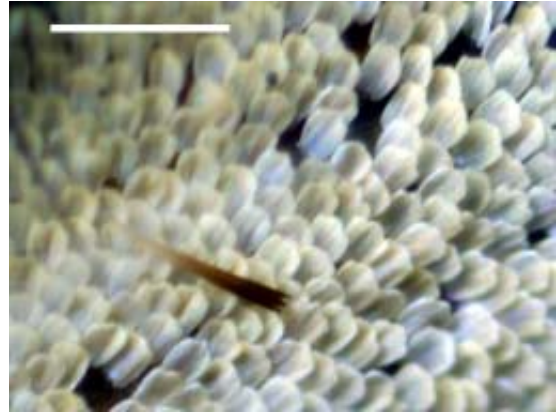
It is likely that more species of *Actinote* will be found in southeastern Brazil. Because some species are nearly indistinguishable, collections may have mixed series identified under the name of the most common species (e.g., *pyrrha* and *pratensis*). Furthermore, many areas have not been sampled systematically, where collectors might have missed the short flight period characteristic of *Actinote*. We hope that this key will be of help in the identification of *Actinote* butterflies and facilitate the finding and description of species that have gone unnoticed to us and to our predecessors.

**PLATE 1**

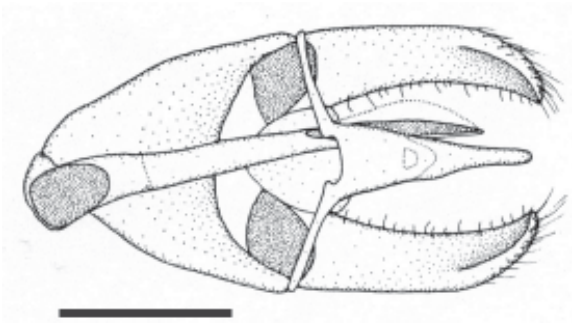
*Actinote morio*



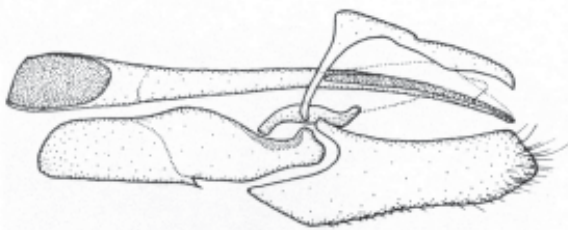
*Wings in dorsal view*



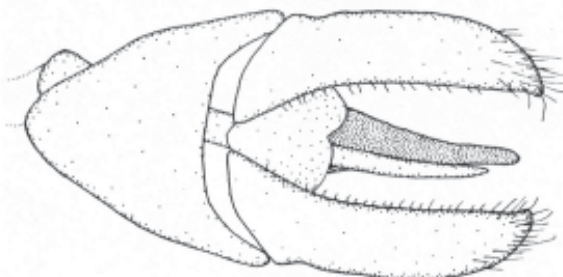
*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*



*Genitalia in lateral view*



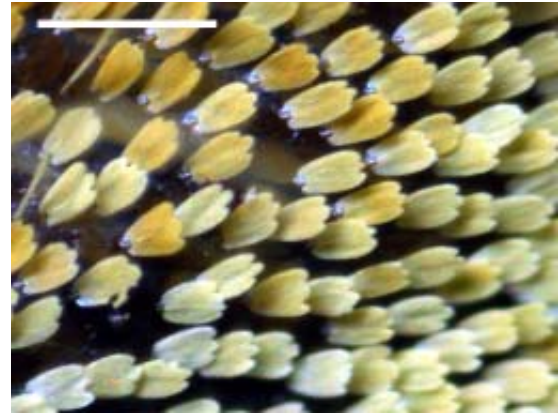
*Genitalia in ventral view*

PLATE 2

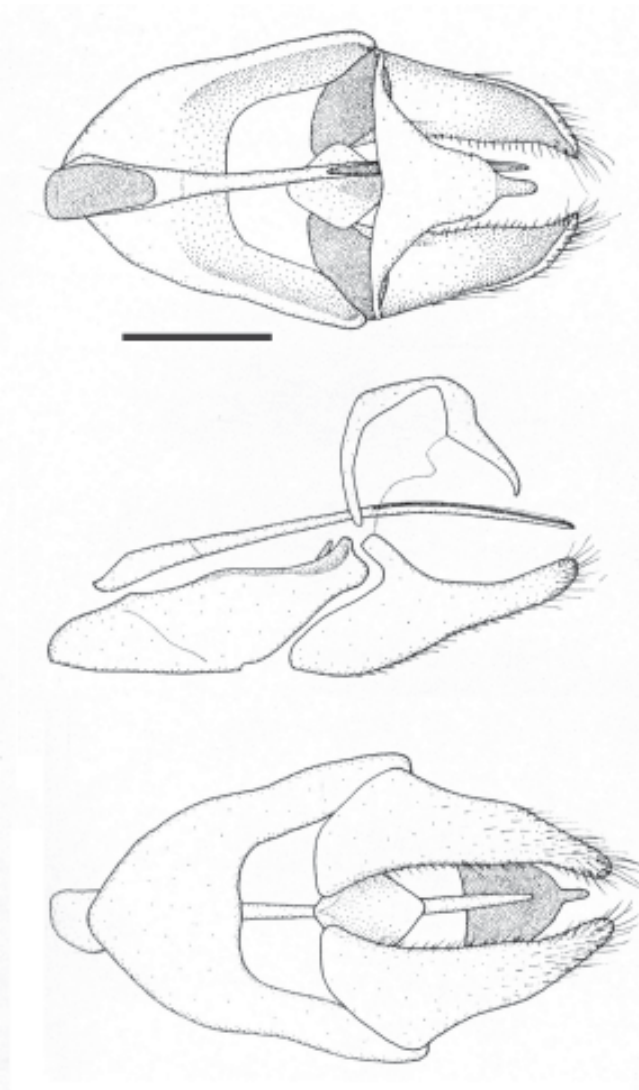
*Actinote zikani*



Wings in dorsal view



Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm

Genitalia in lateral view

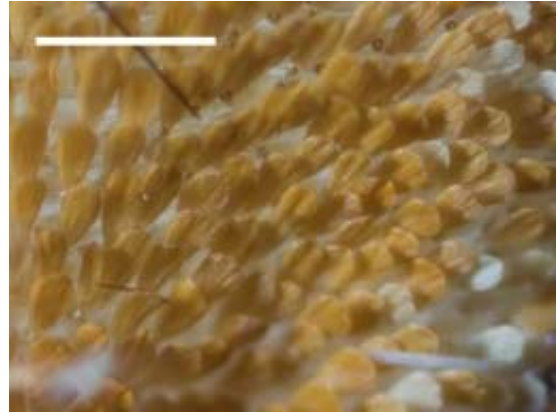
Genitalia in ventral view

**PLATE 3**

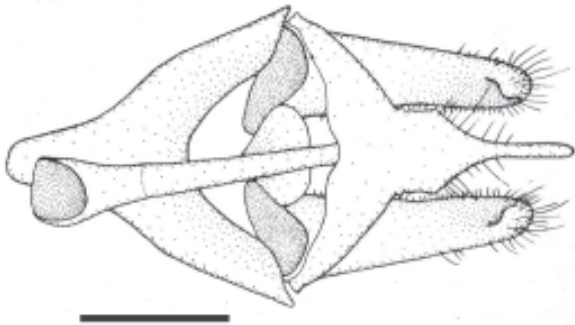
*Actinote mamita*



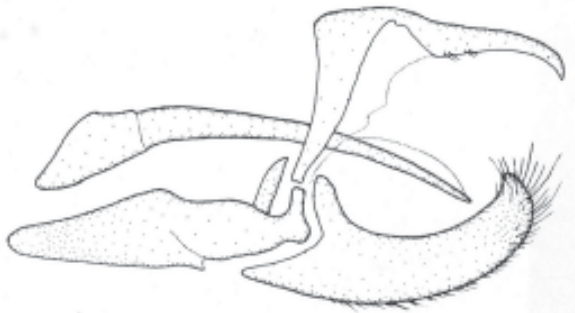
*Wings in dorsal view*



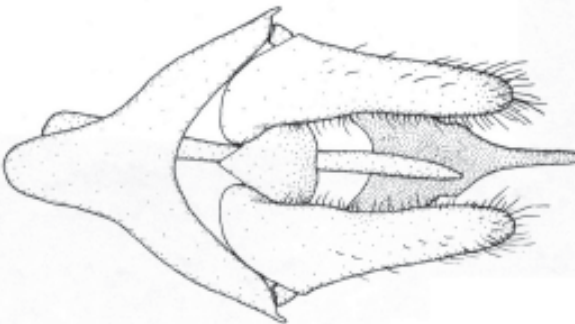
*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*



*Genitalia in lateral view*



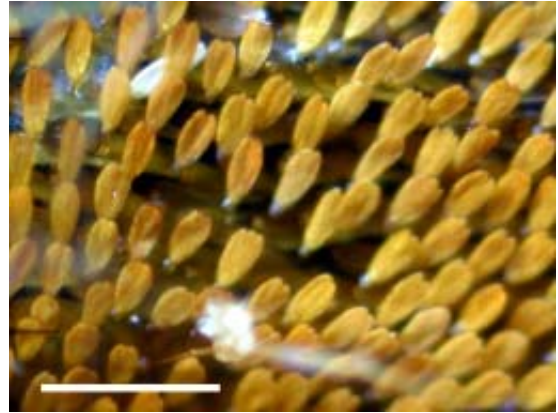
*Genitalia in ventral view*

PLATE 4

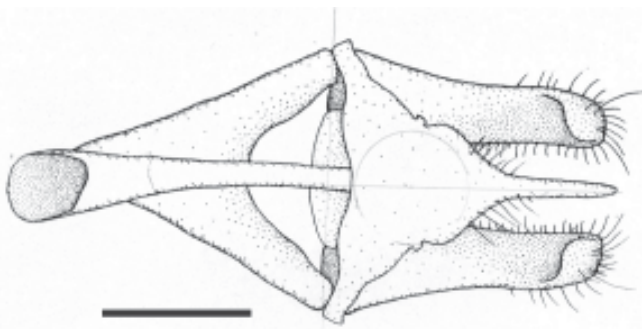
*Actinote canutia*



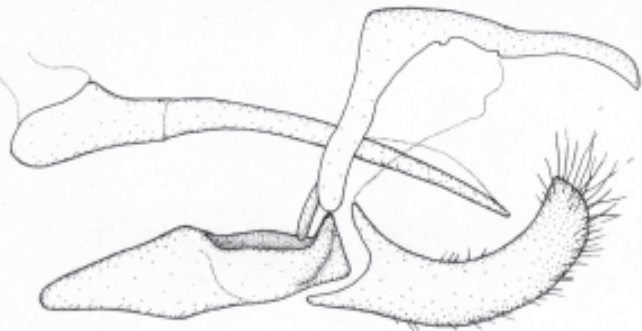
Wings in dorsal view



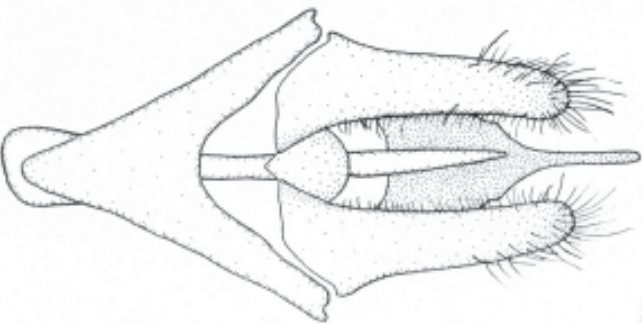
Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm



Genitalia in lateral view



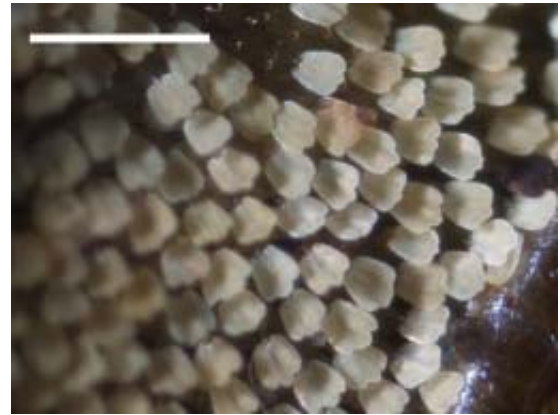
Genitalia in ventral view

PLATE 5

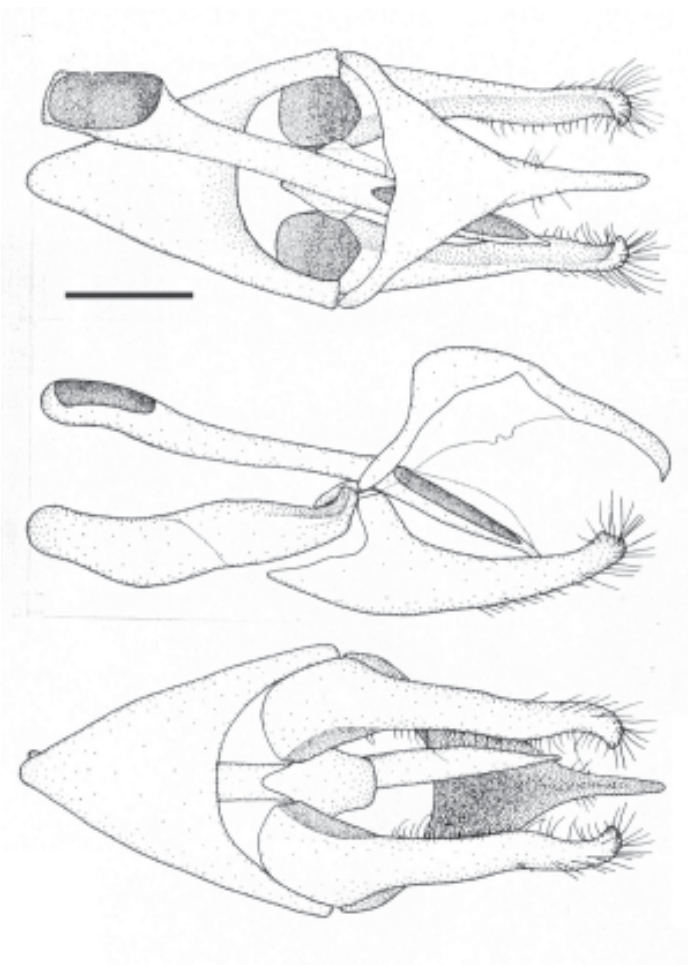
*Actinote genitrix*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
Scale bar 0.1 mm



*Genitalia in dorsal view*  
Scale bar 1 mm

*Genitalia in lateral view*

*Genitalia in ventral view*

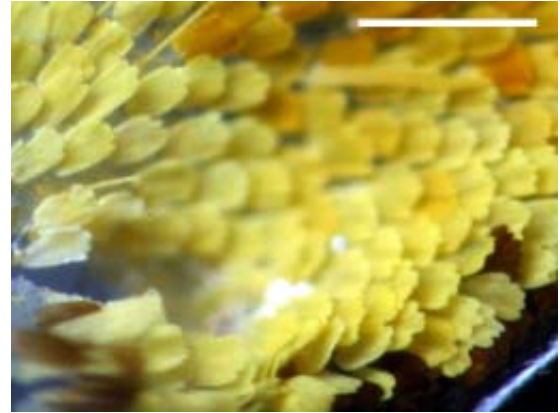


PLATE 6

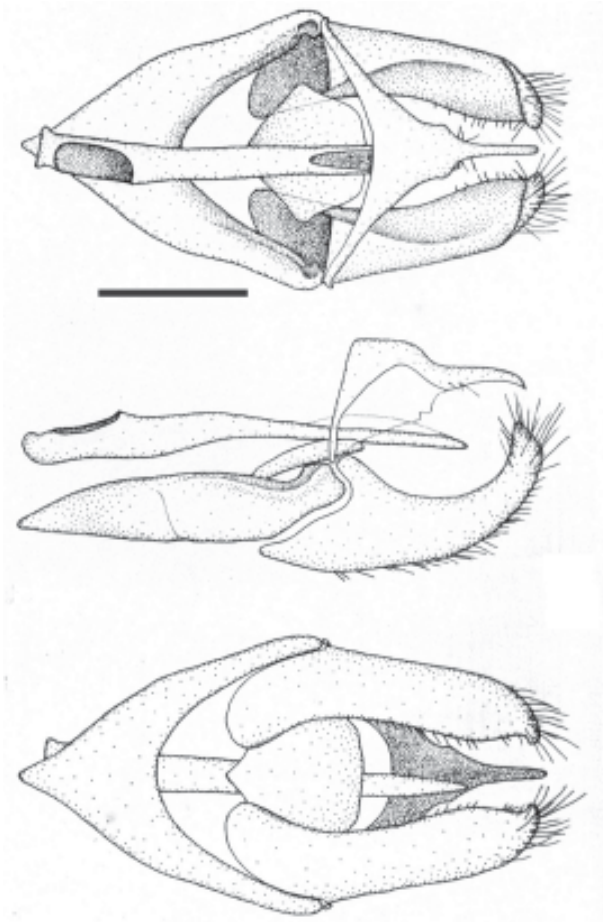
*Actinote discrepans*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
Scale bar 0.1 mm



*Genitalia in dorsal view*  
Scale bar 1 mm

*Genitalia in lateral view*

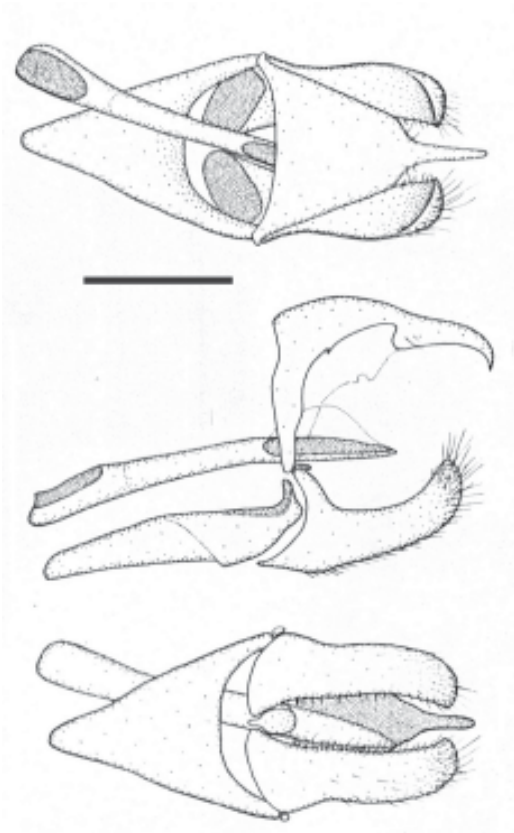
*Genitalia in ventral view*

PLATE 7

*Actinote eberti*



Wings in dorsal view



Genitalia in dorsal view  
Scale bar 1 mm

Genitalia in lateral view

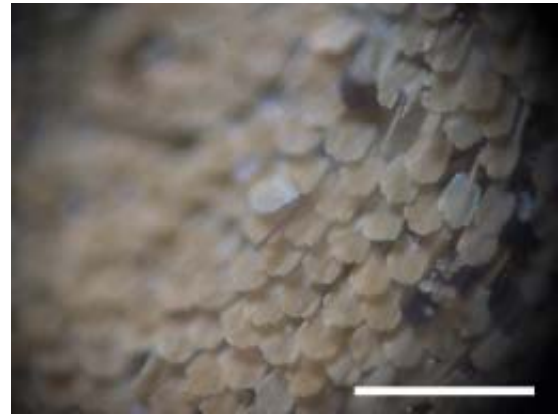
Genitalia in ventral view

PLATE 8

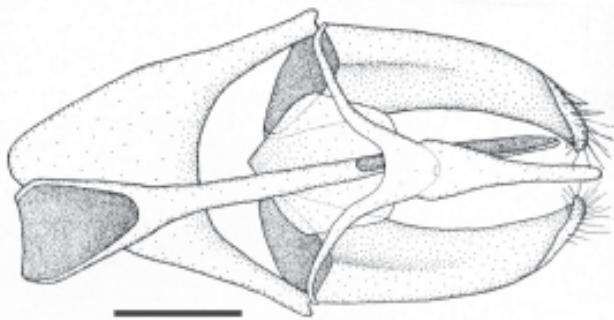
*Actinote melanisans*



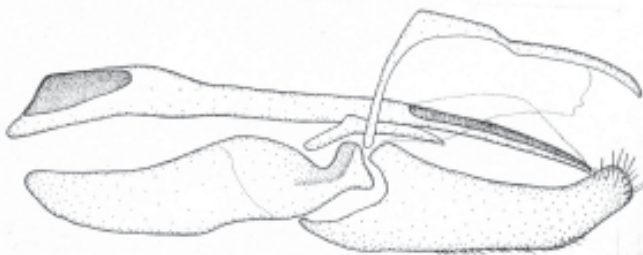
Wings in dorsal view



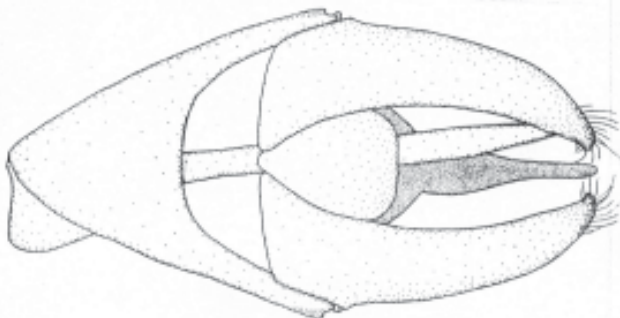
Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm



Genitalia in lateral view



Genitalia in ventral view

PLATE 9

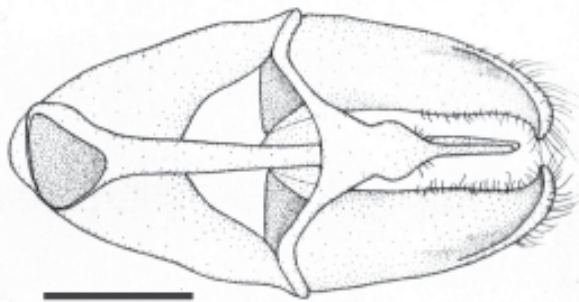
*Actinote rhodope*



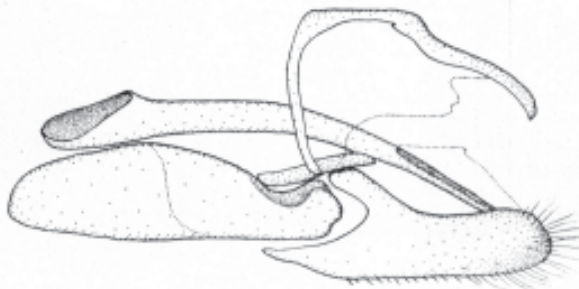
*Wings in dorsal view*



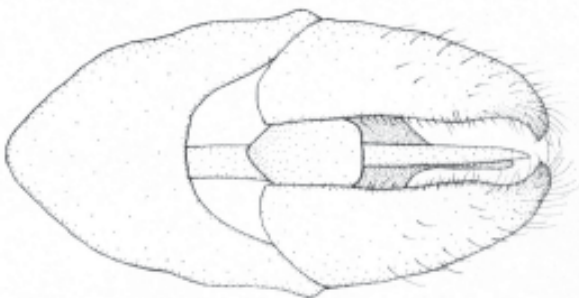
*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*



*Genitalia in lateral view*



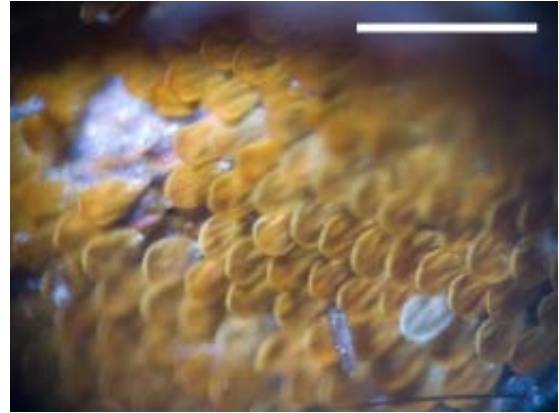
*Genitalia in ventral view*

**PLATE 10**

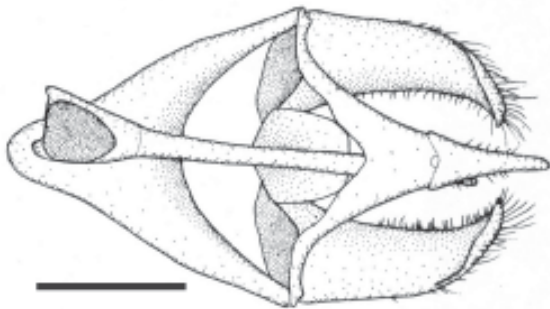
*Actinote surima*



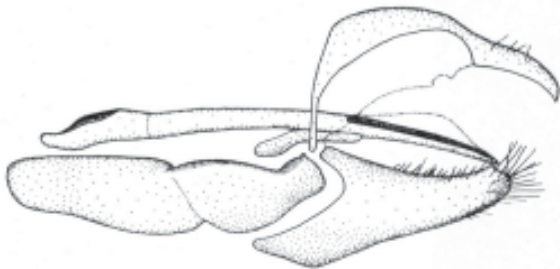
*Wings in dorsal view*



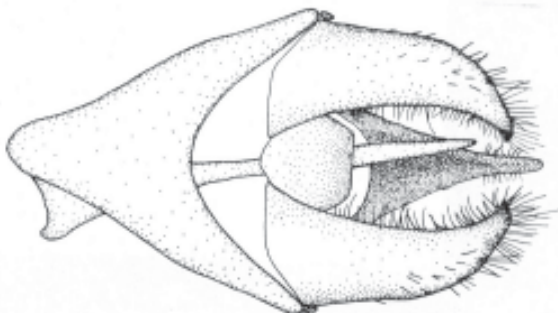
*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*



*Genitalia in lateral view*



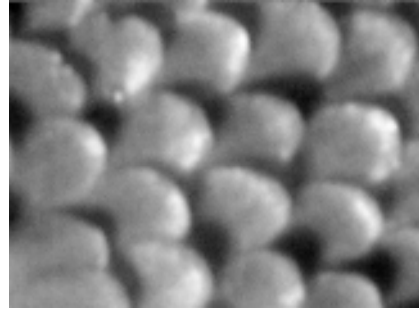
*Genitalia in ventral view*

**PLATE 11**

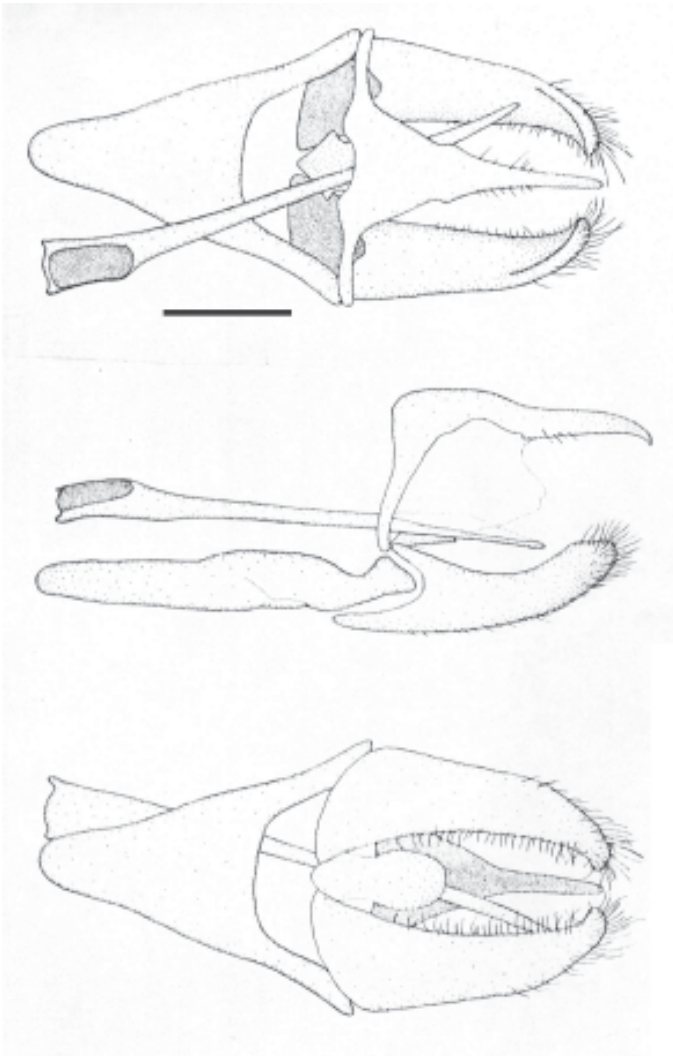
*Actinote catarina*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*

*Genitalia in lateral view*

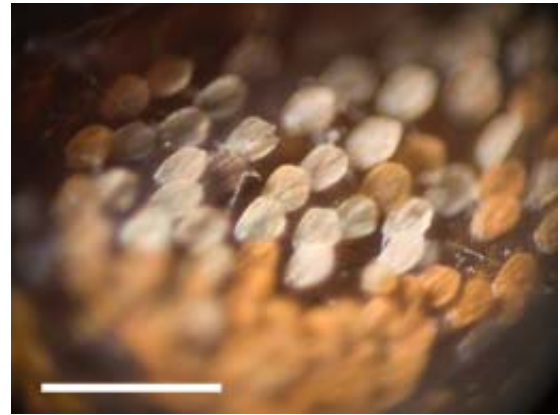
*Genitalia in ventral view*

PLATE 12

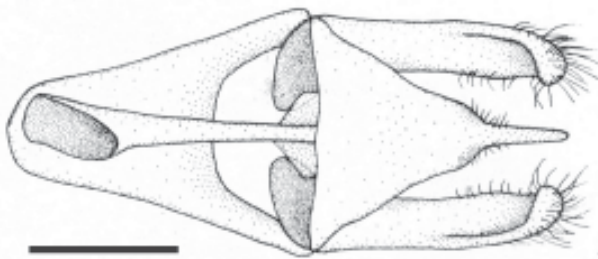
*Actinote alalia*



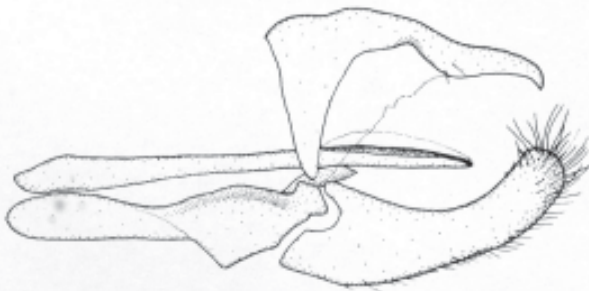
Wings in dorsal view



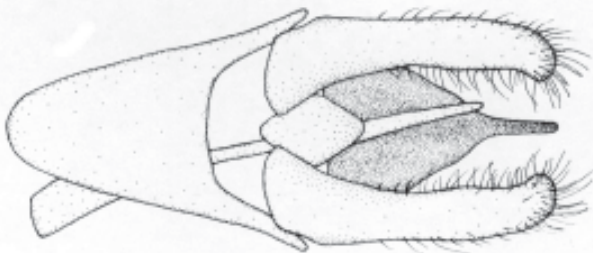
Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm



Genitalia in lateral view



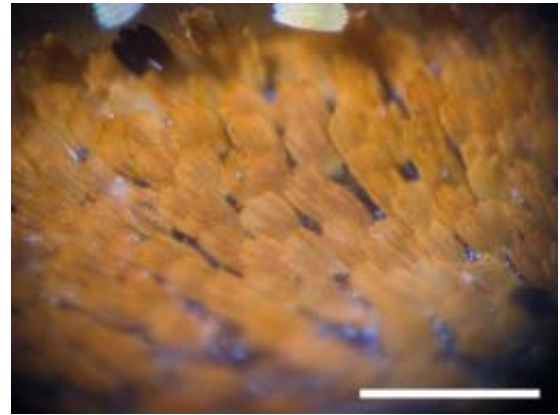
Genitalia in ventral view

PLATE 13

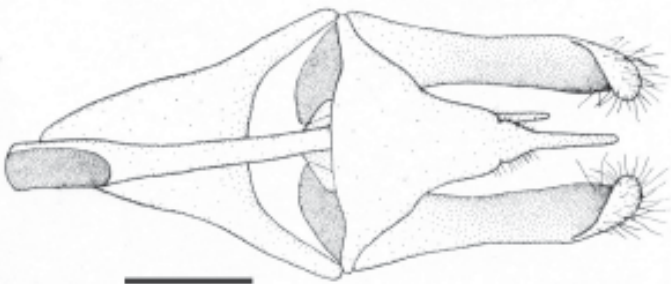
*Actinote conspicua*



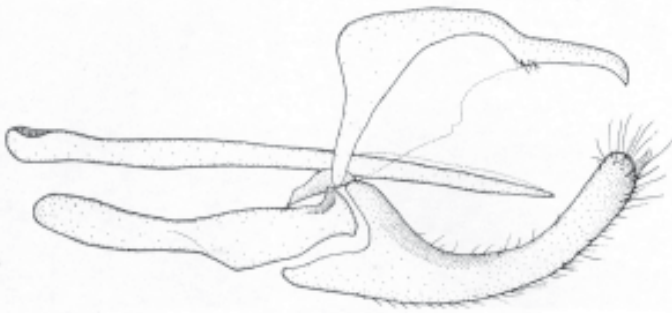
Wings in dorsal view g



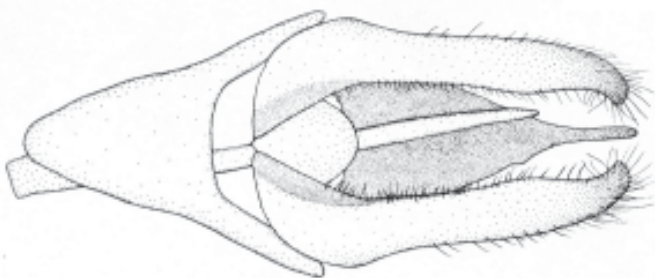
Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm



Genitalia in lateral view



Genitalia in ventral view

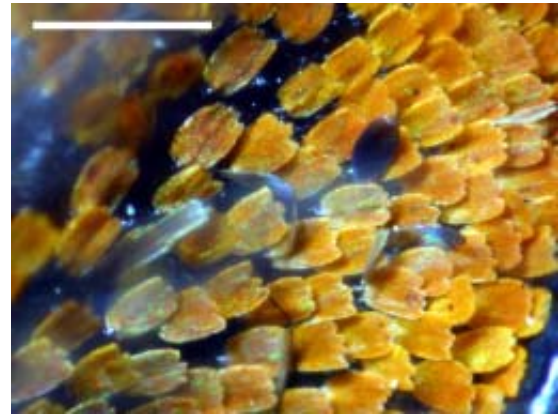


**PLATE 14**

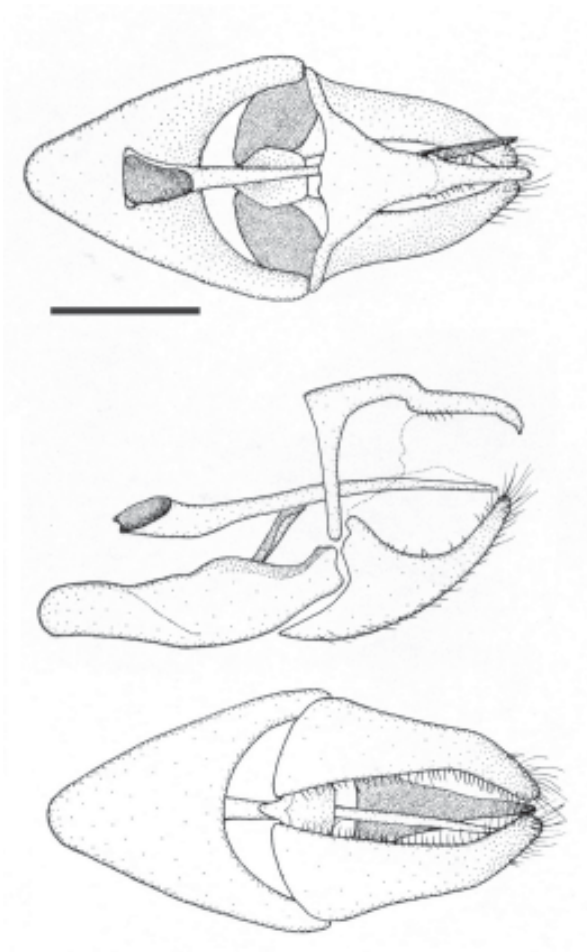
*Actinote bonita*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*

*Genitalia in lateral view*

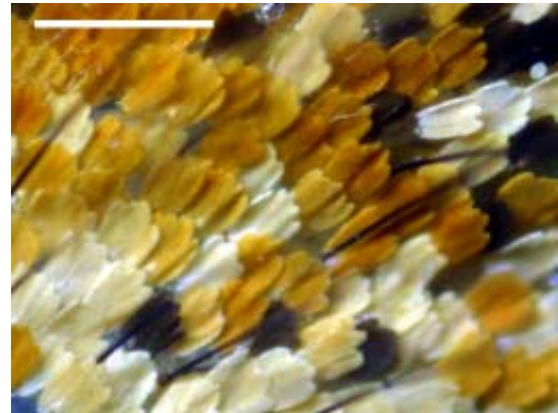
*Genitalia in ventral view*

PLATE 15

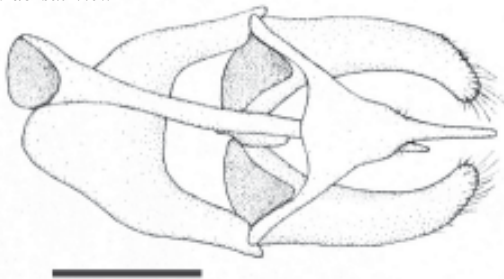
*Actinote dalmeidai*



Wings in dorsal view



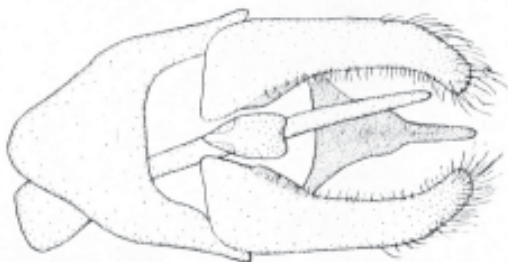
Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm



Genitalia in lateral view



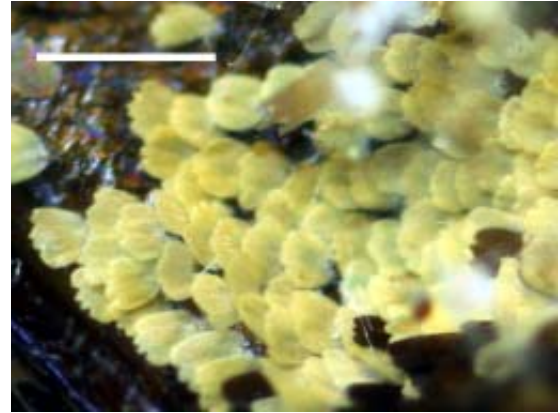
Genitalia in ventral view

**PLATE 16**

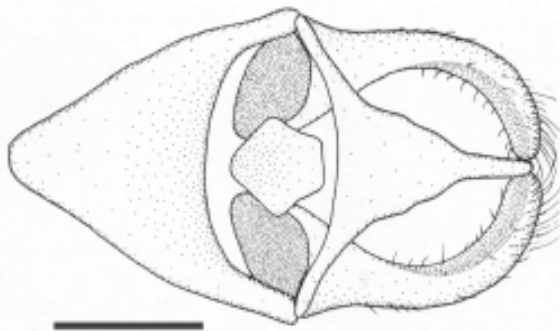
*Actinote quadra*



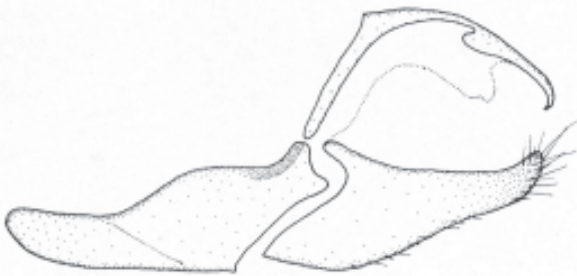
*Wings in dorsal view*



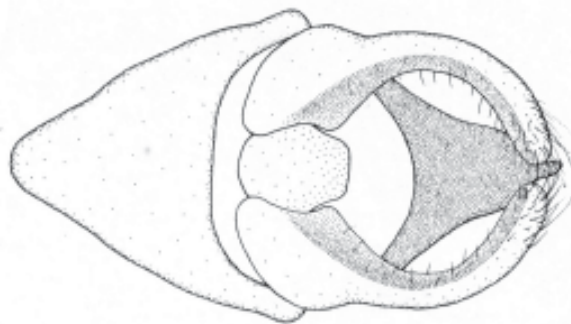
*Scales of the basal area of the hindwing*  
Scale bar 0.1 mm



*Genitalia in dorsal view*  
Scale bar 1 mm



*Genitalia in lateral view*



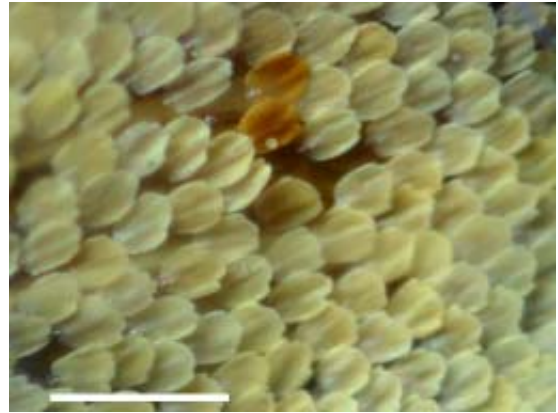
*Genitalia in ventral view*

PLATE 17

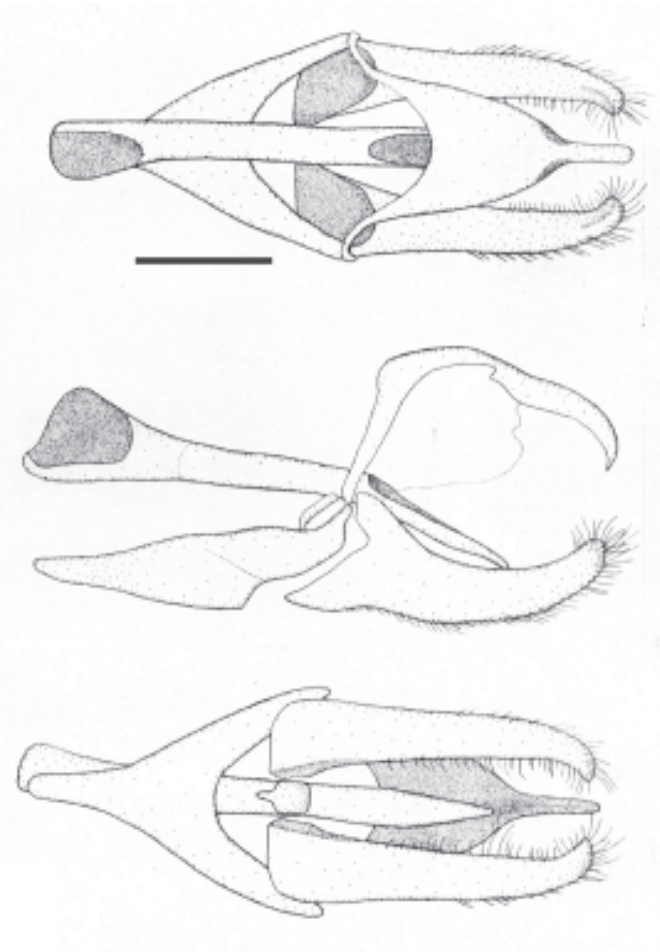
*Actinote parapeles*



Wings in dorsal view



Scales of the basal area of the hindwing  
Scale bar 0.1 mm



Genitalia in dorsal view  
Scale bar 1 mm

Genitalia in lateral view

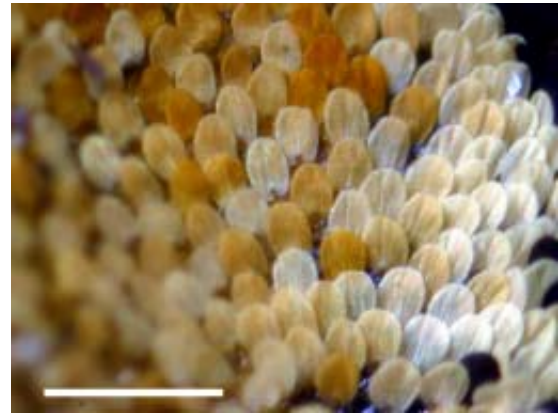
Genitalia in ventral view

PLATE 18

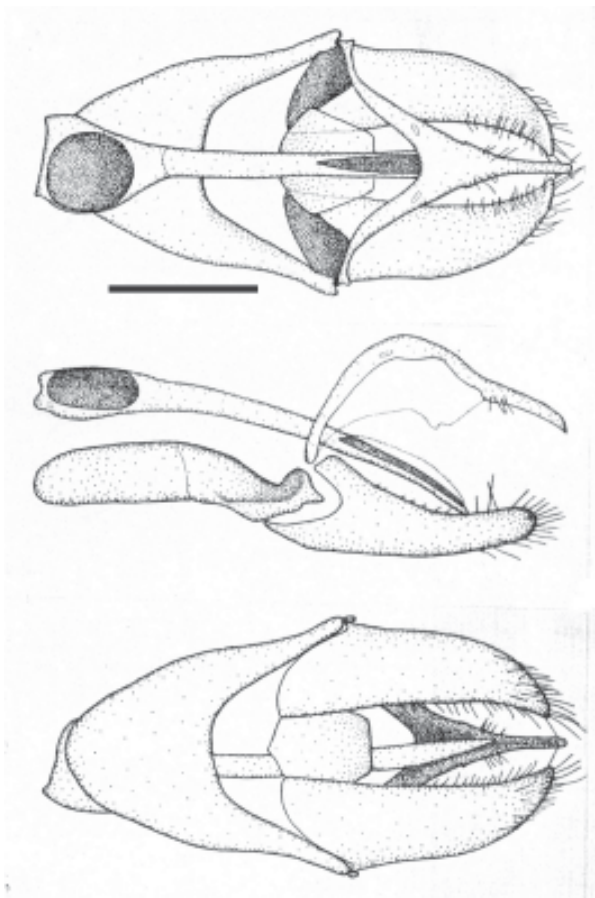
*Actinote pellenea*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*

*Genitalia in lateral view*

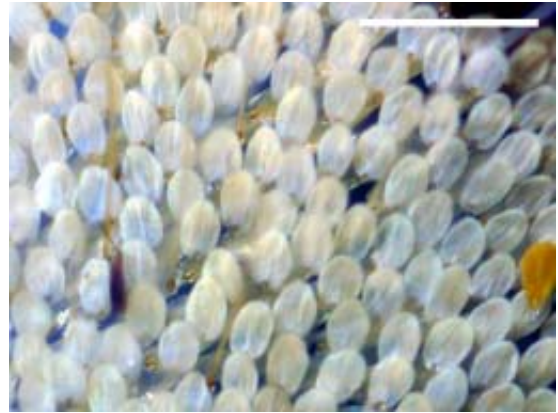
*Genitalia in ventral view*

PLATE 19

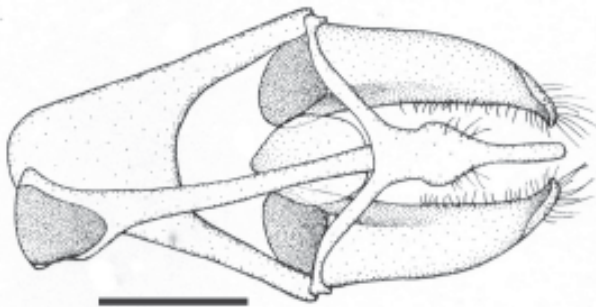
*Actinote carycina*



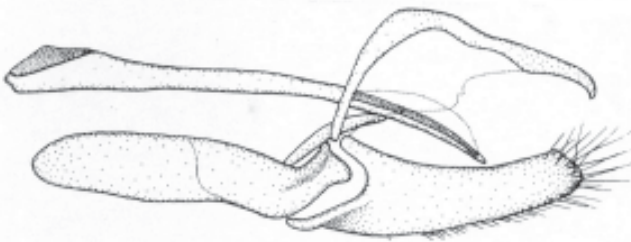
*Wings in dorsal view*



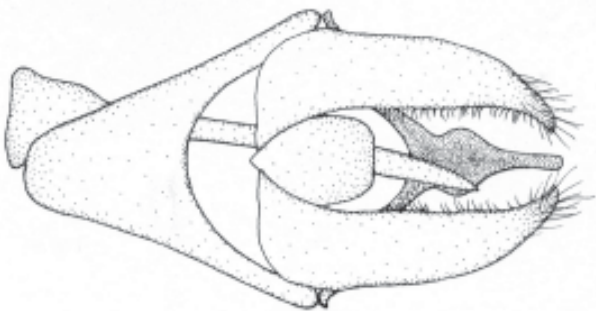
*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*



*Genitalia in lateral view*



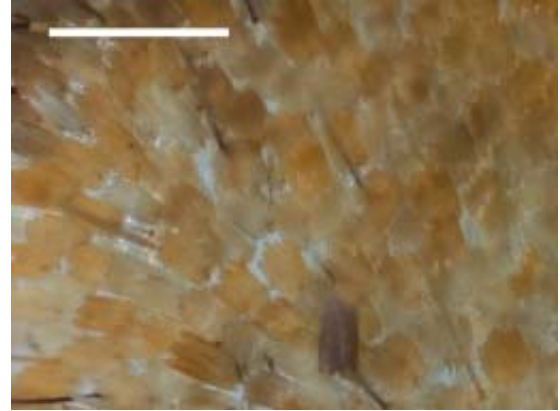
*Genitalia in ventral view*

**PLATE 20**

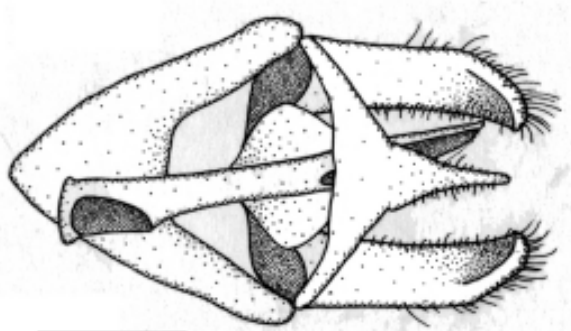
*Actinote pratensis*



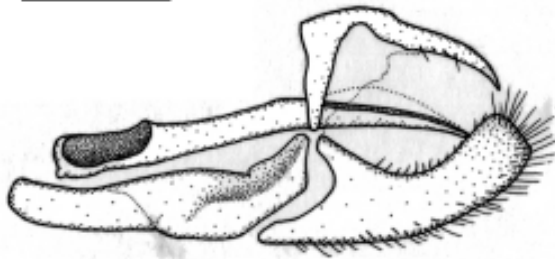
*Wings in dorsal view*



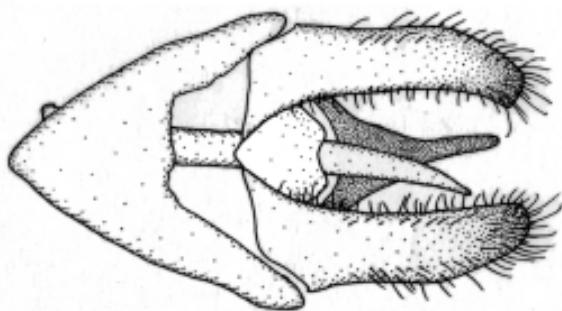
*Scales of the basal area of the hindwing*  
Scale bar 0.1 mm



*Genitalia in dorsal view*  
Scale bar 1 mm



*Genitalia in lateral view*



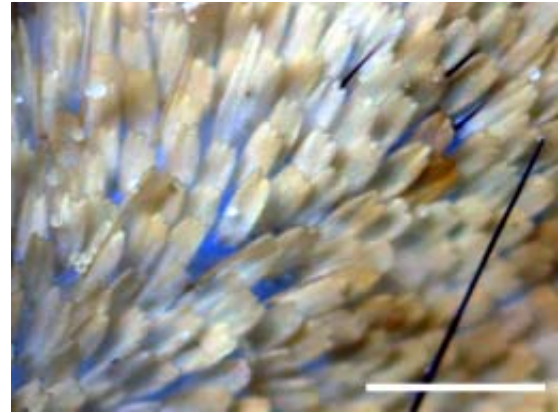
*Genitalia in ventral view*

PLATE 21

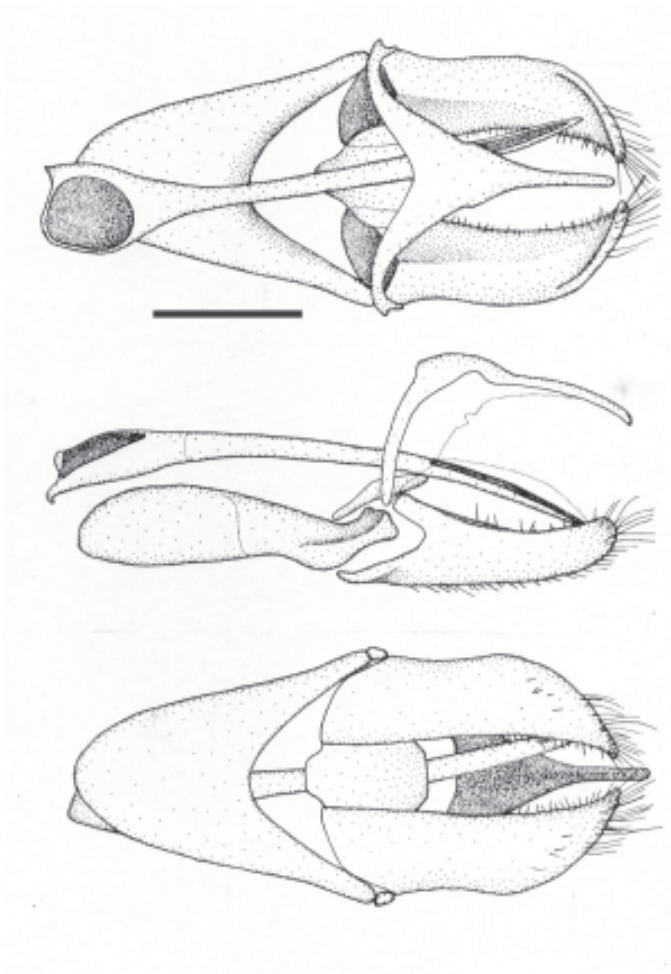
*Actinote pyrrha*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
*Scale bar 0.1 mm*



*Genitalia in dorsal view*  
*Scale bar 1 mm*

*Genitalia in lateral view*

*Genitalia in ventral view*

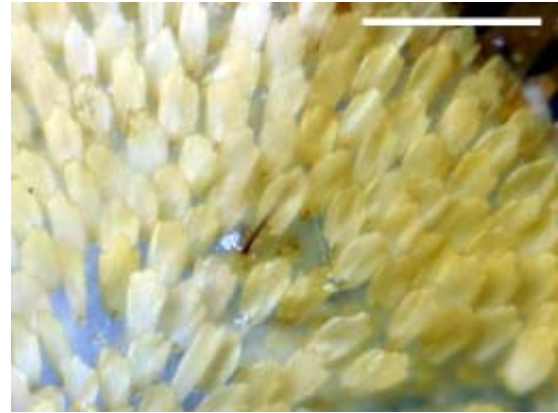


**PLATE 22**

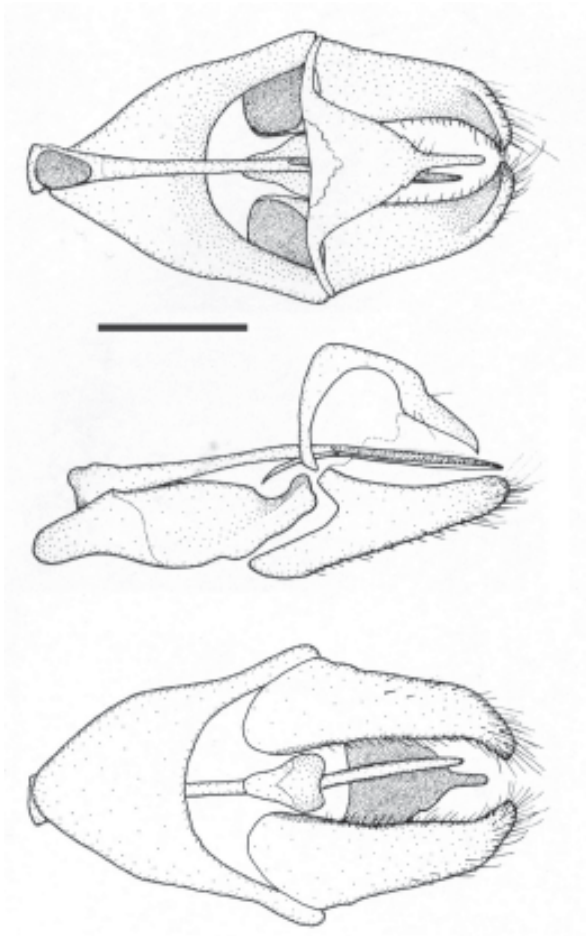
*Actinote brylla*



*Wings in dorsal view*



*Scales of the basal area of the hindwing*  
Scale bar 0.1 mm



*Genitalia in dorsal view*  
Scale bar 1 mm

*Genitalia in lateral view*

*Genitalia in ventral view*

## Acknowledgments

Numerous colleagues and friends encouraged us to produce this key, and we are grateful to all. For access to collections and help in the initial development of our work, we thank Olaf Mielke and Mirna Casagrande (Universidade Federal do Paraná), Fernando Meyer (Museu Anchieta, Porto Alegre), Phil Ackery (The Natural History Museum, London), and Bob Robbins (Smithsonian Institution). Phil DeVries and Andrew Neild provided discussion and useful comments to early versions of the manuscript. Special thanks to Márlon Paluch and an anonymous reviewer for their detailed suggestions. This work was funded by FAPESP (fellowships to RBF) and the National Science Foundation (DEB 0527441, to CMP).

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Biota Neotropica, Vol. 6 (number 1): 2006

<http://www.biotaneotropica.org.br/v6n1/pt/abstract?identification-key+bn00606012006>

Date Received 06/06/2005 - Revised 10/20/2005

Accepted 01/01/2006

ISSN 1676-0611