

## HESPERIIDAE OF CENTRAL RONDÔNIA BRAZIL: THREE NEW SPECIES OF *NARCOSIUS* (PYRGINAE)

GEORGE T. AUSTIN

Nevada State Museum and Historical Society, 700 Twin Lakes Drive,  
Las Vegas, Nevada 89107, USA

**ABSTRACT.** Three new species of *Narcosius* are described from western Brazil: *Narcosius steinhauseri*, *N. pseudomura*, and *N. odysseus*. *Narcosius pseudomura* was previously considered to have fallen within the normal range of variation of *N. mura*. A revised key to the males of the genus is presented.

**Additional key words:** *Narcosius colossus*, *N. hercules*, *N. nazaraeus*, *N. parisi*, *N. samson*.

Studies of butterflies in central Rondônia, Brazil, over the last several years (Emmel & Austin 1990, Austin et al. 1993) have revealed a number of new butterfly taxa (Austin 1993, Austin & Mielke 1993). Among these were three species of *Narcosius* (Hesperiidae: Pyrginae), a genus proposed and reviewed by Steinhauser (1986). Their discovery is not particularly surprising since several of the known taxa are quite rare in collections. Two of the new species apparently have not been taken elsewhere, while the third was previously considered to have fallen within the normal range of variation of a described species.

In the following descriptions, all forewing lengths are measured from the base to the apex. All measured specimens are from the Rondônia locality. Structures of the genitalia are those used by Steinhauser (1986).

### *Narcosius steinhauseri* Austin, new species

(Figs. 1, 5)

**Description.** *Male.* Forewing length 30.3 mm (holotype) (range 28.5-32.0, n=10); forewing produced with prominent costal fold, termen evenly convex; hindwing termen evenly convex, slightly produced at tornus into pointed lobe; dorsal ground color dull black; wing bases glossy dark green proximal to hyaline macules on forewing, extending beyond end of discal cell posterior to  $M_1$  and nearly to outer margin at tornus on hindwing, somewhat purplish in certain lights distad; forewing with white hyaline macules as follows: discal cell, nearly square, anterior edge slightly longer than posterior, variably excavate distad, slightly concave proximad; costal cell, relatively short, centered over discal cell macule (absent on one specimen); faint streak or none in  $Sc-R_1$ ;  $CuA_1-CuA_2$ , the largest, more or less quadrate, posterior edge usually longer than anterior, excavate distad, slightly concave to straight proximad;  $M_3-CuA_1$ , small, triangular to rhomboidal, not reaching base of cell, completely overlapped by distal portion of macule in  $CuA_1-CuA_2$ ; anterior portion of  $CuA_2-2A$ , variable, distal edge excavate or not, proximal edge straight, not overlapping macule in  $CuA_1-CuA_2$ , either contiguous with posterior-distal corner or disjunct; forewing fringe black, white in posterior half of  $CuA_2-2A$ ; hindwing unmarked, fringe white to pale grayish with black at vein tips. Ventral surface dull black with indistinct gray overscaling, pure black at subapex and in discal cell, purplish towards paler anal margin which is pale brown basad; hyaline macules as on dorsum, that in  $Sc-R_1$  larger, no extra white scaling adjacent to macule in  $CuA_2-2A$ ; hindwing with relatively vague pattern created by sparse yellow and gray overscaling, gray concentrated on outer and anal margins, yellow largely basad and outlining postmedian area of ground color. Dorsal

head, thorax, and anterior abdomen gray-green, posterior abdomen dark greenish black with gray and, occasionally, red-brown at segments; palpi dark gray with numerous scattered white scales; pale gray beneath eyes, whiter behind; antennae black, some white on venter distad on shaft and on club, nudum gray to red-brown, 30 (n=2), 31 (n=2), or 32 (n=3) segments; ventral thorax gray becoming gray-green beneath wings, legs dark gray, mid and hind tibiae spined; ventral abdomen pale to dark gray, anal tuft white (n=15), mixed white and gray (n=3), or pale yellow (n=3). *Male genitalia*. Uncus divided with narrow arms relatively short, divergent; gnathos spiculose laterally; valva long, narrow, costa concave, ampulla long and narrowly curved over mesad, harpe long, dorsal margin with erect and moderately serrated triangular tooth, narrow caudal lobe of similar length, curved slightly ventrad, lightly serrated, sacculus more or less parallelogram-shaped; penis about length of valva, in lateral view relatively straight, caudal end not flattened, in dorsal view cephalic end rounded, not expanded, caudal edge curved, not dentate; cornutus a single long, slender spine. *Female*. Unknown.

**Types.** Holotype ♂ with the following labels: white, printed—BRASIL: Rondonia / 62 km S Ariquemes / linha C-20, 7 km E / B-65, Fazenda / Rancho Grande / 29 November 1991 / leg. G. T. Austin / (associated with / *Labidus praedator*); white, printed and hand-printed—Genitalic Vial / GTA—1611; red, printed—HOLOTYPE / *Narcosius steinhauseri* / Austin. Paratypes (all same location as holotype, leg. G. T. Austin unless otherwise noted; PL=at paper lures, EB=associated with *Eciton burchelli*): same data as holotype (1 ♂); 13 June 1993, EB, 1630–1700h (1 ♂); 14 June 1993, PL, 1500–1530h (1 ♂); 18 June 1993, PL, 1600–1630h (1 ♂); 13 August 1993, PL, 1530–1600h (1 ♂); 17 August 1993, EB, 1500–1530h (1 ♂); 20 August 1993, EB, 1600–1630h (1 ♂); 21 August 1993, EB, 1330–1400h (1 ♂); 6 October 1993, PL, 1200–1230h (1 ♂); 1430–1500h (1 ♂); 26 November 1991, EB (1 ♂); 11 November 1992, EB, 1400–1430h (1 ♂); 12 November 1992, EB, 1630–1700h (1 ♂); 14 November 1992, EB, 0930–1000h (1 ♂); 16 November 1992, EB, 1130–1200h (1 ♂); 18 November 1992, EB, 1600–1630h (1 ♂); 26 October 1992, leg. J. P. Brock, EB (2 ♂); 3 km E Fazenda Rancho Grande, lot 18, 25 September 1992 (1 ♂); 22 November 1992, leg. G. Bongioi, PL, 1230–1300h (1 ♂). The holotype will be deposited at the Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil. The paratypes will be deposited in other collections.

**Type locality.** BRASIL: Rondônia; 62 km south of Ariquemes, linha C-20, 7 km (by road) east of route B-65, Fazenda Rancho Grande, 180 m. This is approximately 5 km northeast of Cacaulândia in typical lowland tropical rainforest. The types were taken while studying butterfly relationships with army ants (see Austin et al. 1993).

**Etymology.** It is a pleasure to name this species after my friend Stephen R. Steinhauser, who has added greatly to our knowledge of Neotropical skippers, including a revision of the *Narcosius*, and whose expertise has helped me in numerous ways.

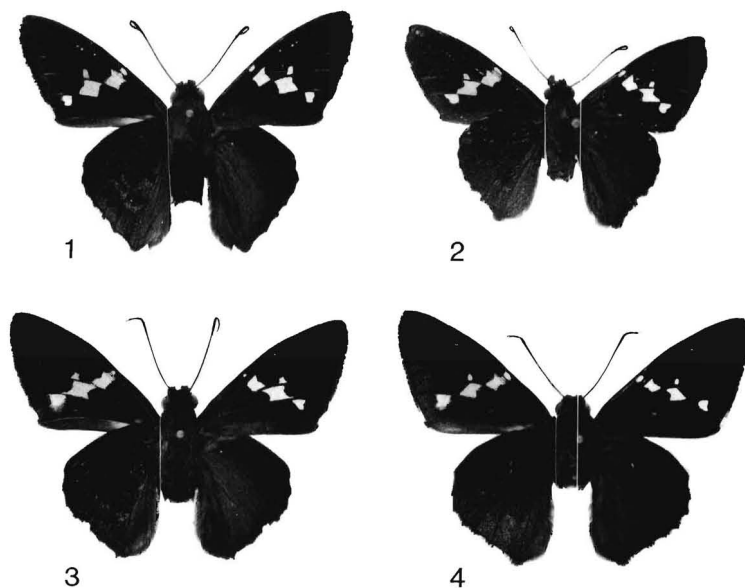
**Diagnosis and discussion.** The superficial phenotypes of *Narcosius* are so similar that it is almost a necessity to examine the genitalia to determine species. The male genitalia of *N. steinhauseri* are readily distinguishable from described species. In Steinhauser (1986), this taxon initially keys to the second group with a “prominently rough or heavily spiculose” gnathos, then to those without a dorsal process on the ampulla, and finally to those with a dorsal projection on the harpe. From there, it is not included in the given options. The terminal end of the harpe has a pair of projections oriented at nearly right angles to each other, one directed caudad and the other dorsad, somewhat reminiscent of the harpe of *Astraptus aulus* (Plötz). These projections are prominently dentate on the facing edges. No other known *Narcosius* has a configuration of the harpe remotely resembling this. This species is known only from the type locality with records for June and August through November.

### *Narcosius pseudomura* Austin, new species

(Figs. 2, 8)

*Narcosius mura* (Williams 1927), (Steinhauser 1986, in part)

**Description.** *Male*. Forewing length 32.0 mm (holotype), 31.1, 32.0 (paratypes); forewing produced and broadly convex with relatively long and narrow costal fold; hindwing



FIGS. 1-4. 1. *Narcosius steinhauseri*, holotype male. 2. *Narcosius pseudomura*, holotype male. 3. *Narcosius mura*, male (BRAZIL: Rondônia; 62 km S Ariquemes, linha C-20, 7 km E B-65, Fazenda Rancho Grande). 4. *Narcosius odysseus*, holotype male. On all figures, venter on left, dorsum on right.

termen slightly crenulate but evenly convex; dorsal ground color dull black; wing bases glossy dark green proximal to hyaline macules on forewing, extending beyond end of discal cell posterior to  $M_1$  and nearly to outer margin at tornus on hindwing; forewing with white hyaline macules as follows: discal cell, nearly square, edges about equal, variably excavate distad, less so or slightly concave proximad; costal cell, small to minute, over proximal portion of discal cell macule; no macule in  $Sc-R_1$ ;  $CuA_1-CuA_2$ , the largest, more or less quadrate, posterior edge longer than anterior, margin S-shaped distad, concave proximad;  $M_3-CuA_1$ , small, more or less quadrate, not reaching base of cell, partially overlapped by distal portion of macule in  $CuA_1-CuA_2$ ; anterior portion of  $CuA_2-2A$ , variable, triangular to rhomboidal, distal edge excavate, proximal edge straight, contiguous with or slightly overlapping macule in  $CuA_1-CuA_2$ ; forewing fringe black, white in posterior half of  $CuA_2-2A$ ; hindwing unmarked, fringe white with black at vein tips. Ventral surface dull black with indistinct gray overscaling, pure black at subapex and in discal cell, purplish towards paler anal margin which is pale brown basad; hyaline macules as on dorsum, costal macule longer, streak present in  $Sc-R_1$ , macule in  $CuA_2-2A$  extended somewhat with white scaling caudad; hindwing dull greenish black with scattered pale yellow scales distad, no discernable pattern. Dorsal head, thorax, and anterior abdomen gray-green, posterior abdomen dark greenish black; palpi dark gray with numerous scattered white scales; gray beneath eyes, outlined with white, white behind; antennae black, apiculus gray, nudum dark red-brown, 30 ( $n=2$ ) or 32 ( $n=1$ ) segments; ventral thorax gray becoming gray-green beneath wings, legs gray, mid and hind tibiae spined; ventral abdomen charcoal gray, anal tuft white. *Male genitalia*. Uncus divided with moderately long, stout, and slightly divergent arms; gnathos with spiculose lobes; valva broad, costa relatively straight; ampulla narrowly curved over mesad, narrowly and deeply separated from harpe; harpe short, angled to broad and coarsely serrated tooth cephalad, serrations continued ventrad along cephalic margin facing ampulla; sacculus broad cephalad, angled

gradually caudad; penis somewhat longer than valva, evenly curved (concave ventrad in lateral view); short caudal medial projection in dorsal view, not dentate; cornutus a single long, slender spine. *Female*. Unknown.

**Types.** Holotype ♂ with the following labels: white, printed—BRASIL: Rondonia / 62 km S Ariquemes / linha C-20, 7 km E / B-65, Fazenda / Rancho Grande / 19 November 1991 / leg. D. Russell; white, printed and handprinted—Genitalic Vial / GTA—2284; red, printed—HOLOTYPE / *Narcosius pseudomura* Austin. Paratypes: ♂, same location as holotype, 5 December 1991, leg. G. T. Austin, associated with *Eciton burchelli*; ♂, 28 October 1992, leg. J. P. Brock, associated with *Eciton burchelli*. The holotype will be deposited at the Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil. The paratypes will be deposited in other collections.

**Type locality.** BRASIL: Rondônia; 62 km south of Ariquemes, linha C-20, 7 km (by road) east of route B-65, Fazenda Rancho Grande, 180 m. This is approximately 5 km northeast of Cacauplandia in typical lowland tropical rainforest.

**Etymology.** This species' name reflects its previous confusion with *Narcosius mura*.

**Diagnosis and discussion.** Steinhauser (1986) included *N. pseudomura* in his concept of *N. mura*. The variation which was noted within his concept of *N. mura* is largely accounted for by the present separation of the latter into two species. He illustrated the male genitalia of *N. pseudomura* as *N. mura*. The genitalia of *N. mura* (Fig. 7, see also Williams 1927) are similar to those of *N. pseudomura* but differ as follows: the ampulla is more broadly curved over mesad, the ampulla is more broadly and less deeply separated from the harpe, the harpe is shorter with its row of serrations shorter, the tooth of the harpe has no serrations on its cephalic margin facing the ampulla, and the penis is slightly shorter than the valva with its caudal margin more evenly curved in dorsal view. The holotype of *N. mura* illustrated by Williams (1927) and Steinhauser (1986) is nearly identical to specimens (Fig. 3) from the same locality as the types of *N. pseudomura*. These *N. mura* differ superficially from *N. pseudomura* as follows: they are somewhat smaller in size, the costal fold is shorter and broader, the macules are smaller and well separated, the hindwing margin has a slight lobe at vein 2A, the ventral hindwing has a relatively heavy yellowish overscaling which creates a discernable pattern where absent, the mid tibiae are not spined, and there are no white scales adjacent to the hyaline macule in cell CuA<sub>2</sub>-2A on the ventral forewing. This species is known from the type locality with records between late October and early December and from Pará, Brazil.

### *Narcosius odysseus* Austin, new species

(Figs. 4, 6)

**Description.** *Male*. Forewing length 27.2 mm (holotype); forewing termen broadly and evenly rounded with prominent costal fold; hindwing convex anteriorly, slightly concave posteriorly to short tornal lobe; dorsal ground color dull black; wing bases glossy dark green proximal to hyaline macules on forewing, extending beyond end of discal cell posterior to M1 and nearly to outer margin at tornus on hindwing; forewing with white hyaline macules as follows: discal cell, nearly square, anterior edge slightly longer than posterior, excavate distad, slightly concave proximad; costal cell, relatively short, centered over discal cell macule; faint dot in Sc-R<sub>1</sub>; CuA<sub>1</sub>-CuA<sub>2</sub>, the largest, more or less hourglass-shaped, posterior edge longer than anterior, deeply excavate distad, less so proximad; M<sub>3</sub>-CuA<sub>1</sub>, small, quadrate, not reaching base of cell, completely overlapped by distal portion of macule in CuA<sub>1</sub>-CuA<sub>2</sub>; anterior portion of CuA<sub>2</sub>-2A, more or less rhomboidal, distal edge slightly excavate, proximal edge slightly concave, contiguous with macule in CuA<sub>1</sub>-CuA<sub>2</sub>; forewing fringe black, white in posterior half of CuA<sub>2</sub>-2A; hindwing unmarked, fringe white to gray basad, white distad with black at vein tips. Ventral surface dull black, forewing brownish purple towards paler anal margin which is pale brown basad; hyaline macules as on dorsum, that in Sc-R<sub>1</sub> as long as costal macule, macule in CuA<sub>2</sub>-2A with some additional white scaling basad; hindwing with very sparse pale yellow overscaling, no discernable pattern. Dorsal head, thorax, and anterior abdomen gray-green, posterior abdomen dark greenish black with gray at segments; palpi dark gray with numerous scattered white scales; white beneath and behind eyes; antennae black, some white on venter and

beneath club, nudum gray, 24 segments; ventral thorax gray-brown becoming gray-green beneath wings, legs gray-brown, mid and hind tibiae spined; ventral abdomen charcoal gray, anal tuft gray with a few white scales. *Male genitalia*. Uncus divided with long, narrow arms, these wide apart in ventral view; gnathos very weakly spiculose; valva broad, stout; ampulla short, curved over mesad; harpe short, broadly triangular, slightly produced cephalad, dorsal margin finely serrate; sacculus short, roughly triangular; penis very slightly shorter than valva, slightly concave ventrally in lateral view, cephalic end broad, somewhat expanded laterally in dorsal view, caudal end flat in lateral view, squared in dorsal view, left side with fine teeth caudad. *Female*. Unknown.

**Types.** Holotype ♂ with the following labels: white, printed and handprinted—BRASIL, Rondonia, / 62 km S Ariquemes / linea C-20, 7 km E B-65, / Fazenda Rancho Grande / leg. Jim P. Brock / 28 Oct 1992 / assoc w/ *E. burchelli* / 1:00–1:30 [=1300–1330h]; white, printed and handprinted—Genitalic Vial / GTA—3197; red, printed—HOLOTYPE / *Narcosius odysseus* / Austin. The holotype will be deposited at the Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil.

**Type locality.** BRASIL: Rondônia; 62 km south of Ariquemes, linea C-20, 7 km (by road) east of route B-65, Fazenda Rancho Grande, 180 m. This is approximately 5 km northeast of Cacaulândia in typical lowland tropical rainforest.

**Etymology.** The species is named after the king of Ithaca in Greek mythology.

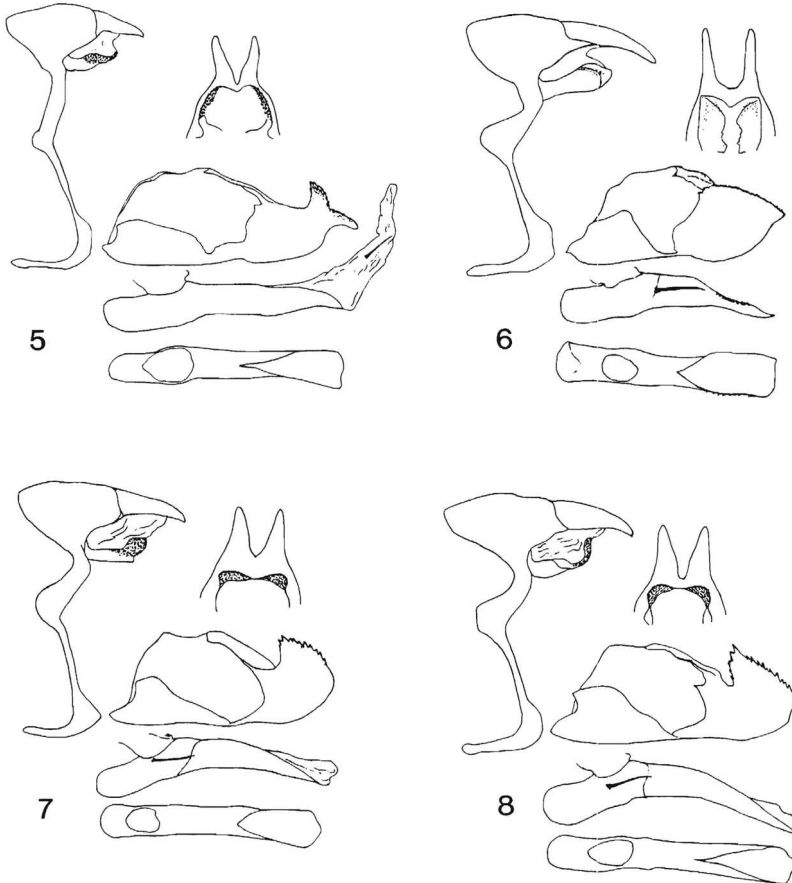
**Diagnosis and discussion.** This is a small *Narcosius* but otherwise similar in color and pattern to the other species in the genus. The male genitalia are most like those of *N. parisi* (Williams 1927). The smooth gnathos is similar to that species in form as is the relatively long uncus and spatulate penis. The valva differs from those of all known species by having little modification of either the harpe or the ampulla. The species is known only from the holotype taken in late October.

These three newly described *Narcosius* species fly with six additional congeners at their type locality: *N. parisi parisi*, *N. hercules* (Bell), *N. mura*, *N. colossus granadensis* (Mösschler), *N. nazaraeus* Steinhauser 1986, and *N. samson* (Evans). Of the remaining three known species, *N. narcosius* (Stoll) may also occur in central Rondônia. It has been recorded in Bolivia, Peru, and Brazil; *N. aulina* (Evans) is known only from northern South America and *N. dosula* (Evans) occurs in southernmost Brazil (see Evans 1952, Steinhauser 1986). With nine of the twelve described species present, Rondônia appears to be the center of diversity for the genus.

With three new species now known for the genus, Steinhauser's (1986) key to the males needs modification. The following key is only to species; subspecific determinations may be made from the original key:

#### Key to the species of male *Narcosius*

1. Gnathos sclerotized but smooth or only lightly spiculose . . . . . 2
- 1'. Gnathos sclerotized, prominently rough or heavily spiculose . . . . . 4
2. Harpe without dorsal process . . . . . *odysseus*
- 2'. Harpe with dorsal process . . . . . 3
3. Dorsal process of harpe from near distal end, a simple long spine projecting dorsad, variously dentate . . . . . *parisi*
- 3'. Dorsal process of harpe from near center of harpe, projecting fore and aft parallel to dorsal margin, dentate . . . . . *hercules*
4. Ampulla with prominent dorsal process, harpe terminally pointed, penis with curved single row of very prominent teeth on left side extending distally to ventral side of terminus . . . . . 5



FIGS. 5-8. 5. *Narcosius steinhauseri*, holotype male genitalia, vesica partially extruded. 6. *Narcosius odysseus*, holotype male genitalia, vesica not extruded. 7. *Narcosius mura*, male genitalia (GTA-3192, BRAZIL: Rondônia; Fazenda Rancho Grande), vesica not extruded. 8. *Narcosius pseudomura*, paratype male genitalia (GTA-3191), vesica not extruded. Shown in all figures are: lateral view of tegumen, gnathos, uncus, and associated structures; ventral view of uncus, gnathos, and anterior tegumen; interior of right valva; left lateral view of penis; and dorsal view of penis (latter without vesica and cornutus).

- 4'. Ampulla without dorsal process, harpe not terminally pointed, penis with scattered fine teeth on left side distally or may be smooth . . . . . 6
- 5. Dorsal process of ampulla more or less circular, not projecting very far caudad . . . . . *samson*
- 5'. Dorsal process of ampulla more or less rhomboid, projecting prominently caudad . . . . . *nazaraeus*
- 6. Distal end of harpe with both dorsal and caudal projections . . . . . *steinhauseri*
- 6'. Distal end of harpe without caudal projection . . . . . 7
- 7. Terminally rounded harpe not prominently produced dorsad, dentate along its entire dorsal edge . . . . . *narcosius*

- 7'. Terminally rounded harpe prominently produced dorsad, dentate only on produced portion . . . . . 8
8. Harpe with additional dorsal process near its juncture with ampulla . . . . . *aulina*
- 8'. Harpe produced dorsad only at distal end . . . . . 9
9. Terminal portion of harpe prominently recurved, projecting cephalad, dentation very coarse and prominent . . . . . *dosula*
- 9'. Terminal portion of harpe may be very coarsely dentate, but not recurved cephalad . . . . . 10
10. Harpe long and slender . . . . . *colossus*
- 10'. Harpe not long and slender . . . . . 11
11. Ampulla broadly curved over mesad, harpe broadly and shallowly separated from ampulla, dorsal projection of harpe relatively short, penis slightly shorter than valva, VFW with no opaque white associated with macule in  $CuA_2-2A$  . . . . . *mura*
- 11'. Ampulla narrowly curved over mesad, harpe narrowly and deeply separated from ampulla, dorsal projection of harpe relatively long, penis longer than valva, VFW with opaque white associated with macule in  $CuA_2-2A$  . . . . . *pseudomura*

#### ACKNOWLEDGMENTS

I thank O. H. H. Mielke and S. R. Steinhauser for the loan of specimens, the sharing of their knowledge of Neotropical Hesperidae, and many helpful critical comments on the manuscript. J. P. Brock and D. Russell kindly allowed use of their data. Steinhauser and L. D. and J. Y. Miller made my visits to the Allyn Museum profitable and enjoyable. T. C. Emmel has provided continuing encouragement and support. The Harald Schmitz family at Fazenda Rancho Grande continue to facilitate field studies.

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and illustration of the genitalia of both sexes. The Bionomics sections are full of detail, including larval foodplants and comments on activity periods during the night reflecting the authors' substantial field experience.

The lineages covered in Volume 7 have their greatest diversity in the New World, and clear understanding of relationships must await revision of the extensive Nearctic fauna as well as resolution of enigmatic taxa from the southern neotropics. *Calophasia lunula*, a recent introduction to North America feeding on both alien and native species of *Linaria*, is stated to be holarctic without clarification of its history in the Nearctic.

Volume 7 does have some confusing problems in organization, such as Plate 4 and its caption on page 144 appearing before the conclusion of the caption for Plate 3 on page 145, or the 76 pages of plates and figures (pp. 136–211) separating the main text from its last four pages.

Funding permitting, additional volumes of *Noctuidae Europaeae* will soon appear. If these continue to improve in response to modern analyses of phylogeny while maintaining the current high quality of the published volumes, the series will become the most impressive regional fauna in existence for any family of moths. Encyclopedic coverage of the regional fauna, combined with superb color illustrations of adults and a comprehensive concatenation of literature and personal communications from world specialists, have already made this series a truly magistral contribution on the Noctuidae of Europe.

JOHN E. RAWLINS, *Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213-4080.*

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### CORRECTION TO VOLUME 50

In the article by George Austin, "Hesperiidae of central Rondônia Brazil: three new species of *Narcosius*" which appeared in 50(1):54–60, the adults on page 56 are numbered incorrectly. The caption should read: "FIGS. 1–4. **1.** *Narcosius steinhauseri*, holotype male. **2.** *Narcosius odyseus*, holotype male. **3.** *Narcosius pseudomura*, holotype male. **4.** *Narcosius mura*, male (BRAZIL: Rondônia; 62 km S Ariquemes, linea C-20, 7 km E B-65, Fazenda Rancho Grande). On all figures, venter on left, dorsum on right." Similarly, on page 55, "(Figs. 3, 8)" should appear under *Narcosius pseudomura*; on page 57, under Diagnosis and Discussion, *Narcosius mura* should be noted as illustrated in "(Fig. 4);" and on page 57, "(Figs. 2, 6)" should appear under *Narcosius odyseus*.