

Continued from 15(3):185-200, 1976

TRIBE Plebejini

306. *Hemiargus (Hemiargus) ceraunus zachaeina* (Butler & Druce)

SPECIMENS: 37 ♂♂, 12 ♀♀; 0-2,300 feet; 6 June-15 Aug.

This blue is abundant in most open, sunny areas throughout most of the Sierra irrespective of plant formation. The butterflies fly relatively slowly, close to the ground, and visit flowers—particularly *Oxalis neaeii*, an abundant plant in the oak and pine-oak forests—and mud puddles very frequently.

307. *Hemiargus (Echinargus) huntingtoni hannoides* Clench

SPECIMENS: 15 ♂♂, 5 ♀♀; 350-2,350 feet; 6 June-4 Oct.

This blue is common only in the Savanna, Deciduous Woodland, and the *Pinus-Quercus* Associates. The butterflies were collected most frequently as they flew relatively slowly and close to the ground in partially shaded, grassy glades. Thus, *H. huntingtoni hannoides* is less widely distributed than is the sibling *H. ceraunus zachaeina* and only partially sympatric with it.

308. *Hemiargus (Echinargus) isola isola* (Reakirt)

SPECIMEN: 1 ♂; Ocotol Chico, 1,900 feet, 5 Feb. 1965.

Only one specimen of this species was collected. The butterfly was found along a sunny trail within the *Pinus-Quercus* Associates of the Deciduous Woodland. Although the data indicate that the species is rare, the conclusion may be erroneous for it is possible that numerous individuals were overlooked because of the species' close similarity to both *H. ceraunus zachaeina* and *H. huntingtoni hannoides*.

309. *Everes comyntas comyntas* (Godart)

SPECIMENS: 10 ♂♂, 8 ♀♀; 1,100-2,300 feet; 6 Feb.-23 Oct.

The eastern tailed blue is common to abundant in most open, sunny areas throughout the Sierra. The butterflies fly relatively slowly, close to the ground, and are attracted to the flowers of a variety of plant species as well as mud puddles.

310. *Leptotes cassius striata* (Edwards)

SPECIMENS: 11 ♂♂, 10 ♀♀; 1,100-5,100 feet; 11 Feb.-7 Sept.

The cassius blue is abundant in most open, sunny areas. The butterflies are attracted to flowers and mud puddles. The flight is relatively slow and within two feet of the ground. Within the Catemaco Basin, I observed females ovipositing on *Crotalaria vitellina*, a common plant in fields and pastures.

311. *Celastrina argiolus gozora* (Boisduval)

SPECIMENS: 7 ♂♂, 1 ♀; 1,800-5,400 feet; 24 March-25 Aug.

The spring azure is common on the peaks of the two highest volcanoes. The butterflies frequently were seen as they flew above the ridges and as they rested on leaves in the canopy of the Elfin Woodland. The flight is relatively weak but moderate in velocity.

FAMILY RIODINIDAE
SUBFAMILY Euselasiinae

TRIBE Euselasiini

312. *Euselasia sergia* (Godman & Salvin)

SPECIMENS: 2 ♂♂; Ocotal Grande, 1,800 feet, 15 May 1965, 1 ♂; Ocotal Chico, 1,900 feet, 17 April 1965, 1 ♂.

This metalmark is rare. Both specimens were collected along the margins of the Semi-Evergreen Seasonal Forest on the southern slopes of Volcán Santa Marta. The behavior of this species is typical of most members in the family: first, a fast erratic flight that usually is of relatively short duration; and secondly, a resting position usually on the undersurfaces of leaves with the wings held in a horizontal position.

313. *Euselasia hieronymia* (Godman & Salvin)

SPECIMENS: 6 ♂♂, 3 ♀♀; 1,100-4,300 feet; 24 March-30 Oct.

Euselasia hieronymia is locally common. Most butterflies were collected in the *Liquidambar-Quercus* Associates of the Montane Rain Forest, Semi-Evergreen Seasonal Forest, and Montane Rain Forest on the Santa Marta massif above the villages of Ocotal Chico and Ocotal Grande. The behavior is similar to that of *E. sergia*.

314. *Euselasia cheles aurantiaca* (Godman & Salvin)

SPECIMENS: 11 ♂♂, 2 ♀♀; 2,300-5,400 feet; 24 March-25 Aug.

This large *Euselasia* is locally common in the Montane Thicket and Elfin Woodland on the two highest volcanoes. The flight is extremely erratic and usually in excess of six feet of the ground.

315. *Euselasia cataleuca* (Felder)

SPECIMENS: 6 ♂♂, 1 ♀; 1,150-3,000 feet; 1 Sept.-30 Oct.

This species is uncommon, local, and seasonal. Most butterflies were collected along wide, sunny trails within the Lower Montane Rain Forest on the southern slopes of Volcán San Martín Tuxtla. The species seems to prefer low, damp areas, particularly where *Boehmeria* sp. is growing. The flight is extremely erratic and usually in excess of five feet of the ground.

316. *Euselasia pusilla* (Felder)

SPECIMENS: 1 ♂, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 22 July 1962, 1 ♀; 30 Sept. 1962, 1 ♂.

Both individuals of this rare species were collected in a coffee finca within the Semi-Evergreen Seasonal Forest in the vicinity of Lago Catemaco.

317. *Euselasia eubule* (Felder)

SPECIMEN: 1 ♂; 8 mi. SSE Catemaco, 1,900 feet, 13 Nov. 1962.

The single specimen was collected in a partially shaded section of Semi-Evergreen Seasonal Forest.

SUBFAMILY Riodininae

TRIBE Riodinini

318. *Hades noctula* Westwood

SPECIMENS: 1 ♂, 3 ♀♀; 1,800-2,400 feet; 13 March-8 June.

This riodinid is uncommon. All specimens were collected along streams in ravines within the Semi-Evergreen Seasonal Forest on the southern slopes of Volcán Santa Marta. The flight is very slow, weak, and usually between four and eight feet of the ground.

319. *Perophtalma tullius lasius* Stichel

SPECIMEN: 1 ♂; 0.5 mi. N Ocotal Grande, 2,100 feet, 21 June 1963.

The single specimen of this rare species was collected as it rested on the uppersurface of a leaf along a shaded trail within the *Liquidambar-Quercus* Associates of the Montane Rain Forest. *Perophtalma tullius lasius* has not been recorded from Veracruz. The nearest recorded locale is Chiapas (Hoffmann, 1940).

320. *Leucochimona philemon nivalis* (Godman & Salvin)

SPECIMENS: 3 ♂♂, 4 ♀♀; 800-2,100 feet; 10-29 July.

This white metalmark is uncommon and is found primarily in

the interiors of the Lower Montane Rain Forest. The butterflies were netted most frequently as they rested on the ground with the wings held in a horizontal position. The flight is extremely slow, weak, and usually within two or three feet of the ground.

321. *Leucochimona vestalis vestalis* (Bates)

SPECIMENS: 6 ♀ ♀; 0.5 mi. NNE Ocotal Chico, 2,200 feet, 1 July 1963, 1 ♀; 2 mi. SSW Peak Volcán San Martín Tuxtla, 2,200 feet, 24 July 1962, 1 ♀; 5 mi. E Cuetzalapan, 2,450 feet, 18 Aug. 1962, 1 ♀; 2,500 feet, 4 Sept. 1962, 1 ♀; S slope Volcán San Martín Tuxtla, 4,300 feet, 25 Aug. 1962, 1 ♀; 4,750 feet, 25 Aug. 1962, 1 ♀.

This species is uncommon, being found mainly in the interiors of the Montane Rain Forest and the Lower Montane Rain Forest (only at the upper limits). This species has not been recorded from the state. The nearest recorded locale is Chiapas (Hoffmann, 1940).

322. *Mesosemia tetrica* Stichel

SPECIMENS: 11 ♂ ♂, 4 ♀ ♀; 500-2,300 feet; 30 June-23 Oct.

This metalmark is locally common and is found principally in disturbed areas of Semi-Evergreen Seasonal Forest. The butterflies usually were found in very restricted areas (usually along trails) within the forests and so the species apparently is colonial. The flight is slower and less erratic than that of most species of riodinids but similar to that of the small species of satyrids (*Euptychia* spp.). The butterflies rest on the undersurfaces of leaves with the wings held in a horizontal position and on the uppersurfaces of leaves with the wings held at a 45° angle.

323. *Mesosemia gaudiolus* Bates

SPECIMENS: 20 ♂ ♂, 2 ♀ ♀; 500-3,000 feet; 1 March-19 Oct.

Mesosemia gaudiolus is locally common and found primarily in the relatively low and damp areas of the Lower Montane Rain Forest and Montane Rain Forest. The species appears to be colonial although the colonies are less restricted than those of *M. tetrica*. The resting behavior is identical with that of *M. tetrica*.

324. *Eurybia lycisca* Westwood

SPECIMENS: 2 ♂ ♂; 4.5 mi. ESE Sontecomapan, 75 feet, 6 Aug. 1962.

Both specimens of this rare species were collected at 6:30 P.M. in a dark, dense patch of Swamp Forest bordering Río Yougualtapan. The butterflies were chasing each other approximately two feet above the ground.

325. *Cremna umbra* (Boisduval)

SPECIMENS: 6 ♂♂, 2 ♀♀; 1,100-2,900 feet; 24 June-20 Nov.

Cremna umbra is uncommon and local. Most butterflies were collected as they rested on the undersurfaces of leaves along the margins of Hedgerows and the Semi-Evergreen Seasonal Forest.

326. *Ancylusis jurgensenii* (Saunders)

SPECIMEN: 1 ♂; 1 mi. E Zapoapan, 0 feet, 19 May 1965.

Only one specimen of this large riodinid was collected. The butterfly was found in a Pasture.

327. *Rhetus arcus thia* (Morisse)

SPECIMENS: 4 ♂♂, 1 ♀; 1,100-1,800 feet; 17 July-16 Sept.

This tailed metalmark is uncommon, being found primarily along the margins of the Semi-Evergreen Seasonal Forest in the vicinity of Lago Catemaco.

328. *Isapis agyrtus hera* Godman & Salvin

SPECIMEN: 1 ♂; 1 mi. ENE Ocotil Chico, 1,700 feet, 17 June 1965.

This little butterfly is rare and was collected along a thicket within the *Pinus-Quercus* Associates of the Deciduous Woodland. The species has not been recorded from Veracruz. The nearest recorded locale is Chiapas (Godman & Salvin, 1879-1901).

329. *Notheme eumeus diadema* Stichel

SPECIMEN: 1 ♂; 9 mi. SSE Catemaco, 1,800 feet, 23 June 1962.

The single specimen was collected as it rested on the under-surface of a leaf of a coffee plant in a coffee finca located in the Semi-Evergreen Seasonal Forest.

330. *Calephelis fulmen* (Stichel)

SPECIMEN: 1 ♂; 2 mi. NE Catemaco, 1,100 feet; 12 Aug. 1962.

This little metalmark is rare (although numerous other individuals may have been overlooked because of the species' similarity to other species of *Calephelis*). The butterfly was collected in a Pasture bordering Lago Catemaco. According to McAlpine (personal communication), the species has an extensive distribution through Mexico and Central America.

331. *Calephelis* sp. 1

SPECIMENS: 6 ♂♂, 3 ♀♀; 9 mi. ENE Sontecomapan, 0 feet, 15 Aug. 1962, 1 ♂: 0.5 mi. S Barrosa, 500 feet, 30 June 1962, 1 ♂: 2 mi. NE Catemaco, 1,100 feet, 26 July 1962, 1 ♂; 27 July 1962, 1 ♀; 12 Aug. 1962, 1 ♂: 2 mi. WSW Tapalapan, 1,600 feet, 20 Sept. 1962, 1 ♂: 2 mi. SSW Peak Volcán San Martín Tuxtla, 2,200 feet, 24 Aug. 1962, 1 ♂.

This species is common in Recently Abandoned Milpas, Pastures, and along Hedgerows throughout the Sierra. The butterflies have a relatively rapid flight that usually does not exceed three feet of the ground. The species is being described in McAlpine's forthcoming revision of the genus *Calephelis*. According to McAlpine (personal communication) the species is widely distributed in Mexico.

332. *Calephelis* sp. 2

SPECIMENS: 3 ♂♂, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 26 July 1962, 1 ♂; 16 Sept. 1962, 1 ♂, 1 ♀; 8 mi. SSE Catemaco, 1,950 feet, 29 Sept. 1962, 1 ♂.

This species apparently is sympatric with the former but less common. Most butterflies were collected in Recently Abandoned Milpas, Pastures, and along Hedgerows. The species is being described by McAlpine in his forthcoming revision of the genus *Calephelis*, and who states (personal communication) that the species is known from Tabasco, Quintana Roo, and Yucatán. Thus, my specimens from the Sierra represent a new state record.

333. *Charis velutina* (Godman & Salvin)

SPECIMENS: 6 ♂♂; 800-1,900 feet; 27 Feb.-24 Oct.

Charis velutina is uncommon and found primarily along the borders of Hedgerows, Semi-Evergreen Seasonal Forest, Lower Montane Rain Forest and in the Deciduous Woodland and the *Pinus-Quercus* Associates. The flight is relatively rapid and close to the ground.

334. *Charis myrtea* (Godman & Salvin)

SPECIMENS: 9 ♂♂; 1,900 feet, 13 Nov.

This species is common but extremely local. All nine specimens were collected as they rested on the upper- and under-surfaces of leaves of an unidentified tall bush that was growing along the margin of a disturbed section of Semi-Evergreen Seasonal Forest on Cerro Cintepec.

335. *Charis psaros* (Godman & Salvin)

SPECIMEN: 1 ♂; 1.5 mi. NNW Ocotac Chico, 2,700 feet, 15 June 1965.

Charis psaros is rare. The single specimen was collected along a sunlit trail within the *Liquidambar-Quercus* Associates of the Montane Rain Forest.

336. *Charmona gynaea zama* (Bates)

SPECIMENS: 6 ♂♂, 2 ♀♀; 1,100-2,400 feet; 21 June-16 Nov.

This metalmark is locally common, being found mainly along

the margins of the Semi-Evergreen Seasonal Forest, the *Pinus-Quercus* Associates of the Deciduous Woodland, Montane Rain Forest, and Hedgerows.

337. *Baeotis hisbon zonata* Felder

SPECIMENS: 3 ♀ ♀ ; 1,800, 1,900 feet; 29 May-25 Oct.

All three specimens of this rare species were collected as they fed on the blossoms of *Calliandra grandiflora* in the *Pinus-Quercus* Associates of the Deciduous Woodland.

338. *Lymnas pixe pixe* Boisduval

SPECIMENS: 4 ♂ ♂ , 8 ♀ ♀ ; 500-1,800 feet; 20 June-10 Aug.

This riodinid is locally common and found principally along the margins of the Semi-Evergreen Seasonal Forest and Hedgerows. Most butterflies were collected on cloudy days.

339. *Mesene margaretta* (White)

SPECIMEN: 1 ♂ ; 2 mi. NE Catemaco, 1,100 feet, 26 Sept. 1962.

The single individual was collected as it fed on the white flowers of the composite *Bidens pilosa* var. *bimucronata* in a Recently Abandoned Milpa bordering Lago Catemaco.

340. *Mesene croceola* Bates

SPECIMENS: 7 ♂ ♂ , 11 ♀ ♀ ; 1,100-2,300 feet; 22 Feb.-30 Oct.

This species is locally common and seasonal. Most specimens were collected in the fall within the *Pinus-Quercus* Associates of the Deciduous Woodland as they fed on the blossoms of *Calliandra grandiflora* and as they rested on the undersurfaces of the leaves of *Quercus conspersa*. The species probably is colonial for rarely was a single butterfly seen alone.

341. *Symmachia rubina* Bates

SPECIMENS: 2 ♀ ♀ ; Ocotal Chico, 1,900 feet, 9 July 1963, 1 ♀ : 8 mi. SSE Catemaco, 1,900 feet, 13 Nov. 1962, 1 ♀ .

This metalmark is rare. One female was collected as it fed on the blossoms of *Heliotropium indicum*—a plant that is common around the houses of the Popoluca Indians—and the other as it rested on the undersurface of a leaf in a Recently Abandoned Milpa.

342. *Symmachia accusatrix* Westwood

SPECIMEN: 1 ♂ ; 2 mi. NE Catemaco, 1,100 feet, 30 Aug. 1963.

The single specimen was collected as it rested on the undersurface of a leaf of an unidentified shrub along the margin of a section of Semi-Evergreen Seasonal Forest.

343. *Symmachia tricolor hedemanni* (Felder)

SPECIMENS: 3 ♂♂; 2,100, 2,700 feet; 5 May, 24 Oct.

This species is uncommon and restricted to the *Pinus-Quercus* Associates of the Deciduous Woodland. All butterflies were collected as they fed on the flowers of *Calliandra grandiflora*.

344. *Phaenochitoniasagaris tyriotes* (Godman & Salvin)

SPECIMENS: 2 ♂♂; 2 mi. SW Sontecomapan, 900 feet, 12 July 1962, 1 ♂: Ocotal Chico, 1,900 feet, 11 Feb. 1965, 1 ♂.

This riodinid is rare. One butterfly was collected as it flew through a Recently Abandoned Milpa and the other as it rested on the undersurface of a leaf in a shrubby area within the *Pinus-Quercus* Associates of the Deciduous Woodland.

345. *Anteros carausius carausius* Westwood

SPECIMENS: 5 ♂♂, 3 ♀♀; 1,100-2,600 feet; 12 March-23 Oct.

Although uncommon, this species is found in a variety of habitats—margins of Hedgerows, the Semi-Evergreen Seasonal Forest, and the Lower Montane Rain Forest. Unlike most other species of riodinid, the butterflies of *A. c. carausius* very seldom hold their wings in a horizontal position.

346. *Calydna venusta* Godman & Salvin

SPECIMENS: 1 ♂, 1 ♀; 0.5 mi. S Barrosa, 500 feet, 30 June 1962, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 4 Oct. 1962, 1 ♂.

Both specimens of this rare species were collected along the margins of Semi-Evergreen Seasonal Forest. *Calydna venusta* has not been recorded from Veracruz. The nearest recorded locale is Oaxaca (Godman & Salvin, 1879-1901).

347. *Emesis liodes* Godman & Salvin

SPECIMENS: 6 ♂♂, 3 ♀♀; 1,100 feet; 28 June-7 Sept.

Emesis liodes is uncommon and extremely local. All nine specimens were collected as they rested on the undersurfaces of leaves along the margins of and just within a small section of Semi-Evergreen Seasonal Forest bordering Lago Catemaco. The flight is rapid and erratic.

348. *Emesis mandana mandana* (Cramer)

SPECIMENS: 1 ♂, 4 ♀♀; 500-2,600 feet; 12 March- 23 Sept.

This riodinid is uncommon and found primarily along the margins of Hedgerows and the Semi-Evergreen Seasonal Forest. Most butterflies were collected as they fed on the blossoms of *Cordia spinescens*.

349. *Emesis tenedia* Felder

SPECIMENS: 1 ♂, 7 ♀♀; 1,100-2,450 feet; 14 June-18 Aug.

Although *E. tenedia* is uncommon, the species nevertheless is the most common member of the genus within the Sierra.

The butterflies were collected in a variety of habitats—along the margins of Hedgerows and the Semi-Evergreen Seasonal Forest, and in Recently Abandoned Milpas and grassy areas in the *Pinus-Quercus* Associates of the Deciduous Woodland. The behavior is similar to that of most members of the family.

350. *Emesis lupina* Godman & Salvin

SPECIMENS: 3 ♂♂, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 29 July 1962, 1 ♀; 28 Sept. 1962, 1 ♂; 30 Sept. 1962, 2 ♂♂.

All specimens of this uncommon species were collected along the margins of small patches of Semi-Evergreen Seasonal Forest bordering Lago Catemaco. Hoffmann (1940) records the species only from the valley of the Río Balsas (Guerrero). Therefore, my specimens from the Sierra represent a new state record.

351. *Tharops menander isthmiae* Godman & Salvin

SPECIMENS: 6 ♂♂, 1 ♀; 1,100 feet; 1 July-12 Aug.

This species is local and uncommon. All specimens were collected in a small pasture bordered by small patches of Semi-Evergreen Seasonal Forest. The butterflies are attracted to the blossoms of *Lantana camara*.

352. *Thisbe irenea belides* Stichel

SPECIMENS: 1 ♂, 1 ♀; 1 mi. SE Sontecomapan, 700 feet, 14 July 1962, 1 ♂; 2 mi. SW Sontecomapan, 900 feet, 24 July 1962, 1 ♀.

This rioidinid is rare. Both specimens were collected along the borders of Lower Montane Rain Forest.

353. *Polystichtis sudias* (Hewitson)

SPECIMENS: 5 ♂♂, 7 ♀♀; Ocotal Grande, 1,800 feet, 15 May 1965, 2 ♂♂; 1,900 feet, 19 June 1963, 2 ♀♀; 1 mi. NNE Ocotal Chico, 2,000 feet, 31 May 1965, 1 ♂; 2,100 feet, 14 June 1963, 1 ♀; 2 mi. N Ocotal Chico, 2,800 feet, 3 Aug. 1963, 1 ♀; 2,900 feet, 26 July 1963, 1 ♀; 3 mi. NNW Ocotal Chico, 3,550 feet, 1 ♀; 2 mi. NNW Ocotal Chico, 3,800 feet, 13 April 1965, 2 ♂♂, 1 ♀.

This dimorphic species is locally common and found primarily in the *Liquidambar-Quercus* Associates of the Montane Rain Forest and the Montane Rain Forest on the Santa Marta massif. The butterflies were collected most frequently as they rested on the undersurfaces of leaves and on the trunks of gum trees. The flight of the male is very rapid, erratic, and usually above eight feet of the ground. The flight of the female usually is considerably slower and nearer the ground than that of the male. On several occasions I mistook females for specimens of

Dismorphia fortunata (Pieridae: Dismorphiinae) and for one of the transparent species of ithomiids.

354. *Anatole agave* (Godman & Salvin)

SPECIMEN: 1 ♂; 2 mi. NE Catemaco, 1,100 feet, 18 Nov. 1962.

The single male was collected as it flew about one foot above the ground in a Pasture bordering Lago Catemaco. The flight of this species is not as rapid and erratic as most members of the family.

355. *Anatole rossi* Clench

SPECIMENS: 61 ♂ ♂, 32 ♀ ♀; 1.25 mi. E. Mecayapan, 1,025 feet, 1 Aug. 1963, 1 ♂: 0.25 mi. SSE Ocotal Chico, 1,700 feet, 8 June 1963, 2 ♀ ♀: 0.5 mi. SSE Ocotal Chico, 1,800 feet, 23 June 1963, 1 ♂; 25 July 1963, 1 ♂; 26 July 1963, 1 ♂: 1 mi. S Ocotal Chico, 1,800 feet, 7 June 1963, 2 ♂ ♂: 0.25 mi. E Ocotal Grande, 1,800 feet, 19 June 1963, 1 ♀: 1 mi. SSE Ocotal Chico, 1,800 feet, 23 Oct. 1962, 1 ♂: Ocotal Chico, 1,800 feet, 8 June 1963, 4 ♀ ♀; 4 Aug. 1963, 1 ♂; 1,900 feet, 7 June 1963, 2 ♂ ♂, 2 ♀ ♀; 13 July 1965, 26 ♂ ♂, 5 ♀ ♀: 1 mi. E Ocotal Grande, 1,850 feet, 8 Aug. 1963, 1 ♂: 0.25 mi. E Ocotal Chico, 1,900 feet, 9 June 1963, 3 ♂ ♂, 2 ♀ ♀: Ocotal Grande, 1,900 feet, 19 June 1963, 1 ♂; 4 July 1963, 1 ♂: 0.25 mi. SE Ocotal Chico, 1,950 feet, 1 Aug. 1963, 1 ♂: 0.25 mi. SE Ocozotepec, 1,950 feet, 1 Aug. 1963; 6 ♀ ♀: 0.25 mi. ESE Ocozotepec, 1,950 feet, 1 Aug. 1963, 3 ♂ ♂ (of which 1 is the holotype): Ocozotepec, 2,000 feet, 1 Aug. 1963, 3 ♂ ♂, 4 ♀ ♀: 0.25 mi. N Ocotal Chico, 2,100 feet, 11 June 1963, 3 ♂ ♂; 15 June 1963, 1 ♂; 18 June 1963, 1 ♀: 1.25 mi. N Ocotal Chico, 2,200 feet, 26 July 1963, 1 ♀: 1 mi. N Ocotal Grande, 2,300 feet, 15 May 1965, 5 ♂ ♂; 2 June 1965, 1 ♂: 1.25 mi. NE Ocotal Chico, 2,600 feet, 16 June 1963, 1 ♂; 2,700 feet, 16 June 1963, 1 ♀. (All specimens collected in 1962 and 1963, except the one holotype, are paratypes—see Clench, 1964).

This metalmark, which is described in Clench (1964), is locally abundant throughout the *Pinus-Quercus* Associates of the Deciduous Woodland. The butterflies occur in small colonies only on many of the pine covered ridges in the immediate vicinities of the Popolucan villages of Ocotal Chico, Ocotal Grande, and Ocozotepec. The immature stages (of which most are myrmecophilous) and the life history of this endemic species have been described (Ross, 1964c, 1966). The larval food plant is *Croton repens*.

356. *Peplia lamis molpe* (Hübner)

SPECIMENS: 11 ♂ ♂, 8 ♀ ♀; 150-2,400 feet; 15 May-18 Nov.

This species is common in most open, shrubby areas throughout the Sierra irrespective of plant formation. Most butterflies were collected as they visited flowers, particularly those of *Vismia mexicana*, and as they rested on the undersurfaces of leaves.

357. *Nymula calice mycone* (Hewitson)

SPECIMEN: 1 ♂; Ocotal Chico, 1,900 feet, 5 Feb. 1965.

The single male of this species was collected along the margin of a section of Semi-Evergreen Seasonal Forest on the Santa Marta massif.

358. *Calociasma lilina* (Butler)

SPECIMEN: 1 ♂; 0.5 mi. S Barrosa, 500 feet, 30 June 1962.

This riodinid is rare. The single specimen was collected as it rested on the undersurface of a leaf along the margin of a small section of Semi-Evergreen Seasonal Forest.

TRIBE Theopini

359. *Theope eleutho* Godman & Salvin n. ssp.

SPECIMENS: 2 ♂♂, 1 ♀; 2 mi. NE Catemaco, 1,100 feet, 3 Aug. 1962, 1 ♂; 7 Sept. 1962, 1 ♀; Ocotal Chico, 1,900 feet, 4 July 1963, 1 ♂.

This species is uncommon and found both in pastures and the *Pinus-Quercus* Associates of the Deciduous Woodland. The specimens were collected as they fed on the blossoms of *Cordia spinescens*. Clench (personal communication) states that the specimens from the Sierra probably represent a new subspecies. The nearest recorded locale for *T. eleutho* is Panamá (Godman & Salvin, 1879-1901).

VI. CORRELATION AND SYNTHESIS

Biotic Relationships

LIFE ZONES

Merriam (1892) in his original life zone classification unfortunately dealt only superficially with areas south of the United States. His broad "Tropical Region" included the entire Sierra de Tuxtla. However, several other authors—Goldman (1920, 1951), Dickey and van Rossen (1938), and Lowery and Dalquest (1951)—working in various localities in Mexico and

Central America, have found it necessary within their respective study areas to subdivide this "Tropical Region." The resulting divisions or zones, as with nearly all of the life zones in North America, originally were defined and delineated using plants, mammals, and birds as indicator species. Lately, however, several workers (see Garth and Tilden, 1963) have recognized that insects—especially butterflies with their fixed larval food plants, their relatively high mobility potential, and their migratory habits—may, with some justification, be ranked below plants but before mammals and birds in order of decreasing reliability as zonal indicators.

Andrle (1964) was the first to attempt a zonal analysis of the Sierra de Tuxtla. His avifaunal and mammalian faunal investigations indicated that no distinct life zone boundaries existed but that only vaguely defined zones (if indeed they could be termed zones) were evident. He recognized two major zones: a Humid Tropical Zone (divisible into an Upper Subzone and a Lower Subzone) and an Arid Tropical Zone (nondivisible).

In order to determine if the 359 species of butterflies in the Sierra can be grouped according to Andrle's classification, to one of the others proposed for other areas of Mexico, or, indeed, to any pattern at all, I have compiled a list of butterfly species that are associated with each plant formation (Table II). The butterfly species are divided into two categories. First, are "indicator species"—those species that are found exclusively within the formation regardless of relative abundance. For the most part these species are in the Lycaenidae and Riodinidae, the members of which are notoriously flighty and evasive. Thus, additional collecting probably will remove many of these from the list. Second, are "characteristic species"—those species that are found commonly within the formation but not confined to it.

An analysis of the data in Table II indicates that all of the formations below 2,500 to 3,000 feet are rather similar regarding characteristic butterfly species. Likewise, those formations above approximately 3,000 feet are rather similar but quite distinct from those at lower elevations. Indeed, of the 39 species listed as occurring in the high altitude formations (Elfin Woodland, Montane Thicket, and Montane Rain Forest), only nine (23%) occur commonly in formations at lower elevations. Thus, a major division in butterfly fauna apparently does exist within the Sierra—a division separating the lower formations from the upper ones (the *Liquidambar-Quercus* Associates of the Montane Rain Forest serving as a transitional zone or ecotone).

TABLE II
PLANT FORMATIONS AND ASSOCIATED BUTTERFLIES
IN THE SIERRA DE TUXTLA

(When only one or two specimens were collected, these numbers appear in parentheses.)

1. Elfin Woodland

INDICATOR SPECIES

<i>Pedaliodes pisonia circumducta</i>	<i>Callophrys</i> nr. <i>longula</i> (1)
<i>Dione moneta poeyii</i>	<i>Callophrys a. agricolor</i> (1)
<i>Hypanartia dione</i>	<i>Thecla laothoe</i> (1)

Celastrina argiolus gozora

CHARACTERISTIC SPECIES

<i>Graphium c. calliste</i>	<i>Morpho polyphemus luna</i>
<i>Papilio androgeus epidaurus</i>	<i>Heliconius hortense</i>
<i>Dismorphia euryope</i>	<i>Vanessa virginiensis</i>
<i>Dismorphia nemesis</i>	<i>Limenitis leuceria</i>
<i>Dismorphia jethys</i>	<i>Anaea proserpina</i>
<i>Greta anetta</i>	<i>Eumaeus debora</i>
<i>Dioriste tauropolis</i>	<i>Euselasia cheles aurantiaca</i>
<i>Morpho theseus justiciae</i>	

2. Montane Thicket

INDICATOR SPECIES

<i>Oleria zea</i>	<i>Prepona brooksiana</i> (1)
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Epiphile plutonia

CHARACTERISTIC SPECIES

<i>Graphium c. calliste</i>	<i>Heliconius hortense</i>
<i>Ithomia leila</i>	<i>Limenitis leuceria</i>
<i>Greta anetta</i>	<i>Anaea proserpina</i>
<i>Dioriste tauropolis</i>	<i>Eumaeus debora</i>
<i>Morpho theseus justiciae</i>	<i>Euselasia cheles aurantiaca</i>
<i>Morpho polyphemus luna</i>	

3. Montane Rain Forest

INDICATOR SPECIES

<i>Thecla politus</i> (1)	<i>Thecla dodava</i> (1)
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CHARACTERISTIC SPECIES

<i>Parides photinus</i>	<i>Morpho polyphemus luna</i>
<i>Ithomia leila</i>	<i>Heliconius sapho leuce</i>
<i>Oleria paula</i>	<i>Heliconius hortense</i>
<i>Dircenna klugi</i>	<i>Limenitis leuceria</i>
<i>Episcada artena</i>	<i>Eumaeus debora</i>
<i>Greta anetta</i>	<i>Thecla plusios</i>
<i>Taygetes andromeda</i>	<i>Mesosemia gaudiolus</i>
<i>Caligo uranus</i>	<i>Polystichtis sudias</i>
<i>Morpho theseus justiciae</i>	

4. *Liquidambar-Quercus* Associates of the Montane Rain Forest
(Ecotone)

INDICATOR SPECIES

<i>Calycopis pisis</i> (2)	<i>Peropthalma tullius lasius</i> (1)
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Thecla thales (2) *Charis psaros* (1)

Thecla tarpa (2)

CHARACTERISTIC SPECIES

Dismorphia fortunata

Caligo memnon

Eurema albula

Morpho peleides montezuma

Eurema dina westwoodi

Heliconius cleobaea zorcaon

Ithomia leila

Heliconius ismenius telchinia

Oleria paula

Heliconius sapho leuce

Dircenna klugi

Heliconius petiveranus

Episcada artena

Heliconius charitonius

Pteronymia cottyto

vazquezae

Taygetes andromeda

Calycopis beon

Euptychia hesione

Strymon yojoa

Euptychia themis

Euselasia hieronymi

Euptychia disaffecta

Polystichtis sudias

Euptychia hermes sosybius

Peplia lamis molpe

5. Lower Montane Rain Forest

INDICATOR SPECIES

Hyposcada v. virginiana

Eryphanis aesacus (2)

Heliconius sara veraepacis (1)

Thecla minthe

Phyciodes clara (1)

Thecla tera (1)

Polygonia g-argenteum (2)

Thecla coronata (1)

Catagramma lyca

Euselasia cataleuca

Catagramma casta (1)

Thisbe irenea belides (2)

Limenitis oberthuri (2)

CHARACTERISTIC SPECIES

Parides photinus

Euptychia undina

Parides iphidamas

Euptychia hermes sosybius

Parides arcas mylotes

Euptychia libye

Dismorphia fortunata

Caligo memnon

Dismorphia praxinoe

Caligo uranus

Itaballia pisonis kicaha

Morpho peleides montezuma

Itaballia v. viardi

Heliconius cleobaea zorcaon

Melinaea lilis imitata

Heliconius ismenius telchinia

Mechanitis polymnia lycidice

Heliconius doris transiens

Mechanitis egaensis doryssus

Heliconius sapho leuce

Mechanitis menapis saturata

Heliconius petiveranus

Hypothyris lycaste dionaea

Heliconius charitonius

Napeogenes tolosa

vazquezae

Ithomia patilla

Phyciodes phillyra

Oleria paula

Biblis hyperia aganisa

Aeria pacifica

Pyrrhogyra otolais neis

Dircenna klugi

Diaethria anna

<i>Episcada artena</i>	<i>Dynamine mylitta</i>
<i>Pteronymia cottyto</i>	<i>Dynamine dyonis</i>
<i>Greta oto</i>	<i>Hamadryas februa gudula</i>
<i>Greta nero</i>	<i>Hamadryas g. guatemalena</i>
<i>Pierella luna heracles</i>	<i>Limenitis iphicla</i>
<i>Taygetes andromeda</i>	<i>Limenitis paraeca</i>
<i>Taygetes keneza</i>	<i>Anaea electra</i>
<i>Euptychia hesione</i>	<i>Calycopis beon</i>
<i>Euptychia metaleuca</i>	<i>Strymon yojoa</i>
<i>Euptychia themis</i>	<i>Thecla marysas damo</i>
<i>Euptychia labe</i>	

6. Semi-Evergreen Seasonal Forest

INDICATOR SPECIES

<i>Euptychia nr. alcinoe</i>	<i>Euselasia sergia</i> (2)
<i>Epiphile adrasta bandusia</i>	<i>Euselasia pusilla</i> (2)
<i>Nessaea aglaura</i>	<i>Euselasia eubule</i> (1)
<i>Myscelia rogenhoferi</i> (1)	<i>Hades noctula</i>
<i>Chlorippe cherubina</i> (1)	<i>Notheme eumeus diadema</i> (1)
<i>Anaea artacaena</i> (1)	<i>Charis myrtea</i>
<i>Calycopis trebula</i>	<i>Symmachia accusatrix</i> (1)
<i>Strymon albata</i> (2)	<i>Calydna venusta</i> (2)
<i>Thecla inachus carpophora</i> (2)	<i>Emesis liodes</i>
<i>Thecla lisus</i> (2)	<i>Emesis lupina</i>
<i>Thecla jebus</i> (1)	<i>Nymula calice mycone</i> (1)
<i>Thecla mulucha</i> (1)	<i>Calociasma lilina</i> (1)

CHARACTERISTIC SPECIES

<i>Graphium belesis</i>	<i>Caligo memnon</i>
<i>Parides p. polyzelus</i>	<i>Morpho peleides montezuma</i>
<i>Dismorphia fortunata</i>	<i>Heliconius cleobaea zorcaon</i>
<i>Eurema albula</i>	<i>Heliconius ismenius telchinia</i>
<i>Eurema dina westwoodi</i>	<i>Heliconius doris transiens</i>
<i>Melinaea lilis imitata</i>	<i>Heliconius petiveranus</i>
<i>Mechanitis polymnia lycidice</i>	<i>Heliconius charitonius</i>
<i>Mechanitis egaensis doryssus</i>	<i>vazquezae</i>
<i>Mechanitis menapis saturata</i>	<i>Chlosyne janais</i>
<i>Hypothyris lycaste dionaea</i>	<i>Biblis hyperia aganisa</i>
<i>Ithomia patilla</i>	<i>Pyrrhogyra otolais neis</i>
<i>Oleria paula</i>	<i>Diaethria anna</i>
<i>Dircenna klugi</i>	<i>Dynamine mylitta</i>
<i>Episcada artena</i>	<i>Dynamine dyonis</i>
<i>Pteronymia cottyto</i>	<i>Hamadryas februa gudula</i>
<i>Greta nero</i>	<i>Hamadryas ferronia farinulenta</i>
<i>Greta oto</i>	<i>Hamadryas g. guatemalena</i>

<i>Pierella luna heracles</i>	<i>Limenitis iphicle</i>
<i>Taygetes andromeda</i>	<i>Limenitis paraeca</i>
<i>Taygetes keneza</i>	<i>Anaea aidea</i>
<i>Euptychia hesione</i>	<i>Anaea electra</i>
<i>Euptychia mollina</i>	<i>Calycopis beon</i>
<i>Euptychia labe</i>	<i>Strymon yojoa</i>
<i>Euptychia themis</i>	<i>Heterosmaitia palegon</i>
<i>Euptychia undina</i>	<i>Thecla marsyas damo</i>
<i>Euptychia hermes sosybius</i>	<i>Mesosemia tetrica</i>
<i>Euptychia libye</i>	<i>Lymnas p. pixe</i>

7. *Bursera-Sabal-Orbignya* Associates of the Semi-Evergreen Seasonal Forest

INDICATOR SPECIES

Itaballia demophile calydonia *Calycopis* sp. "C"

CHARACTERISTIC SPECIES

The same as those for the Semi-Evergreen Seasonal Forest.

8. Savanna

INDICATOR SPECIES

None.

CHARACTERISTIC SPECIES

<i>Papilio thoas autocles</i>	<i>Hamadryas g. guatemalena</i>
<i>Phoebis sennae marcellina</i>	<i>Marpesia chiron</i>
<i>Phoebis agarithe maxima</i>	<i>Limenitis iphicla</i>
<i>Eurema lisa</i>	<i>Limenitis paraeca</i>
<i>Eurema nise nelphe</i>	<i>Libytheana carinenta mexicana</i>
<i>Euptychia gemma freemani</i>	<i>Calycopis beon</i>
<i>Euptychia mollina</i>	<i>Strymon yojoa</i>
<i>Euptychia hermes sosybius</i>	<i>Thecla brescia</i>
<i>Actinote guatemalena</i>	<i>Hemiargus ceraunus zachaeina</i>
<i>veraacruzis</i>	<i>Hemiargus huntingtoni</i>
<i>Thessalia t. theona</i>	<i>hannoides</i>
<i>Junonia evarete</i>	<i>Everes comyntas</i>
<i>Mestra amymone</i>	<i>Leptotes cassius striata</i>
<i>Hamadryas februa gudula</i>	<i>Peplia lamis molpe</i>

9. Deciduous Woodland

INDICATOR SPECIES

Eunica alcmena *Thecla maeonis* (1)

Strymon serapio

CHARACTERISTIC SPECIES

All of those in the Savanna in addition to *Mesene croceela*.