

BULLETIN OF THE ALLYN MUSEUM

3701 Bayshore Rd.
Sarasota, Florida 33580

Published By
The Florida State Museum
University of Florida
Gainesville, Florida 32611

Number 85

19 April 1984

FIVE NEW SPECIES OF *CALISTO* (SATYRIDAE) FROM HISPANIOLA

Albert Schwartz¹

Miami-Dade Community College, North Campus, Miami, FL 33167

and

Frank Gali

156 South Melrose Dr., Miami Springs, FL 33166

Fifteen species of the endemic Antillean satyrid genus *Calisto* are known from Hispaniola (Munroe, 1950; Riley, 1975; Schwartz, 1983a). Among these only two (*granus* Bates, *arcas* Bates) have two unhw (under hindwing) ocelli not in series with other ocelli or white dots or distinctive unhw pale pattern. Both these species are known only from the Cordillera Central in the República Dominicana. Although supernumerary ocelli are of common occurrence in the Satyridae, it is pertinent to note that of 322 specimens of seven species of *Calisto* from Haiti examined, only three (all *C. hysius*) had one supernumerary ocellus (Schwartz, 1983b). Thus, supernumerary unhw ocelli are of unusual occurrence in Hispaniola *Calisto*. Conversely, when one secures a series of *Calisto* on that island, all of which have more than one unhw ocellus, it suggests that one is dealing with a new taxon.

During July 1982, we encountered a population of *Calisto* in the Sierra de Neiba with more than the customary one unhw ocellus in all (14) specimens collected. The site, at 976 m, is unusual in that it is a small patch of minimally disturbed forest with a single path traversing it. Most (but not all) species of Hispaniolan small *Calisto* have some brick-red unfw (under forewing) markings, generally involving the fw cell in some manner. The Sierra de Neiba specimens agree in this basic condition, but the extent of the red unhw markings do not agree with those of other "similar" species (*confusa* Lathy, *obscura* Michener, *lyceius* Bates, *hysius* Godart, *montana* Clench, *micheneri* Clench). Finally, at this same locality, but in open grassy and weedy areas along the road, we collected typical specimens of *C. confusa* and *C. hysius*. No one has previously collected

¹ Adjunct Curator, Florida State Museum, Gainesville, Florida.

Calisto (or very many butterflies at all) in the Sierra de Neiba. All of the above suggest very strongly that this population is a distinct species. It is important that these butterflies seemed to be restricted to this particular sort of forest and perhaps at this elevational band. We did not encounter them at lower nor higher elevations (in a mesic forest of different constituent plants). These details will be discussed below. For this population we propose the name

***Calisto neiba*, new species**

(Fig. 1, holotype ♂; Fig. 6A, paratype; Fig. 7A, ♂ genitalia)

Male fw length 14-16 mm (\bar{x} = 15.1 mm; N = 8); upfw and uphw dark brown (Pl. 16A12; all color designations from Maerz and Paul, 1950) without distinct markings; androconial patch barely discernible, covering basal two-thirds of fw, its outer margin paralleling the outer margin and extending posteriorly to the inner margin; uphw with a slightly paler area (tinged with very dull orange) submarginally from the anal angle; unfw dark brown, slightly paler (Pl. 16E7); a submarginal apical black ocellus, ringed with dull yellow and with two bluish white pupils, one displaced posteriorly and almost on the yellow ocellar ring; fw cell brick red (Pl. 6J12), the red scales completely filling the cell and barely extending into the bases of spaces R_s - M_1 , M_1 - M_2 , M_3 - Cu_1 , and Cu_1 - Cu_2 , but not into M_2 - M_3 , the extensions into these spaces from the cell minimal and not extensive; unhw slightly paler than unfw, pale submarginal and discal lines very dull and barely discernible, the submarginal line the more bold and wavy, the discal line straighter, both converging on a dark anal angle spot which is non-ocellar; a faint pale basal line across dark wing base; complete ocelli present in R_s - M_1 , M_1 - M_2 , Cu_1 - Cu_2 , Cu_2 -2A, those in M_1 - M_2 and Cu_1 - Cu_2 the largest; a white dot usually present in M_2 - M_3 and M_3 - Cu_1 ; thus, enclosed between the submarginal and discal "paler" lines, in anterior-posterior sequence, the following markings: small ocellus-large ocellus-dot-dot-large ocellus-small ocellus-anal spot. Two males lack an ocellus in R_s - M_1 , and one lacks a dot in M_2 - M_3 (the white dots are composed of a very few individual scales and their absence might be due to wear), and another male has the complete complement of ocelli but lacks dots in M_2 - M_3 and M_3 - Cu_1 . Five ♂ lack an ocellus in Cu_2 -2A.

Female fw length 15-17 mm (\bar{x} = 16.0; N = 3); upfw and uphw generally slightly paler than males, the hw dull orange marginal blush barely discernible; un like males including four ocelli and two intermediate white dots (although the dots are absent in 2 ♀, and the ocellus in Cu_2 -2A is minute in one female); the ocellar band (bounded by the submarginal and discal "pale" lines) is slightly darker than in males with the basal line slightly more contrasting; color and extent of red in cell and adjacent spaces like that in males except that in some specimens the red extends further into adjacent spaces and even into M_2 - M_3 .

HOLOTYPE male: REPUBLICA DOMINICANA: PROVINCIA DE LA ESTRELETA: 15 km S Elias Piña, 976 m, 26.vii.1981 (F. Gali), *ex colln.* A. Schwartz, now in the collection of Allyn Museum of Entomology, Florida State Museum.

PARATYPES: 5 ♂, 5 ♀, 26.vii.1981; 2 ♂, 1 ♀, 27.vii.1981 (A. Schwartz colln.) from the type-locality; 1 ♂ (F. Gali colln.), 1 ♂ (A. Schwartz colln.), 5.viii.1982, República Dominicana, Prov. de la Estrelleta, 2 km NE Puesto Pirámide 204, 1586 m; 5 ♂ (F. Gali colln.), 5 ♂ (A. Schwartz colln.), 1 ♂ (R. W. Wisor colln.), 6.viii.1982, Rep. Dom., Prov. de la Estrelleta, 2 km NE Puesto Pirámide 204, 1586 m.

Comparisons: *Calisto neiba* belongs to Munroe's (1950) Section II, in which fw R₁ is stalked with R_s. This section is divided into 4 groups: *hysius* group, which is in turn divided into three subgroups: A — *tragi*us Bates, *grannus* Bates, *micheneri* Clench, *montana* Clench; B — *hysius* (including subspecies *hysius* and *batesi*), *confusa* Lathy, *debarriera* Clench, *obscura* Michener, *lyceius* Bates, plus one unnamed species; C includes only species from Cuba and the Bahamas. The remaining groups (*eleleus*, *pulchella*, *nubila*) are not germane; each contains one species, the first two from Hispaniola, the last from Puerto Rico.

Of the pertinent species above, note that only *grannus* has two ocelli on the unhw; the

other species with two unhw ocelli, *C. arcas*, belongs to another section of the genus. *Calisto neiba* differs from *C. grannus* in that the latter has only two ocelli on the unhw and no red on the unfw. *Calisto hysius* (in both "subspecies") has only one unhw ocellus, although three specimens with one supernumerary ocellus have been reported (Schwartz, 1983b). This species lacks a dark anal angle spot, has the red pigment in the fw cell sharply delimited within (= across) the cell by a dark transcellular line, a postocellar red blush on the fw, often some orange suffusion on the uphw marginally, and the unhw pale postmarginal, discal, and basal lines bold and prominent.

Both *C. micheneri* and *C. montana* are poorly known, the latter from only the holotype from Mt. Basil in the Haitian Monts Cahos, the former from one specimen from the Cordillera Central in the República Dominicana. Neither is multiocellate on the unhw. In *C. montana* the entire unhw cell is red, and there are three white dots in the three spaces anterior to the hw ocellus in Cu_1-Cu_2 . *Calisto micheneri* is gray-brown ventrally, not multiocellate; in fact, the single ocellus in Cu_1-Cu_2 is very small and black, preceded by two white dots in the immediately more adjacent spaces. The fw cell is entirely red. Like *C. neiba*, the hw submarginal, discal, and basal lines are not strikingly paler in comparison with the ground color.

Of the remaining species, none is multiocellate; only *C. confusa* has a dark area at the anal angle, and *C. confusa*, *C. obscura*, *C. lyceius* all have the unhw lines bold and the unhw ground color paler than in *C. neiba*. The remaining species, *C. tragi*, is pale brown above with the fw cell only faintly reddish, not deep red as in *C. neiba*. Although Munroe listed *C. debarriera* as a member of this group, Riley (1975:50) considered it a form of *C. confusa*. This taxon is known from two specimens from the Haitian Massif de la Hotte at an elevation of 1220 m. The description of *C. debarriera* (Clench, 1943:25-26) suggests the characters of *C. neiba* (dark underside, red unfw pigment restricted to cell, the color extending slightly into neighboring spaces), but the two taxa differ in many other details of coloration and pattern. Since the status of *C. debarriera* is uncertain, it is futile to pursue this comparison further. However, it may well be that *C. neiba* is most closely related to *C. debarriera*. Their ranges are separated by about 260 km airline, and *C. neiba* is on the north island (see Schwartz, 1980), whereas *C. debarriera* is on the distal portion of the Tiburon Peninsula of the south island.

Remarks: The Sierra de Neiba lies on the southern "shore" of the north paleoisland, one of the two islands that formerly were separated from each other by a marine strait. This strait now is the xeric (and at places below sea level) Cul de Sac-Valle de Neiba plain. Thus the Sierra de Neiba is separated from the south island Sierra de Baoruco and Massif de la Selle by desert. The range is separated from the Cordillera Central to the north by the Valle de San Juan, a semi-mesic upland valley. Thus, the Sierra de Neiba is a high (maximum elevation 2260 m) mesic range, completely isolated from other ranges on Hispaniola. It extends into Haiti as the Montagnes du Trou-d'Eau, which are mesic near the Dominico-Haitian border but become increasingly drier to the west (where they are readily accessible). The eastern extreme of the range in Haiti is mesic but unreachable by road. Additionally, the Sierra de Neiba is composed of two parallel (north and south) ranges, separated by a valley; these ranges gradually diverge to the west, the northern range forming the xeric Montagnes Noires in Haiti. In the República Dominicana, two towns, La Descubierta (south of the south range) and Elías Piña (north of the north range) are connected by a border road which crosses both ranges and drops between them to the town of Hondo Valle. The type-locality of *C. neiba* lies on the northern slope of the north range, between (and closer to) Elías Piña and Hondo Valle (Fig. 4).

When ascending the road into the north range of the Sierra de Neiba, one passes from Elías Piña (395 m) through semi-xeric countryside, deforested and under cultivation. At higher elevations (825 m), the aspect of the range becomes less rigorous and more wooded but still greatly disturbed. At the type-locality of *C. neiba* (976 m), we stopped in 1981 at the first stand of more-or-less virgin forest we had seen. *Calisto neiba* was common along a short (100 m) path through these woods. No specimens were seen in other wooded areas in the immediate vicinity; all other woods here were greatly disturbed by

cutting and human intrusion. Realizing that we presumably had a new kind of *Calisto*, as we traveled further along the road we watched for other wooded areas and saw none until we reached an elevation of 1464 m just north of the guard post of Puesto Calimete. These woods are lush and untouched, but the component vegetation is quite different from that at the type-locality; tree ferns (Cyatheaceae) were dominant at the latter locality but did not occur at the former, for instance. Only one *C. hysius* was encountered at the Puesto Calimete locality. It would thus seem that the elevation was too high there or the vegetational complex unsatisfactory for not only *C. neiba* but almost all other *Calisto*.

A visit to the type-locality on 3.vii.1982 yielded no specimens. Collecting on that date was between 1115 and 1215 h (T 34° C); the day was bright and sunny. Both *C. hysius* and *C. confusa* were collected at the edge of the *cafetal* and woods but not on the path inside. Further travel along this road to 21 km S Elías Piña (the locality noted above) yielded no other *Calisto* of any species.

The second locality (2 km NE Puesto Pirámide 204) for *C. neiba* was visited by us on 5.viii.1982 and 6.viii.1982. This locality lies on the north face of the south range of the Sierra de Neiba and is removed some 13 km from the type-locality. The elevation (1586 m) is higher than that at the type-locality (976 m). At this point, the border road from Hondo Valle to La Descubierta travels for about one km up a gradual slope; the area has deciduous forest with some canopy over the road, and the verges are grassy; the general aspect is almost park-like and landscaped. Here, *C. neiba* was taken on the low grass adjacent to the road, along with *C. confusa*. The aspect of the forest, despite its higher elevation, is very like that of the type-locality and unlike the rich mesic tree-fern forest near Puesto Calimete (where *C. neiba* has not been taken).

At the type-locality we collected on 26.vii.1981 between 1130 and 1215 h (T 32° C), and on 27.vii.1981 between 1300 and 1400 h (T 33° C). Both days were bright and sunny, and butterflies in general were abundant. At Puesto Calimete we collected on the same days; on 26.vii.1981 between 1300 and 1515 h (T 29° C), and on 27.vii.1981 between 1100 and 1230 h (T 27° C). The weather conditions were clear and sunny with some alternating overcast, typical of these higher elevations. We cannot account for the virtual absence of any *Calisto* from the Puesto Calimete locality due either to elevation, time of day, or temperature, since none was extreme, and there are species of *Calisto* elsewhere at this elevation that we have collected under these (and even less favorable) weather conditions, temperatures, and times of day. It seems likely that *C. neiba* is a species that occupies a certain type of mesic forest at moderate elevations and that much of its habitat has been destroyed through cultivation and removal of that habitat, at least adjacent to roads and most paths.

At the second locality we collected on 5.vii.1982 between 1430 and 1500 h (T 25° C); the day was completely overcast. On 6.viii.1982, we collected at this same locality between 1030 and 1130 h, and 1330 and 1430 h; the morning T was 24° C, the afternoon T, 27° C; the weather was bright and sunny on both occasions. Only 2 *C. neiba* were taken on 5.viii and 11 on 6.viii; the difference in weather on the two days is undoubtedly significant.

As previously noted, Munroe (1950) divided his *hysius* group into three subgroups. His subgroup A is defined by having "Ocellus on underside of hind wing with pupil central, or nearly so." The subgroup is exclusively Hispaniolan and includes *tragi*, *grannus*, *micheneri*, and *montana*. *Calisto grannus*, described (Bates, 1939) from five specimens from the Cordillera Central (type-locality = Valle Nuevo, ca. 7000 ft.), is extremely abundant in that mountain range. The holotype and paratypes are all ♂, and Munroe (1950) listed only the type-series as examined by him. We have a long series from the area between Constanza and La Horma; note that the species also is known (3 of the paratypes) from Loma Rucilla in the Cordillera Central, removed some 40 km to the northwest of the type-locality.

In 1979, William W. Sommer and S. Craig Rhodes collected two specimens of a biocellate *Calisto* on the Haitain side of the Dominico-Haitian border in the Massif de la Selle (Schwartz, 1983b:24). Examination of these specimens suggested strongly that we were

dealing with a new species, restricted to the south island massifs (La Selle, Baoruco). In April 1982, we visited the area where Sommer and Rhodes had collected their material and were successful in securing a modest series. Since this area is very close (about 12 km) to the República Dominicana, it seemed reasonable that the same species would occur on the Dominican side of the border, between Los Arroyos and El Aguacate. We made two visits to the region in 1982 and secured a long series; the butterflies were extremely abundant. Our suspicions were confirmed, and these Haitian and Dominican butterflies do indeed represent an undescribed species.

Finally, in the summer of 1982, we collected in the Sierra de Neiba; on the south range of this massif we secured another long series of biocellate *Calisto* that differ from both *C. grannus* to the north in the Cordillera Central and from the second species to the south in the Massif de la Selle. Although these three species are related, the differences between them are of such magnitude that we have no hesitancy in describing the La Selle and Neiba series as new species. To understand the differences between the three species, we must first redescribe *C. grannus*.

Calisto grannus Bates

(Fig. 2A, ♂; Fig. 6B, ♂; Fig. 7B, ♂ genitalia)

Calisto grannus Bates, 1939. Psyche, 46:49. *Type-locality*: "Valle Nuevo, S.E. Constanza, Rep. Dom. . . . c. 7000 ft."

Male fw length 18 - 19 mm (\bar{x} = 16.0; N = 15); upfw and uphw dark brown; androconial patch very dark, covering basal two-thirds of fw; un slightly paler than up, with a fine dark postmedian line on unfw extending from the costal to the inner margin, in addition two wavy submarginal lines along the outer margin; basal portion of cell brick red, four specimens with only an orange-red blush in cell; large black ocelli between M_1 and M_3 , ringed with yellow, with two white dots, the anterior displaced anteriorly of the center, the posterior adjacent to the yellow ring; postocellar reddish blush present in six of 37 ♂; unhw reddish brown antemedian and postmedian lines and two pale irregular submarginal lines with no distinctive color between them; two frequently equal-sized ocelli black, ringed with yellow, the posterior (♂ 1.5 - 2.0 mm, \bar{x} = 1.8 mm; ♀ 1.6 - 2.0 mm, \bar{x} = 1.9 mm) in Cu_1 - Cu_2 , the anterior (♂ 1.3 - 1.6 mm, \bar{x} = 1.4 mm; ♀ 1.4 - 1.8 mm, \bar{x} = 1.5 mm) in M_1 - M_2 , each with a single central white dot; two symmetrical white dots intermediate between ocelli, one in M_2 - M_3 , the other in M_3 - Cu_1 , the former more proximal. The series of 37 ♂ agrees with the above description except for the following: one smaller ocellus in Rs - M_1 (9 ♂). These variants come from a locality whence we have a long series of typical *C. grannus*; thus we consider them slightly aberrant.

Female fw length 16 - 18 mm (\bar{x} = 17.1; N = 15); unfw and uphw generally slightly paler than males, hw infrequently tinged with orange; unfw basal portion of wing brick red, one individual with orange-red blush; un submarginal and median lines like ♂; un ocelli similar; unfw postocellar blush occurs in all but two ♀. The series of 34 ♀ agrees with the above description except for the following: unfw, one small ocellus in M_2 - Cu_1 , and another small ocellus in Rs - M_1 (1 ♀); small ocellus in Rs - M_1 (9 ♀). Again, we consider these conditions as part of the variation of *C. grannus*.

Remarks: *Calisto grannus* is primarily an inhabitant of the high uplands of the Cordillera Central in the República Dominicana (Fig. 4). Its center of altitudinal distribution is between 1400 and 2288 m, but there is a record from 1220 m (La Palma, 1 ♂). The species is most easily and abundantly encountered in the open meadows and pinewoods of the high uplands, where it is locally common. Imagines are regularly encountered feeding on the blue flowers of *Cynoglossum amabile* (Boraginaceae) and the tall white-flowered racemes of *Melilotus alba* (Fabaceae). Specimens have been collected 18° - 34° C, under conditions varying from bright and sunny to cold and overcast, even raining. The butterflies were active from 0930 to 1530 h.

Two localities deserve special comment. We have a single specimen from a La Palma, at an elevation of 1220 m, to the northwest of Constanza and more or less between that town and the Loma Rucilla records of *C. grannus*. Not only is the low elevation note-

worthy, but the fact that at La Palma we collected in a mesic deciduous-wooded but cultivated valley along a river. No pines occur in the immediate vicinity, and the habitat is distinctly different from that in the high mountains. Despite many visits to La Palma, and many *Calisto* (*hysius*, *obscura*) collected there, there is only a single *C. grannus* from that locality. The second locality (6 km SSE Constanza) is noteworthy in that, although pines are present, the collecting was done in open mesic woods along a road. In contrast to La Palma, 3 ♂ and 4 ♀ were collected here on 1.vii.1982. Two other small *Calisto* (*hysius*, *obscura*) occur syntopically here with *C. grannus*. Additionally, many hours of collecting in the Valle de Constanza at 1098 m has never yielded *C. grannus*, despite collecting in and near pinewoods.

Specimens examined (all from República Dominicana, Prov. de la Vega, and all in AS colln. except as noted): 12 km NE Constanza, 1220 m, 1 ♀; 6 km SSE Constanza, 1430 m, 3 ♂, 4 ♀; 14 km SE Constanza, 1922 m, 16 ♂, 14 ♀; 18 km SE Constanza, 1586 m, 1 ♀; 18 km SE Constanza, 2288 m, 4 ♂; 5 km NW Valle Nuevo, 2288 m, 6 ♂, 2 ♀ (FG colln.); 21 km SE Constanza, 2257 m, 2 ♀; Valle Nuevo, 25 km SE Constanza, 2105 m, 1 ♀; La Nevera, 37 km SE Constanza, 2227m, 1 ♂, 2 ♀; 13 km SE Valle Nuevo, 2074 m, 5 ♂, 3 ♀; 41 km SE Constanza, 2047 m, 3 ♀; 48 km SE Constanza, 2166 m, 1 ♂, 1 ♀; La Palma, 19 km W Jayaco, 1107 m, 1 ♂.

Calisto micrommata, new species

(Fig. 2B, paratype ♂; Fig. 6C, paratype; Fig. 7C, ♂ genitalia)

Male fw length 13 - 16 mm (\bar{x} = 14.9; N = 15); upfw and uphw dark brown without distinctive markings; androconial patch very dark brown, covering basal two-thirds of fw; unfw and unhw much paler than up, particularly submargin-margin area; unfw with a fine dark postmedian line extending from costal to inner margin; two pale brown wavy submarginal lines; subapical ocellus large, black, and ringed with yellow, ocellus with two pale white pupils, one located centrally, the other adjacent to yellow ring; postocellar red blush present; unhw with fine reddish brown antemedian and postmedian lines; two moderately irregular submarginal lines with no distinctive color between them; two small frequently equal-sized ocelli, posterior ocellus (♂ 0.8 - 1.2 mm, \bar{x} = 1.0 mm; ♀ 1.0 - 1.4 mm, \bar{x} = 1.1 mm) in Cu₁-Cu₂, and anterior ocellus (♂ 0.5 - 1.0 mm, \bar{x} = 0.8 mm; ♀ 0.8 - 1.2 mm, \bar{x} = 1.0 mm) in M₁-M₂, each with a single central white dot; two small pale white dots, anterior dot in M₃-Cu₁, posterior dot in M₂-M₃, the former the more proximal. The paratype ♂ agree with the above description except for the following: absence of unhw anterior ocellus (2 ♂). We consider these merely variants.

Female fw length 15 - 17 (\bar{x} = 16.3; N = 15); up slightly paler than in males, unhw infrequently red tinged; up slightly paler than up; upfw basal portion orange-red to brick red; up median and submarginal lines like ♂; ocelli and white dots located as in ♂; postocellar blush present (11 of 19 ♀). The ♀ agree with the above description, except for the following: absence of unhw anterior ocellus (4 ♀); an additional ocellus in fw Cu₂-2A (1 ♀). Again, we consider these casual variants.

HOLOTYPE male: REPUBLICA DOMINICANA: PROVINCIA DE LA ESTRELETA: 2 km NE Puesto Pirámide 204, 1586 m; 6.viii.1982 (A. Schwartz), *ex colln.* A. Schwartz, now in collection of Allyn Museum of Entomology, Florida State Museum.

PARATYPES: 6 ♂, 3 ♀ (AS colln.), 4 ♂, 7 ♀ (FG colln.), 5.viii.1982, from type-locality; 3 ♂ (AS colln.), 2 ♂, 1 ♀ (FG colln.), 5.viii.1982, R.D., Prov. de la Estrelleta, 1 km NE Puesto Pirámide 204, 1730 m; 1 ♀ (AS colln.), 1 ♂, 2 ♀ (FG colln.), 5.viii.1982, R.D., Prov. de la Estrelleta, 1 km SW Puesto Pirámide 204, 1890 m; 2 ♂, 2 ♀ (AS colln.), 1 ♂ (FG colln.), 6.viii.1982, same data as holotype.

Remarks: *Calisto micrommata* is known from the south range of the Sierra de Neiba (Fig. 4) at an elevation between 1586 m and 1890 m. It is primarily an inhabitant of open pinewoods, where it was the only *Calisto* collected. The species also occurs, although less commonly, in mesic deciduous forest, where it is syntopic with *C. neiba*, *C. hysius*, and *C. confusa*. Still higher, *C. micrommata* is syntopic with a species described later in the present paper. At the type-locality the butterflies were active at temperatures be-

tween 24° - 29° C and between 1030 and 1430 h. The weather on both occasions was bright and sunny. The holotype was taken with three other ♂ and two ♀ in a two-hour period from a roadside through mesic deciduous forest; slightly below this locality and in pinewoods with *Cynoglossum amabile*, we collected 10 ♂ and 10 ♀ in 15 minutes. This gives some indication of the abundance of *C. micrommata* in its preferred habitat. At two higher localities under overcast conditions (with occasional sunshine), we took three ♂ and seven ♀ in two hours and 15 minutes. We suggest that *C. micrommata* is primarily a denizen of upland pinewoods in the Sierra de Neiba, but that it does occur also in mesic deciduous forest.

Calisto sommeri, new species

(Fig. 2C, paratype ♂; Fig. 6D, paratype; Fig. 7D, ♂ genitalia)

Male fw length 16 - 19 mm (\bar{x} = 17.3; N = 15); upfw and uphw dark brown (Pl. 16C12) without distinctive markings; androconial patch prominent and extending from M_2 to 2A across the basal-discal portions of the fw cell; cell without red scales; unfw paler brown; large black ocellus ringed with yellow and with two white dots, located in subapical portion of wing and extending from M_1 to below M_3 , one dot located centrally, the other slightly posteriorly and adjacent to yellow ring; pale line passing through outer portion of cell; basal and discal lines irregular and running entire breadth of wing, the discal line the more discernible; a thin tan-brown band running parallel to the submarginal line; unhw brown and slightly darker than unfw; unhw cell dark brown with a brick red line extending across the cell, this cellular line bordered discally by an almost white line; two large black ocelli, the anterior in M_1 - M_2 (♂ 1.3 - 1.7 mm, \bar{x} = 1.5 mm; ♀ 1.4 - 1.8 mm, \bar{x} = 1.6 mm), and the posterior (♂ 1.5 - 2.0 mm, \bar{x} = 1.8 mm; ♀ 1.7 - 2.0 mm, \bar{x} = 1.9 mm) in Cu_1 - Cu_2 , each with one central off-white dot, the latter ocellus slightly larger; prominent and contrasting white dashes between ocelli, anterior dash in M_2 - M_3 and posterior dash in M_3 - Cu_1 , the former the larger and more proximal; basal and submarginal lines brick red, the latter broad and extending along the entire margin of the hw; tan-brown irregular band between the basal and submarginal lines.

The series of 37 paratypic ♂ agrees with the above description except for the following: the larger white dash is appressed to the posterior border of the anterior hw ocellus (2 ♂); bilateral absence of anterior ocellus (2 ♂); unilateral absence of anterior ocellus (1 ♂). These five variants are from localities whence long series of typical *C. sommeri* were taken; we consider them aberrant and a part of the normal variation of *C. sommeri*.

Female fw length 17 - 19 mm (\bar{x} = 18.0; N = 15); upfw and uphw generally paler than males, the up without distinctive markings except for inconsistent red tinge on uphw; un generally like ♂, including two ocelli and two interposed white dashes; unfw with large black ocellus ringed with yellow, located in subapical portion of wing and extending from just anterior to M_1 to just below M_3 , one pupillary dot located centrally, the other slightly posteriorly and adjacent to yellow ring; unhw posterior ocellus slightly larger than anterior and more proximal; unhw characters virtually same as in ♂ except for the following: un bands slightly more bold in ♂; postocellar blush in most ♀ (23 of 29) and absent in all ♂.

HOLOTYPE male: HAITI: DEPARTEMENT DE L'OUEST: Foret des Pins, 1586 m, 26.iv.1982 (A. Schwartz), *ex coll.* A. Schwartz, now in collection of Allyn Museum of Entomology, Florida State Museum.

PARATYPES: 1 ♂, 1 ♀, 13.vii.1979, Haiti, Dépt. de l'Ouest, Foret des Pins, 1525 m (AS colln.); 3 ♀ (AS colln.), 2 ♀ (FG colln.), 26.iv.1982, Haiti, Dépt. de l'Ouest, Foret des Pins, 1586 m; 6 ♂, 2 ♀ (AS colln.), 1 ♂, 1 ♀ (FG colln.), 26.iv.1982, Haiti, Dépt. de l'Ouest, 1 km NW Foret des Pins, 1556 m; 3 ♂ (AS colln.), 1 ♂, 1 ♀ (FG colln.), 28.iv.1982, Haiti, Dépt. de l'Ouest, 8 km SE Foret des Pins, 1495 m; 1 ♂, 1 ♀ (AS colln.), 28.iv.1982, Haiti, Dépt. de l'Ouest, 9 km SE Foret des Pins, 1495 m; 5 ♂, 3 ♀ (AS colln.), 8 ♂, 5 ♀ (FG colln.), 1 ♂, 1 ♀ (RWW colln.), 27.vii.1982, R.D., Prov. de Pedernales, 11 km SW El Aguacate, 1890 m; 1 ♀ (AS colln.), 3 ♂, 7 ♀ (FG colln.), 1.viii.1982, R.D., Prov. de Pedernales, 22 km SW El Aguacate, 1617 m; 7 ♂, 1 ♀ (AS

colln.), 1.viii.1982, R.D., Prov. de Pedernales, 11 km SW El Aguacate, 1890 m.

Remarks: *Calisto sommeri* occurs in the Massif de la Selle at elevations between 1497 and 1890 m. The known range straddles the Dominico-Haitian border; the low elevation is from Haiti, the high from the República Dominicana (Fig. 4). The holotype ♂ and five ♀ were collected at the southern edge of the montane village of Foret des Pins; the area was open pinewoods with scattered houses with lawns. The butterflies were feeding on *Cynoglossum amabile* but were not especially common. The T was 28° C, and the time between 1130 and 1230 h. One km northwest of Foret des Pins, *C. sommeri* was much more abundant on shaded (not sunny) short grass in pinewoods at 26° C, between 1245 and 1400 h. Travel along the road between Foret des Pins and Tiotte, still through undulating pinewoods at elevations generally around 1495 m, yielded specimens from open pinewoods with an understory of *Rubus* and ferns; the day (28.iv.1982) was overcast and cloudy (T 21° - 24° C) between 1030 and 1135 h. In these Foret des Pins uplands, *C. sommeri* occurs with *C. archebates*.

In the República Dominicana on the eastern extreme of the Massif de la Selle, *C. sommeri* was encountered at elevations between 1617 m and 1890 m, almost always in open pinewoods with *Cynoglossum amabile*, upon which the species feeds, along with an upland yellow-flowered herbaceous composite (= "dandelion"), which also serves as a food source. Two localities are on the upland plateau of the range, and the third (22 km SW El Aguacate) is on the southern face, about five km above Los Arroyos; this locality is in mesic forest and along a road through that forest. All Dominican collecting was under sunny conditions (T 26° C - 28° C), between 1115 and 1245 h. In this area, *C. sommeri* occurs without any congener in the pinewoods, but at the Los Arroyos locality, two specimens of another new species, described in the present paper, were taken.

Comparisons: *Calisto sommeri* and *C. micrommata* can be readily recognized by the presence of two ocellate markings on the unhw. *Calisto arcas* and *C. grannus* are the presently named Hispaniolan species with two ocelli on the unhw. *Calisto arcas* is not related to the remaining biocellate species (Munroe, 1950) and need not concern us further. *Calisto grannus* belongs to Munroe's *hysius* subgroup A. *Calisto sommeri* and *C. micrommata* demonstrate typical *hysius* group characters; thus, these new species are considered *hysius* group (subgroup A) members.

It is pertinent to compare the two new species with their closest relative, *C. grannus*. The three species can be easily distinguished from other *Calisto* (except *arcas*) by the presence of two ocelli on the unhw. Diametrical measurements of the hw ocelli result in obvious size differences. Female anterior and posterior ocelli means are slightly greater than those of males for the three species. Posterior ocelli are larger than anterior ones in all species. The largest ocelli are in *C. sommeri*; *C. grannus* ranks second, and *C. micrommata* third. Posterior ocelli were larger than anterior ocelli in *C. sommeri* and *C. micrommata*; *C. grannus* by inspection appears to have the ocelli about equal in size. *Calisto micrommata* hw ocelli are virtually half the size of those of the two other species; this character easily distinguishes *C. micrommata* from *C. grannus* or *C. sommeri*.

Interposed unhw white markings characterize the three species. In *C. micrommata*, the white dots are barely discernible, whereas in *C. grannus* the white dots are distinct. *Calisto sommeri* has prominent and contrasting white dashes (rather than dots) between the ocelli. In all three species, these white markings are located in M_2 - M_3 and M_3 - Cu_1 . The un median and submarginal lines are similar; however, these are bolder in *C. micrommata* and *C. sommeri* than in *C. grannus*. *Calisto sommeri* has a more discernible tan-brown irregular band between the submarginal lines.

The three species have red, orange, to brick red scales in the fw cell, and a red blush posterior to the fw ocellus. The latter more frequently occurs in females than in males. Such a postocellar blush in both sexes is a distinguishing character of *C. hysius*. The presence of a red blush on the up is not constant for any of the species. Observations indicate that this is not a satisfactory species-character in other Hispaniolan *Calisto*, and such is the case in this group of species.

Of the three species, it seems likely that *C. grannus* and *C. micrommata* are most

closely related. Both occur on the north island (Schwartz, 1980) and are rather similar; *C. sommeri*, located on the south island, is an isolated population of *Calisto* with two ocelli on the unhw.

Etymology: *Calisto sommeri* is named in honor of William W. Sommer; he collected one of the first specimens and accompanied us during part of the summer of 1981. It is indeed a pleasure to name this distinctive species for him. The name *micrommata* is from the Greek, meaning "with small eyes," in allusion to the very small unhw ocelli.

We wish to point out that the gender of the name *Calisto* is apparently feminine. Thus we have used feminine suffixes for the adjectival trivial names proposed by us in the present paper. The names *hysius*, *tragi*, *lyceius*, *eleleus*, and *grannus* are all apparently masculine; at least the first four should be changed to agree in gender with feminine *Calisto*.

Calisto tragi has been known from only the type-series (one ♂ and five ♀) from La Visite on the Massif de la Selle, between 5000 and 7000 ft., in Haiti (Bates, 1935; Munroe, 1950:220). In 1981 and 1982, we collected series of inconspicuous and moderately large *Calisto* in the Sierra de Baoruco, to the east of the Massif de la Selle, in the República Dominicana. We assumed that these were *C. tragi*. But examination of these specimens indicates that most are *C. eleleus*, formerly unknown from the República Dominicana, but known from the Massif de la Selle in Haiti. The two species differ in the larger size and tiny oval unhw ocellus with a basal white dot in *C. eleleus* (as well as in male genitalia), in contrast to a round unhw ocellus with one white dot centrally placed in *C. tragi*. Thus, of our supposed Dominican *C. tragi*, only 5 are correctly assigned to that species; the balance is *C. eleleus*. Although the populations discussed below are not in our opinion related to *C. tragi* (or to *C. eleleus*), it is necessary to discuss *C. tragi* to understand the former. Unfortunately, our series of *C. tragi* is badly worn and contains only 1 ♀.

In 1982 we collected a series of brightly colored *Calisto* on the south range of the Sierra de Neiba; these are distinctive, among other ways, in the scalloped outer margins of the wings. We were surprised to discover that we had collected two other individuals, similar to but not identical with these Sierra de Neiba specimens, in the Dominican portion of the Massif de la Selle. These two populations are distinct from all other Hispaniolan *Calisto* and from each other, in ways that we consider to be at the specific level. Before describing them, we must first redescribe *C. tragi*.

Calisto tragi Bates

(Fig. 3A, ♂; Fig. 6E, ♀)

Calisto tragi Bates, 1935. Occ. Papers Boston Soc. Nat. Hist., 8:236. *Type-locality:* "La Visite, in the La Selle Range, 5000 to 7000 ft.," Haiti.

Male fw length 16 - 19 mm (\bar{x} = 17.7; N = 4); upfw and uphw dull brown, lighter toward the outer margin; androconial patch dark brown, covering bases of spaces between M_2 to 2A: un pale brown, fw with moderately sized black subapical ocellus ringed with pale yellow, with central and basal white dots; postmedian line barely visible; basal portion (including cell) of fw with orange suffusion; unhw antemedian, postmedian, and submarginal lines fairly well developed to almost entirely obscured; hw ocellus small, round, and ringed with pale yellow, with a central white dot.

Female fw length 19 mm (N = 1). Unfortunately, only one worn female was collected and a description of details of color and pattern is not possible. Insofar as determinable, the specimen does not differ from the ♂ described above.

Remarks: There is a specimen of *Calisto* from 6 km SSE Constanza, Prov. de la Vega, R.D., a known *C. grannus* locality, which we tentatively regard as related to *C. tragi*. This specimen is a worn ♀, and we originally considered it *C. grannus*. It does not, however, resemble that species closely but seems more like *C. tragi*. Since *C. tragi* has been known only from the high uplands of the Massif de la Selle the south island, not from any material on the north island, and this specimen is from the Cordillera Central on the north island, we are reluctant to assume that *C. tragi* or a relative thereof

occurs on the north island. We only point out here that another species of *Calisto* presumably occurs in the Cordillera Central. Our concept of *C. tragi* has been greatly aided by a photograph of the holotype, taken for us by Arthur C. Allyn.

Specimens examined: Rep. Dom., Prov. de Pedernales, Las Abejas, 12 km NW Aceitillar, 1129 m, 2 ♂, 1 ♀ (AS colln.); Rep. Dom., Prov. de Pedernales, 11 km NW Aceitillar, 1220 m, 1 ♂ (AS colln.), 1 ♂ (FG colln.).

Calisto clydoniata, new species

(Fig. 3B, paratype ♂; Fig. 6F, paratype; Fig. 7E, ♂ genitalia)

Male fw length 16 - 18 mm (\bar{x} = 16.9 mm; N = 10); upfw and uphw dark brown (Pl. 16C12); upfw with large androconial patch occupying most of basal two-thirds of wing; brick red blush infrequently present at outer margin of androconia, costa, and outer margin of uphw; hw outer margin with scalloped edge, concavities in this edge faintly lined with yellow; anal lobe prominent; unfw dark brown (Pl. 16A12); inner margin to base of 2A fuscous; two dull brown submarginal bands; submarginal portion of wing golden brown (Pl. 14L10); small black ocellus ringed with golden brown, with a central whitish dot; unhw dull brick red (Pl. 15A11) with anal margin golden yellow (Pl. 13K7); brick red irregular antemedian, postmedian, and submarginal lines; small ocellus with barely discernible yellow ring and a central white dot, ocellus located in Cu_1 - Cu_2 ; four whitish dots in postdiscal portion of wing paralleling the outer margin in Rs - M_1 , M_1 - M_2 , M_2 - M_3 , and M_3 - Cu_1 .

Female fw length 17 - 18 mm (\bar{x} = 17.6 mm; N = 10); upfw and uphw dark brown like males; up brick red blush more distinct, particularly on hw outer margin; hw outer margin with scalloped edge, concavities faintly lined with yellow; anal lobe conspicuous; unfw dark brown like males; inner margin to base of 2A fuscous; two dull brown submarginal bands present, bands not so bold as in males; unhw color and pattern like males; ocellus, by inspection, smaller, in Cu_1 - Cu_2 , with golden brown ring and central white dot; four whitish spots present, but more inconspicuous than in males.

HOLOTYPE male: REPUBLICA DOMINICANA: PROVINCIA DE LA ESTRELETA: 1 km SW Puesto Pirámide 204, 1891 m, 5.viii.1982 (F.Gali), *ex colln.* F. Gali, now in Allyn Museum of Entomology, Florida State Museum.

PARATYPES: 7 ♂, 1 ♀ (AS colln.), 4 ♂, 1 ♀ (FG colln.), same data as holotype; 3 ♂, 2 ♀ (AS colln.), 1 ♂, 5 ♀ (FG colln.), 1 ♂, 1 ♀ (RWW colln.), same locality as holotype, 6.viii.1982; 3 ♂, 2 ♀ (AS colln.), 2 ♂ (FG colln.), R.D., Prov. de la Estrelleta, 2 km NE Puesto Pirámide 204, 1586 m, 6.viii.1982.

Remarks: The holotype, 11 other ♂ and two ♀ were collected on a road through deciduous upland forest on the south range of the Sierra de Neiba (Fig. 5); collecting was carried on between 1200 - 1400 h (T 27 ° C). The day was generally overcast with only very occasional sun. Here, *C. clydoniata* occurs with *C. galac*, with the former the more common. Individuals were collected as they flew relatively high (1.5 m) along the edge of the road in shrubby growth; when alarmed, they regularly escaped into the forest, flying erratically but with determination. On 6.viii at the type-locality, between 1145 - 1300 h (T 23 ° C), the weather overcast with occasional sun, we secured five ♂ and eight ♀. At the second locality (2 km NE Puesto Pirámide 204) on 6.viii, in deciduous forest, we collected between 1030 - 1130 h (T 24 ° C) and 1330 - 1430 h (27 ° C); the day was bright and sunny during both periods. Five ♂ and two ♀ were secured here, in company with *C. neiba*, *C. confusa*, *C. hysius*, and *C. micrommata*, the last species the least common. *Calisto clydoniata* has been collected only in deciduous forest at elevations of 1586-1891 m, to which it seems admirably adapted behaviorally.

Calisto clenchi, new species

(Fig. 3C, holotype ♀)

Male unknown.

Female fw length 19 mm (2 ♀); upfw and uphw dark brown (Pl. 15A1), slightly tinged

with red on inner margin of fw, costa of hw, and on anal lobe; unfw dark brown; submargin and outer margin olivaceous (Pl. 1414); black subapical ocellus ringed with yellow, with a central white dot; inner margin to base of 2A fuscous; hw with scalloped edge; unhw dark olivaceous (Pl. 14K6), with a thin putty (Pl. 10B4) irregular marginal cell line; lower outer margin and submargin putty; anal lobe very large and brick red; ocellus small and inconspicuous, inner ring yellow and outer ring brick red, with a central white dot, which is so large that it virtually fills the ocellus.

HOLOTYPE female: REPUBLICA DOMINICANA: PROVINCIA DE PEDERNALES: 22 km SW El Aguacate, 1586 m, 1.viii.1982 (A.Schwartz), *ex colln.* A. Schwartz, now in collection of Allyn Museum of Entomology, Florida State Museum.

PARATYPE: ♀, same data as holotype (FG colln.).

Remarks: The holotype and paratype were secured at the same locality (Fig. 5), along a road through cut-over and hurricane-damaged deciduous forest. A few other individuals were seen, but the road-edge was exceptionally shrubby and brushy, and the butterflies used the same escape tactics as *C. clydoniata*. Collecting was carried on between 1030 - 1140 h under bright and sunny conditions (T 30° C). At this same locality we took specimens of *C. sommeri* and *C. eleleus*.

Comparisons: With descriptions of these two species of *Calisto*, it is pertinent to compare *C. clydoniata* with *C. clenchi*. These species both have a similar scalloped edged hw; this character was previously unknown in *Calisto*. Because of the scalloped edges of the hw, it is unquestionable that they are undescribed species and apparently are derived from a common stock. Yet their characters reveal that they are unequivocally different populations. In addition, specimens of *C. tragi* were collected in the general region of *C. clenchi*; thus it is pertinent also to compare these two species.

Calisto clydoniata is quite similar to *C. clenchi* in up coloration. Both species are dark brown with distinct patches of brick red blush on the up. The hw outer margin is scallop-edged, with the depressions faintly lined with yellow. Interestingly, the anal lobe in both species is similarly prominent; however, it is more conspicuous in *C. clydoniata*. *Calisto clydoniata* is strikingly bold in coloration and pattern on the un. Unfw pattern is similar in both species; however, the submarginal portion of the wing is golden brown in *C. clydoniata* and olivaceous in *C. clenchi*. The unhw coloration is most distinctive in both species. *Calisto clydoniata* is dull brick red with a conspicuous golden yellow anal margin, whereas *C. clenchi* is dark olivaceous with thin putty lower outer and submarginal areas. *Calisto clenchi* has a small inconspicuous ocellus on the unhw and has an inner yellow and outer brick red ring with a central white dot, which virtually fills the ocellus. *Calisto clydoniata* has a small ocellus on the unhw with a barely discernible yellow ring and a central white dot and additionally has four whitish dots, parallel to the outer margin, in the discal portion of the wing. *Calisto clenchi* is known from the south island, whereas *C. clydoniata* has been taken only on the north island. Although the airline distance between the two species is less than 50 km, it is not surprising that *C. clydoniata* and *C. clenchi* are distinctive species.

Calisto clenchi and *C. tragi* may well occur syntopically. *Calisto clenchi* is very distinct from *C. tragi*; the former is a large and dark brown butterfly, whereas the latter is pale brown and moderately sized. *Calisto tragi* does not have a prominent anal lobe, scalloped edged hw, and is not olivaceous on the hw outer and submarginal areas. *Calisto tragi* has two white dots in the unfw ocellus, whereas *C. clenchi* has one. In essence, *C. tragi* gives an overall appearance of a simply-patterned insect and *C. clenchi* that of a bold and distinctive one.

Etymology: The name *clydoniata* is from the Greek, meaning "a little wave or ripple," in allusion to the scalloped edges of the wings of this species. *Calisto clenchi* is dedicated to the memory of the late Harry K. Clench; he not only encouraged the work of the senior author on Hispaniola but did so in an enthusiastic and delightfully pedagogical manner. Since one of his early interests was the genus *Calisto* (see his seventh paper, published in 1943, and his twelfth paper, published in 1944), it gives both of us great pleasure to name this species in his honor.

GENITALIA

We have held off until last a discussion of the ♂ genitalia. All species treated and named herein are members of Bates's (1935) *hysius* group. Bates illustrated the ♂ genitalia of *C. hysius* (Fig. 10). Apparently this group is composed, at least as far as ♂ genitalia are concerned, of members that are quite closely related or that have diverged from each other only slightly insofar as ♂ genitalia are concerned but are strikingly different in un patterns and many details of coloration. Thus, examination of our Fig. 6 and comparison of that figure with Bates's illustration of the ♂ genitalia of *C. hysius* show that the differences between species in this complex are generally ones of degree, and not ones of distinctively different configurations and structures; the reader should note the differences between the ♂ genitalia of *C. eleleus* and *C. pulchella* (both Hispaniolan species belonging to other of Bates's groups) in comparison with those of the species described herein. Since the *hysius* group contributes most members to the Hispaniolan *Calisto* explosion, it seems likely that although the appearances of species may be distinctive, the differences on ♂ genitalia are much less so, in many species. We are not distressed by this situation; it is a matter of evolution of one complex of characters more rapidly than that of another. Likewise, what to our eyes appear to be minor genitalic differences may well be of extreme importance in species-separation.

Of the ♂ genitalia, those of *C. micrommata* are the most distinctive. The uncus is elongate and less beak-like than in the other species, and the pretegumental groove is relatively shallow. The penis is quite sinuate, in contrast to the penes of other species, wherein the penis varies from bowed to short and stout. The saccus in *C. micrommata* is about the same size and shape as that of the other species, although that of *C. clydoniata* appears to be somewhat carinate. The uncus in *C. micrommata* equals slightly less than the total dorsal length of the tegumen, but in other species, the unci are short (less than the dorsal length of the tegumina), and are much more beak-like and decurved at the apices. Only *C. clydoniata* appears to have gnathoi; Bates showed these structures in *C. hysius* but they are apparently also absent in *C. eleleus*, *C. pulchella*, and Jamaican *C. zangis*, and weakly developed in Cuban *C. herophile* and *C. smintheus*.

Obviously, we have no doubts that the taxa reported and named herein are "good" species. All the evidence (morphological, zoogeographic, genitalic) makes us secure in the distinctness of these taxa. There is very little (if any) possibility that we are dealing with forms or seasonal variation, or infrasubspecific categories. Return visits during 1983 to localities where we have previously taken these new species yielded still more identical material; one of these visits was in the autumn, so that these taxa are not merely summer variants. We still do not have a ♂ *C. clenchi*; thus, that species may well be found to be a south island subspecies of *C. clydoniata*. But the distinct differences in the ♂ genitalia of *C. micrommata* in comparison with those of *C. grannus* and *C. sommeri*, makes the conspecificity of *C. clenchi* with *C. clydoniata* less likely.

ACKNOWLEDGMENTS

We acknowledge with many thanks the field assistance of A.A. Gineika, S.C. Rhodes, W.W. Sommer, and R.W. Wisor. Wisor also has allowed us to examine *Calisto* in his collection. In the República Dominicana, we were welcomed with courtesy and hospitality at the headquarters of the Alcoa Exploration Company at Cabo Rojo by Alfredo Lebrón and Víctor García, both of whom treat visiting scientists enthusiastically; we are very grateful for their many kindnesses. A photograph of the holotype of *C. tragius* was taken for us by Arthur C. Allyn; to him also we tender our thanks.

LITERATURE CITED

- Bates, M. 1935. The satyrid genus *Calisto*. Occ. Papers Boston Soc. Nat. Hist., 8:229-248.
 ———. 1939. Notes on butterflies from Hispaniola. *Psyche*, 44(2-3):43-51.

- Clench, H.K. 1943. Some new *Calisto* from Hispaniola and Cuba (Lepidoptera: Satyridae). *Psyche*, 50:23-29.
- Maerz, A., and M.R. Paul. 1950. A dictionary of color. McGraw Hill Book Co., Inc., New York: 208 pp.
- Munroe, E.G. 1950. The systematics of *Calisto* (Lepidoptera, Satyrinae) with remarks on the evolutionary and zoogeographic significance of the genus. *J. New York Entomol. Soc.*, 58(4):211-240.
- Riley, N.D. 1975. A field guide to the butterflies of the West Indies. New York Times Book Co., New York, 224 pp.
- Schwartz, A. 1980. The herpetogeography of Hispaniola, West Indies. *Stud. Fauna Curacao and Carib. Is.*, 189:86-127.
- _____. 1983a. A new Hispaniolan *Calisto* (Satyridae). *Bull. Allyn Mus. Ento.*, 80:1-10.
- _____. 1983b. Haitian butterflies. *Mus. Nac. Hist. Nat. Santo Domingo*, 69 pp.

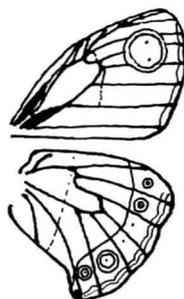


Figure 1. *Calisto neiba*, holotype ♂; underside

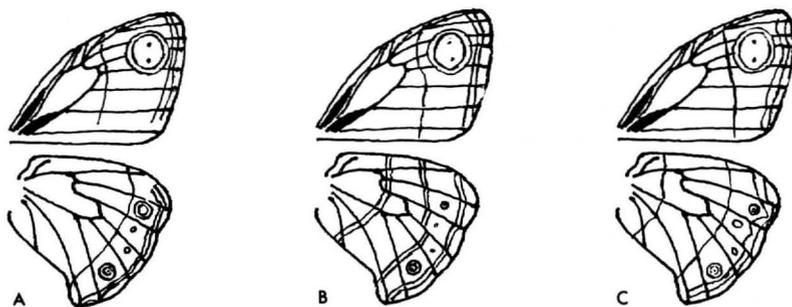


Figure 2. A, *Calisto grannus*, ♂, AS 5943; B, *C. micrommata*, paratype ♂, AS 8627; C, *C. sommeri*, paratype ♂, AS 7595; undersides.

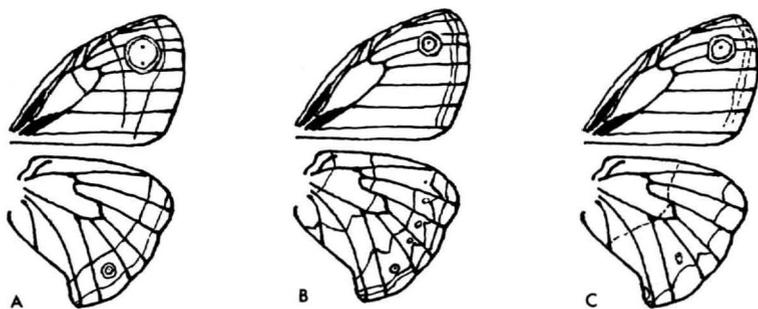


Figure 3. A, *Calisto tragius*, ♂, AS 6288; B, *C. clydoniata*, paratype ♂, AS 8658; C, *C. clenchi*, holotype ♀; undersides.

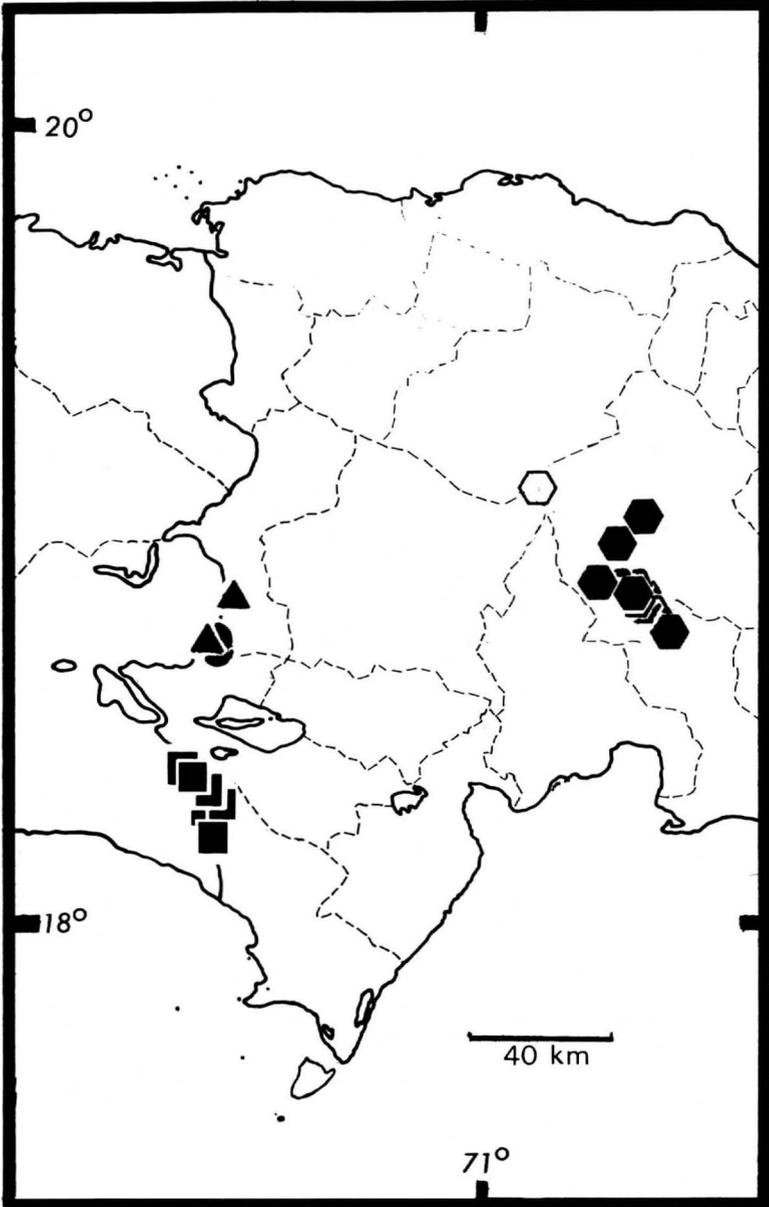


Figure 4. Map of west-central Hispaniola, showing the known ranges of four species of *Calisto*, as follows: triangles, *C. neiba*; hexagons, *C. grannus*; circles, *C. mirommata*; squares, *C. sommeri*. The open symbol for *C. grannus* represents the specimens from Loma Rucilla.

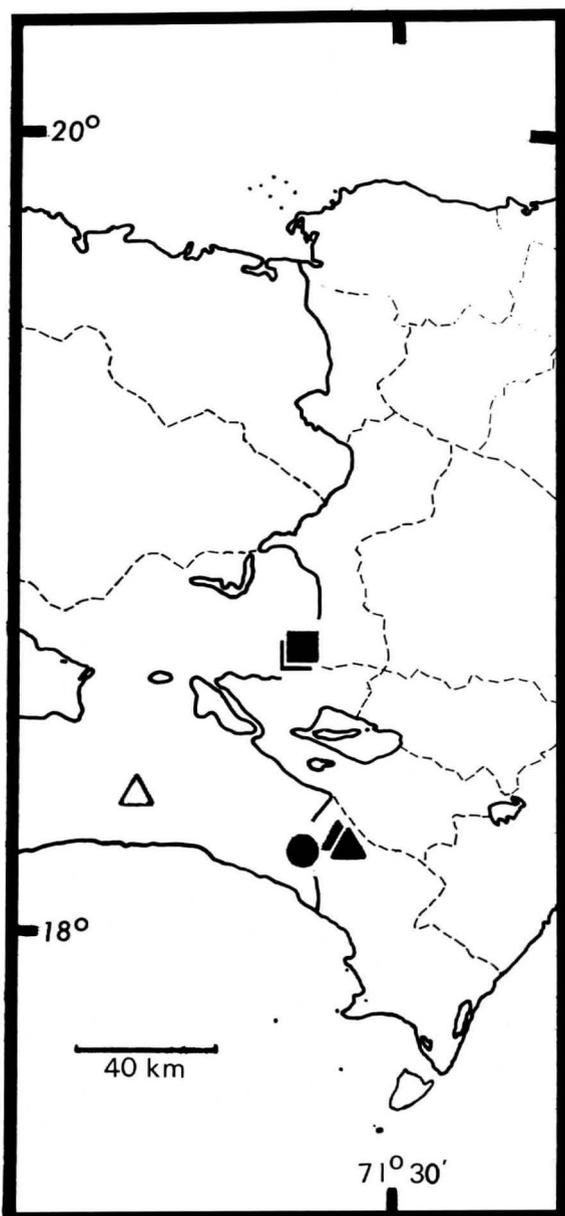


Figure 5. Map of west-central Hispaniola, showing the known ranges of three species of *Calisto*, as follow: triangles, *C. tragius*; squares, *C. clydoniata*; circle, *C. clenchi*. The open triangle is the type-locality of *C. tragius*.

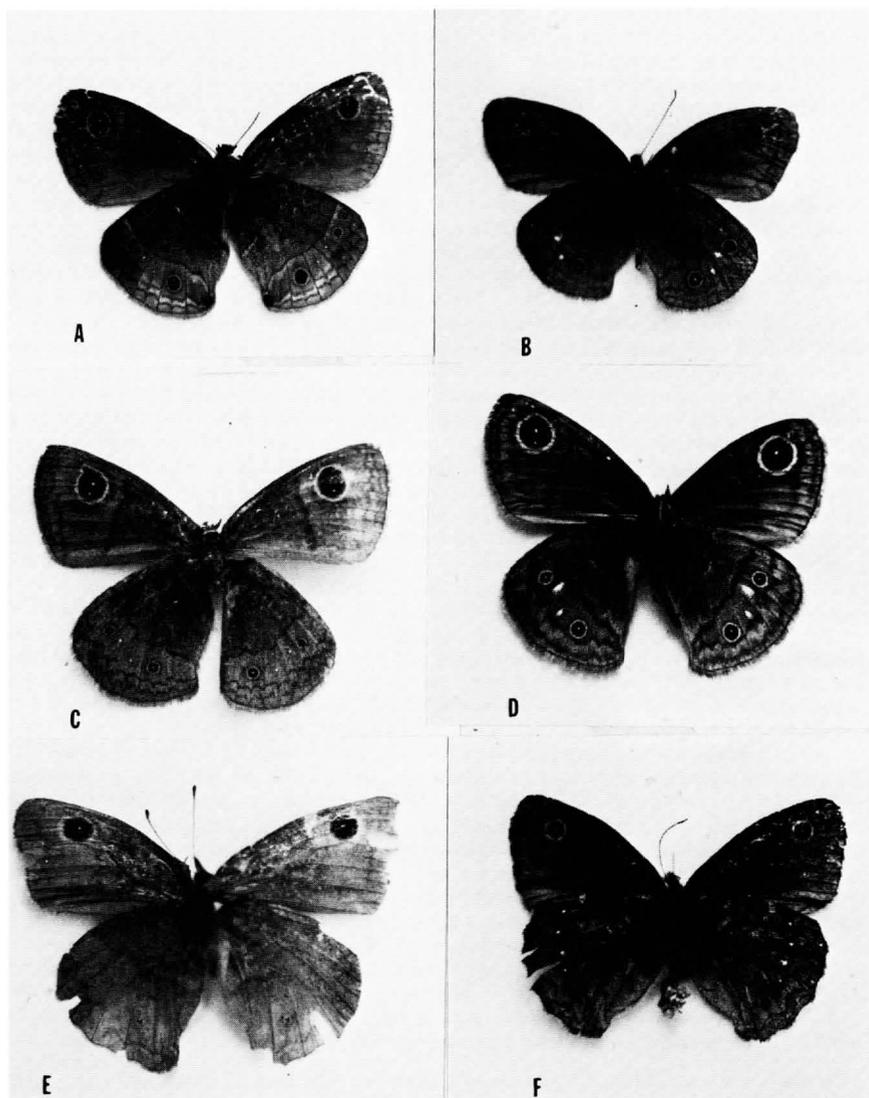


Figure 6. Undersides of 6 species of *Calisto*, as follow: A, *C. neiba*, paratype, FG 905; B, *C. grannus*, ♂, FG 271; C, *C. micrommata*, paratype, FG 883; D, *C. sommeri*, paratype, FG 148; E, *C. tragijs*, ♀, FG 804; F, *C. clydoniata*, paratype, FG 937.

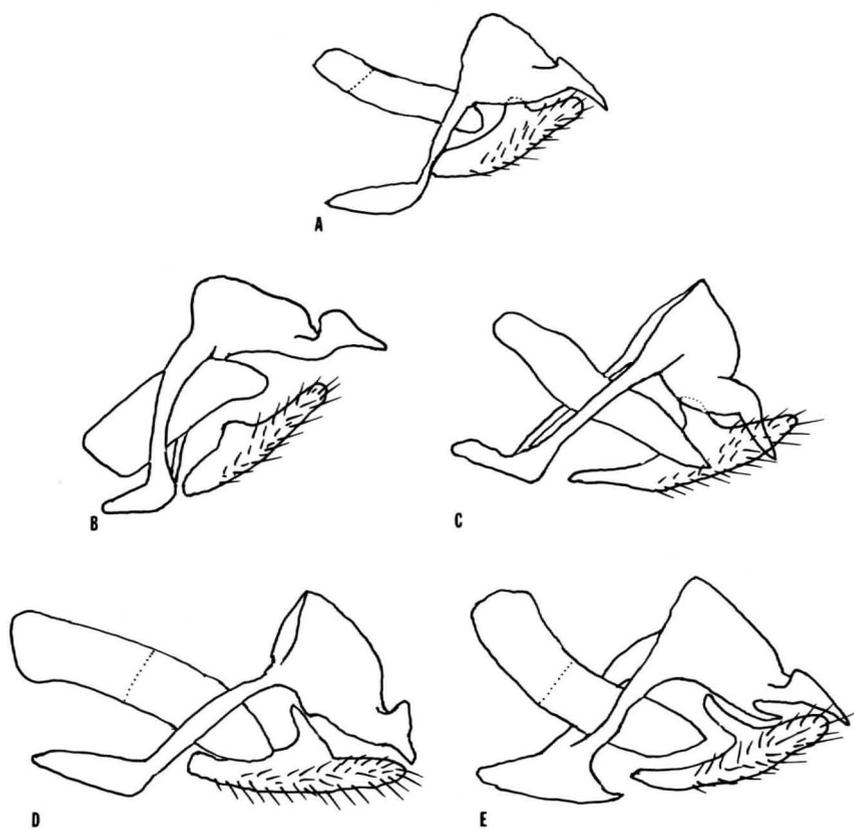


Figure 7. Male genitalia of 5 species of *Calisto*, as follow: A, *C. neiba*, AS 6646; B, *C. grannus*, AS 5971; C, *C. micrommata*, AS 8585; D, *C. sommeri*, AS 8366; E, *C. clydoniata*, AS 8600.

This public document was promulgated at a cost of \$702.00 or \$1.17 per copy. It makes available to libraries, scholars and all interested persons the results of researches in Entomology.