LEPIDOPTERA

BUTTERFLIES OF GUAM

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We procured 14 species of butterflies in Guam in 1936, whereas only 10 species are known in Hawaii. Some of the species in Guam are abundant, a few of them rather scarce. They are mostly immigrants, possibly some of recent arrival, as only three or four have been previously recorded. Most Guam butterflies are known elsewhere, two of the species occurring in Hawaii. Most of the species were determined by comparison with named specimens in the Philippine Bureau of Science, Manila, and the collections at Lingnan University, Canton, China. Three species were determined by Dr. Guy A. K. Marshall, Director of the Imperial Institute of Entomology, London.

Family PAPILIONIDAE

1. Papilio xuthus Linnaeus, Syst. Nat. 1(2) : 751, 1767.

Ritidian Pt., April 15, 22, Bryan; Tarague, April 19, Bryan; Inarajan, May 1, Bryan, May 7, Swezey; Piti, May 16, Usinger; Tarague, May 17, Swezey; Mt. Alifan, May 26, Swezey; Tumon, May 30, Swezey; Machanao, June 2, Swezey; Barrigada, July 22, Swezey; Ritidian Pt., Aug. 6, Swezey; Dededo, Aug. 11, Sept. 7, Swezey; Fadian, Aug. 19, Swezey; Piti, Sept. 12, 18, Swezey. Some were reared from caterpillars found on orange and on *Triphasia.*

This is the only swallowtail butterfly in Guam. It has a wide range in the Orient, from India through China to Korea, Japan, Formosa, Ryukyu Islands, Bonin Islands to the Philippines. Its caterpillars feed on citrus foliage. Some anonymous life history notes are given under the title "Protective Coloring" [Guam Recorder 6(12) : 230, 1930] ; the scientific name is not given. It was collected by Fullaway in 1911 and Schultze recorded it from Guam (Philippine Jour. Sci. 28 : 567, 1925). It is abundant now. Sometimes the butterflies may be seen clustered by the hundreds at road pools or muddy spots. (See figure in Hawaiian Planters' Record 44(3) : 168, 1940.) The large green caterpillars are more often found on *Triphasia trifoliata,* a thorny shrub or small tree, than they are on orange trees. We did not find them so abundant on orange as to be considered a pest.

FAMILY NYMPHALIDAE

2. **Danaida plexippus** (Linnaeus).

Papilio plexippus Linnaeus, Syst. Nat., 10th ed., 471, 1758.

Danaida plexippus (Linnaeus) Walker, Ent. Mo. Mag. **25**: 187, 1914. Poulton, Ent. Soc. London, Trans., 453, 1928; B. P. Bishop Mus., Bull. **114**: 299, (1934) 1935.

Ritidian Pt., April 15, 22, Bryan; Mt. Alifan, May 4, 26, June 19, Swezey; Fadian, Sept. 18, Swezey; Piti, Sept. 17, Swezey; Orote Peninsula, Sept. 27, Swezey; Yigo, Oct. 21, Swezey. The caterpillars were most numerous in a weedy clearing on Mt. Alifan.

This is the widespread American species known as the monarch or milkweed butterfly. There has been confusion in literature because various names have been used for it, particularly *archippus* Fabricius and *plexippus* Linnaeus. It has finally been considered that *plexippus* Linnaeus is the correct name as is explained by N. D. Riley (Ent. Soc. London, Trans., 454, 455, 1928). Where the name *plexippus* has been used for the related Oriental butterfly, *genutia* Cramer should be used.

The monarch has spread from America across the Pacific to the various island groups following the spread of the milkweed (*Asclepias curassavica*) on which its caterpillars feed. They feed on any species of *Asclepias* or related plants, but *A. curassavica* has been the particular species which in historical times spread over the Pacific area. This weed is abundant in Guam, along roadsides and in waste land and fields, sometimes forming dense stands almost acres in extent. Correspondingly the butterfly is abundant. As it is a common species, we paid little attention to it.

3. **Euploea eleutho** (Latreille and Godart).

Danais eleutho Latreille and Godart, Encycl. Meth. 9(2), Suppl. (Guam).

Danais eleutho Latreille and Godart, Quoy and Gaimard, Freycinet Voy., 554, pl. 83, fig. 2, 1824.

Euploea eleutho (Latreille and Godart) Schmeltz, Verh. Ver. Nat. Unterh., Hamburg 2: 180, 1876.

Ritidian Pt., April 15, Bryan; Agana, May 4, Usinger; Machanao, June 30, Swezey; Fonte Valley, Aug. 7, Swezey.

This butterfly was apparently originally described from Guam. Only a few were collected in 1936. We did not find its caterpillar, nor its food plant. It was collected by Fullaway in 1911.

4. **Euploea (Salpinx) leucostictos** subspecies **kadu** Eschscholtz.

Euploea leucostictos Gmelin, Linn. Syst. Ent., 13th ed. **1**(5): 2289, 1788 (Java).

Euploea kadu Eschscholtz, Kotzebue, Voy. Explor. South Seas 3 : 210, fig. 15, *a, b,* 1821 (Guam).

Euploea (*Salpinx*) *kadu* Eschscholtz, Kershaw, Butterflies of Hong Kong, 14, 1907.

Euploea kadu Eschscholtz, Fruhstorfer, Seitz Gross-Schmetterlinge der Erde **9** : 262-264, 1910.

Talofofo, April 4, Bryan; Ritidian Pt., April 15, Bryan; Agana Swamp, May 4, Usinger; Inarajan, May 7, Swezey; Tarague, May 17, Swezey; Machanao, June 4, 30, Swezey; Barrigada, July 6, Swezey; Fadian, August 19, Sept. 18, Swezey; Asan, Aug. 22, Swezey; Orote Peninsula, Aug. 27, Swezey; Yigo, Oct. 21, Swezey; Ylig Valley, Nov. 18, Swezey.

For the new combination of name as given above, I am indebted to R. L. Usinger, who worked it out from literature at the California Academy of Sciences. The species *leucostictos* was described from Java, and according to Fruhstorfer has several variations, and ranges from farther India, to the Nicobars, Sunda Islands, and Formosa. *Kadu* was described from Guam, and according to Matsumura has been taken in Formosa and the Ryukyu Islands. F. X. Williams reared a specimen from *Ficus retusa* at Los Banos, Philippines, June 28, 1921.

We found this fine blue butterfly fairly common on forest trails in Guam. It was reared on only one occasion. A black caterpillar was found on leaves of a broad-leaved *Ficus* at the Asan reservoir, August 22. It formed a chrysalis in a few days, and the adult issued September 3. Our material was identified by comparison with a specimen labelled "*Salpinx kadu* Esch." at Philippine Bureau of Science, Manila. The description of *kadu* by Eschscholtz is apparently from the male, although it is not so stated. Our Guam material was of both sexes. The color and spotting is about the same in both sexes, but Eschscholtz's description of the widely curved backward extension of the inner margin of the forewing so that it covers a considerable portion of the costal part of the hindwing applies only to the male. There is no such expansion of the inner margin of the forewing in the female, it being nearly straight. Also, the female hindwing does not have the large costal pale area of the male where covered by the expansion of the forewing.

5. **Hypolimnas bolina** (Linnaeus).

Papilio bolina Linnaeus, Syst. Nat., 10th ed., 479, 1758.

Hypolimnas bolina (Linnaeus) Waterhouse, Ent. Soc. London, Trans., 493, 1904. Poulton, Ent. Soc. London, Trans., 460, 1928; B. P. Bishop Mus., Bull. **114** : 300, (1934) 1935.

Inarajan, March 28, Bryan; Talofofo, April 1, Bryan; Ritidian Pt., April 15, Bryan; Mt. Alifan, June 27, Swezey; Barrigada, July 22, Swezey; Piti,

July 30, Sept. 17, Swezey; Ritidian Pt., Aug. 6, Swezey; Yigo, Oct. 21, Swezey. Five females and 11 males.

This is a widely distributed butterfly in the Pacific, it or some of its forms being known from most groups of Pacific islands within the tropics, even as far north as Fanning and Wake, but not yet known in Hawaii. It also occurs in New Zealand, Australia, the Philippine Islands, China, India, and Japan. We found it very common in Guam, especially along forest roads and trails. No caterpillars were found, hence its host plant in Guam was not learned.

6. Hypolimnas anomala (Wallace).

Diadema anomala Wallace, Ent. Soc. London, Trans., 285, 1869.

Hypolimnas anomala (Wallace) Fruhstorfer, Seitz Gross-Schmetterlinge de Erde 9: 542-543, 1912.

Ritidian Pt., April 22, Bryan; Tarague, May 17, Usinger; Mt. Alifan, May 26, Swezey; Machanao, June 4, Swezey; Barrigada, July 22, Swezey; Ritidian Pt., Aug. 6, Swezey; Piti, Sept. 4, Swezey; Orote Peninsula, Sept. 27, Swezey. Twenty specimens, mostly reared.

This butterfly was determined by comparison with specimens in the Bureau of Science, Manila. It was described from Java and Malacca.

This is another abundant butterfly in Guam. Its caterpillars feed on *Pipturus argenteus,* a small tree of the forests. In one place on Mt. Alifan, they were so numerous as to defoliate the trees, and apparently had been doing this for one brood after another, so that the trees were badly injured. A butterfly was observed ovipositing on the underside of a leaf. The 360 eggs were laid in a compact cluster of one layer. At Machanao, a butterfly was observed at rest near another cluster which contained 631 eggs. On the same tree another female was ovipositing, and the cluster contained somewhat fewer eggs.

The caterpillars feed gregariously for a time, eventually becoming scattered when nearly full grown. They reach a length of 35 to 40 mm. They are black and very spiny, the head orange brown, and the eyes black. There are two long (4 mm.) spiny black rigid upright somewhat diverging projections on the top of the head. Each segment of the body has a transverse row of spiny upright yellow tubercles 2 mm. long, about six to eight per segment, those on the first segment less developed, only two on the last segment backwardly projecting. Legs black. Spiracles oval, black.

The chrysalis is suspended on the underside of some appropriate object. They were quite numerous on the underside of stems of dead coconut leaves of adjacent trees. The chrysalis is about 20 mm. in length. It is testaceous with rows of sharp black tubercles on dorsum, and black lines showing the wing venation.

7. **Hypolimnas octocula** subspecies **marianensis** Fruhstorfer.

Diadema octocula Butler, Ann. Mag. Nat. Hist., IV, 3: 19, pl. 9, fig. 5, 1869.

Hypolimnas octocula subspecies *marianensis* Fruhstorfer, Seitz Gross-Schmetterlinge der Erde 9: 554-555, 1912.

Piti, from hibiscus at residence, Oct. 17, Swezey.

The species *octocula* was described from "Tologu" which Wallace suggested might be Gilolo.

The subspecies was named for the Marianas Islands. I secured but a single specimen, which was determined for me by Dr. Guy A. K. Marshall.

8. **Issoria egistina** (Latreille and Godart).

Argynne egestina Latreille and Godart, Encycl. Meth. 9, Suppl.: 816-817, 1824. Quoy and Gaimard, Voy. autour du Monde, 256, pl. 83, fig. 4, 1824 (Guam).

Atella egistina (Latreille and Godart) Wallace, Ent. Soc. London, Trans., 4: 343, 1869.

Issoria egistina (Latreille and Godart), Fruhstorfer Seitz Gross-Schmetterlinge der Erde 9: 473-475, 1912.

Ritidian Pt., April 22, Bryan; Yona, April 29, Bryan; gully near Mt. Chachao, June 16, Usinger, Sept. 22, Swezey; Piti, May 23, Sept. 4, Swezey.

This butterfly was described from Guam. I am indebted to R. L. Usinger for looking up the literature on it at the California Academy of Sciences. It was not possible to determine which authors should get credit for the species, as each group of authors (Latreille and Godart, and Quoy and Gaimard) attributes the species to the other group. Each group has given a description of the species, and the publication of each was in the same year 1824. Fruhstorfer, in the above citation, has considerable discussion of the different species of *Issoria* related to *egistina* and seems to consider them all as subspecies.

We found it rather rare, though quite widely spread. We reared it from a small native tree called *luluhut* (*Gymnosporia thompsonii*). The caterpillar and pupa are similar to the figures of *Issoria sinha bowdenia* (Butler) [Hopkins, Insects of Samoa 3(1): pl. 4, figs. 6, 7, 1927]. Also collected by Fullaway.

9. **Neptis guamensis** Swinhoe, Ann. Mag. Nat. Hist. VIII, 18: 483, 1916.

This species was described from Guam, without particulars. We did not see it in 1936.

Family PIERIDAE

10. **Catopsilia crocale** (Cramer).

Papilio pomona Fabricius, Syst. Ent., 479, 1775.

Papilio crocale Cramer, Pap. Exot. 1: 87, pl. 55, fig. C, D, 1775.

Catopsilia pomona (Fabricius) Kershaw, Butterflies of Hong Kong, 101, pl. 9, figs. 18, 19, 20, pl. 5a, 1907.

Catopsilia crocale (Cramer) Fruhstorfer, Seitz Gross-Schmetterlinge der Erde **9**: 162-163, 1910.

Piti, Sept. 19, 20, Oct. 5, 30, Swezey; Piti, Sept. 30, student at Agricultural School; Merizo, Oct. 2, Swezey. Mostly reared specimens.

Kershaw considers *crocale* to be a dimorphic female of *pomona*. This butterfly is known in Japan, China, and Siam and is widely distributed in British India. It is said to be the commonest butterfly in the East Indies, and its range extends to Australia. It has many variations. It was not previously recorded from Guam. I reared it from green caterpillars on leaves of *Cassia grandis* and *C. fistula*. Eggs were found also on the leaves. They are deposited singly. Some of the eggs are parasitized by a trichogrammatid. Of six eggs collected at Merizo, parasites issued from two eggs, a parasitism of 33 percent. Of 19 eggs at Piti, parasites issued from five eggs, a parasitism of 26 per cent.

11. **Appias leis subtuslutea** Roepke.

Catophaga leis Hübner and Geyer, Zutr. Samml. Ex. Schm. 4: 37, figs. 771, 772, 1832.

Appias leis subtuslutea Roepke, Rhopalocera Javanica 12: 66, pl. 9, figs. 12, 15, 1935.

Ritidian Pt., April 22, Bryan; Tarague, May 17, Swezey; Machanao, June 7, Swezey.

This butterfly has a wide distribution, the typical form in Java, and several subspecies in India, Andamans, Nicobar, Sunda Islands, Moluccas, New Guinea, Australia, South Sea islands. The subspecies *subtuslutea* occurs in west Java. It is particularly distinguished by the hindwing of the female being entirely chrome yellow beneath, as is also the forewing at apex beyond the black bar. Of the few specimens collected in Guam, the best female agreed with this coloration and the figures in Rhopalocera Javanica cited above. This species was not previously recorded from Guam, and was quite rare.

12. **Terias hecabe** (Linnaeus).

Papilio hecabe Linnaeus, Syst. Nat. 1(2): 763, 1767.

Terias hecabe (Linnaeus) Walker, Ent. Soc. London, Trans., 464, 1895. Kershaw, Butterflies of Hong Kong, 97, pl. 9, fig. 21; pl. 12, figs. 7, 8; pl. 3a, figs. 19, 20, 1907.

Ritidian Pt., April 22, Bryan, Aug. 6, Swezey; Agana, May 4, Usinger, May 15, 25, Sept. 11, Swezey; Machanao, June 4, Swezey; Barrigada, July 6, Swezey; Piti, Oct. 6, 12, Swezey.

This yellow butterfly, including its variations, has a wide distribution in the tropics and Pacific islands, from India to Japan, and Samoa to Australia. It

was not previously recorded from Guam. We reared it from the foliage of *Pithecolobium dulce,* and not from any other leguminous plant, although in other countries, its larvae feed on various legumes. The butterflies were common everywhere.

FAMILY SATYRIDAE

13. Melanitis leda (Linnaeus).

Papilio leda Linnaeus, Syst. Nat. 1(2) : 773, 1767.

Melanitis leda (Linnaeus) Walker, Ent. Soc. London, Trans., 449, 1895. Kershaw, Butterflies of Hong Kong, 24, pl. 3, figs. 2, 3; pl. 1a, figs. 9, 10, 1907.

Agana Swamp, May 4, Usinger; gully near Mt. Chachao, May 16, Swezey; Piti, Oct. 12, 29, Nov. 6, Swezey; Piti, Agricultural School Farm, student collector.

This butterfly, including several forms, has a wide distribution in the Orient and Pacific regions. The first record in Guam was by Fullaway who reared it from caterpillar on corn in 1911. It is not common now. We did not find any caterpillars. A few butterflies were collected in shady places. I have reared this butterfly from sugar cane in Samoa. In the Philippines, it is considered a rice pest.

FAMILY LYCAENIDAE

14. Cosmolyce boeticus (Linnaeus).

Papilio boeticus Linnaeus, Syst. Nat. 1(2) : 789, 1767.

Polyommatus boeticus (Linnaeus) Kershaw, Butterflies of Hong Kong, 75, pl. 9, figs. 2, 10, 1907.

Cosmolyce baetica (Linnaeus) Toxopeus, Tijdschr. Ent. **70** : 268, 1927.

Cosmolyce boeticus (Linnaeus) Hemming, Entomologist **66** : 224, 276, 1933.

This is a widespread butterfly in the Orient and Pacific regions. It is abundant in Hawaii. It was recorded in Guam by Fullaway in 1911. Our specimens were nearly all from Barrigada (June 12, 14, Swezey), where they were associated with the weed *Crotalaria saltiana,* the larvae feeding in the pods. There was a dense growth of this weed in a fallow corn field. It was about the only place where we observed this plant. One specimen of the butterfly was reared from pod of *Crotalaria quinquefolia* growing sparsely in fallow rice fields at Sasa, June 22, Swezey. The same trichogrammatid parasite which was reared from eggs of *Catopsilia crocale* was also reared from eggs of this butterfly.

15. Zizula gaika (Trimen).

Lycaena Gaika Trimen, Ent. Soc. London, Trans. 3(1) : 403, 1862.

Zizula Gaika (Trimen) Chapman, Ent. Soc. Lond., Trans., 483, 493, 495, pl. 52, fig. 8, pl. 53, fig. 12, 1910.

Ritidian Pt., April 16, Bryan; Piti, April 30, Swezey; Agana, near spring, May 25, Swezey.

This tiny blue butterfly was described from South Africa. Dr. Marshall informs me that it has spread throughout the whole of the Old World tropics, and has also been found in Venezuela. We found it very abundant in Guam, in gardens and in low roadside weeds. We did not discover its larva, so do not know its food plant there. There are specimens in the U. S. National Museum, collected by Fullaway in 1911. Our specimens were determined by Dr. Guy A. K. Marshall.