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ON THE YELLOW FORMS OF COENONYMPHA TULLIA (SATYRIDAE) IN OREGON

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The genus *Coenonympha* is represented in Oregon by both white and yellow forms of the *tullia* complex. Populations of the white ringlets occur in the southwestern counties of the state and are allied to *california* Westwood. Elsewhere they are replaced by yellow forms (see fig. 1). The identification and relationships of these yellow populations have been much confused, largely, it seems, because of insufficient acquaintance with adequate samples and with the features of their geographic distribution and their seasonal dimorphism.

The first point of note lies in the phenotypic distinctness of the eastern and western populations, the zone of separation being the Cascade Range. Contrary to some published implications (e.g., Davenport, 1941), there is no good evidence that these two population groups overlap or that they show clinal intergradation or natural hybridization. They display essentially different spectra of phenotypic variability.

The western populations (plate I) have been generally referred to *Coenonympha ampelos*, which Edwards described in 1871 from two specimens taken in "Oregon," exact place and date undesignated. In the light of Brown's recent study (1964) of the extant female lectotype (Canadian National Collection), this usage must be abandoned. The lectotype bears no resemblance to any ringlet from western Oregon, but it does match summer brood material from east of the Cascades (Brown, personal communication). It may have been collected by William Gabb near the California border of what is now Lake County, Oregon.

In 1937 Field, believing that Edward's *ampelos* applied to the second brood of the western ringlets, introduced the name *eunomia* for the first generation. As an infra-subspecific term ("A New Seasonal Form . . .")

¹ I am indebted to Mr. F. Martin Brown for critical comments on the problems treated in this account; also to Mr. William D. Field for assistance in the location of type specimens.



EXPLANATION OF PLATE I

Coenonympha tullia eunomia Dornfeld, (Western Oregon)

Top row: First generation males. Left to right: McDonald Fst., Benton Co.; same, ventral; Gales Creek, Washington Co. Second row: First generation females. Left to right: Alsea, Benton Co.; same, ventral; McDonald Fst., Benton Co. Third row: Second generation males. Left to right: Corvallis, Benton Co.; same, ventral; Corvallis, Benton Co. Bottom row: Second generation females. Left to right: McDonald Fst., Benton Co.; same, ventral; Corvallis, Benton Co.

eunomia is not eligible for subspecific use under the original authorship and date (International Code of Zoological Nomenclature, Art. 45, d, iii). The name, however, is unambiguously associated with the populations under consideration, and its retention is desirable. Therefore, in recognizing these populations as a distinct subspecies of *C. tullia*, I here apply to this subspecies the name *eunomia* and designate the types established by Field as those of this subspecies.

Coenonympha tullia eunomia Dornfeld, new subspecies

MALE.—Length of forewing 14.1 to 17.9 mm. Forewing: dorsally ochraceous in first generation and immaculate, hairy black scaling at base, lateral fringes black at inner margin; second generation lighter above, approaching buff, little or no black scaling, slight development of yellow vertical ray across upper half of extra-discal area. Ventrally, first generation with orange-brown flush in discal area, apices and lateral margins appearing greenish-gray through broad dusting with black and white scales, non-ocellated, extra-discal vertical ray usually limited to upper third of wing or absent; second generation with light brown discal area, greenish apex and margin repressed or absent, development of ray more pronounced. *Hindwing*: dorsally like forewing; ventral ground color ferruginous in first generation, with heavy overlay of black scales common, margins and base greenish-gray, basal scales very hairy, extra-discal vertical ray extending from costa to end of cell or absent; second generation with ground color light brown, generally without greenish margins, basal scales less hairy, often with fuller development of vertical ray.

Female.—Length of forewing 14.8 to 17.9 mm. Essentially as described for male; wing shape more obtuse, averaging slightly lighter in ground color above and below, vertical ray tending to have small post-cellular component on ventral hind-wing especially in second generation.

Type series (originally designated as *C. ampelos* gen. vern. *eunomia* Field) as follows:

Holotype, male, and allotype, female, Wilhoit, Clackamas County, Oregon, June 6, 1937 (C. W. Herr). *Paratypes* #1 male, McMinnville, Yamhill Co., Ore., May 16, 1931; #2–9 and 11–20 males, Wilhoit, Ore., June 6, 1937 (Herr); #10 female, Oregon, May 24; #21 male and #22 female, Portland, Ore., May 10, 1934; #23–29 males, Oregon, May 21–25.

The holotype, allotype, and paratypes #1, 5–13 and 21–26 are deposited in the U. S. National Museum; the holotype bears the U.S.N.M. type number 34795. Paratypes #2 and 18–20 are in the Canadian National Museum. Paratypes #3 and 4 are in the Los Angeles Museum. Paratypes #14–17 and 27–29, originally in the collection of C. W. Herr of Woodburn, Oregon, appear to be no longer extant.

ORECON RECORDS (see fig. 1) as follows. BENTON CO.: Alsea, 5/vii/52 (Dornfeld); Corvallis, numerous records vi to ix (Dornfeld); McDonald Fst., numerous records v to ix (Dornfeld); Alsea Fish Hatchery, 31/v/64 (Dornfeld); Mary's Peak, 10/vi/61 (Dornfeld). CLACKAMAS CO.: Oak Grove, 20/iv/34 (Jewett); Estacada, 10/viii/34 (Jewett); Mouth of Eagle Cr., 14/vi/53, 11/ix/53 (Jewett); Barton, 15/v/60, 4/vi/61 (Jewett), 1/x/61 (Crowe); Wilhoit, 6/vi/37 (Herr) type series. LANE CO.: Hills Creek Dam Rd. 13/vi/64 (Dornfeld); Form Ridge Reservoir, 31/vii/58 (Woodley). LINN CO.: Cascadia, 12/viii/57, 23/v/59, 10/vi/62, 28/vi/64 (Dornfeld); Brownsville, 17/ix/07 (Wilson). MARION CO.: Silver Cr. Falls St. Park, 22/vi/57 (Jewett). MULTNOMAH CO.: Portland, 14/iv/34 (Jewett), 27/vi/57 (McCorkle), 8, 17/viii/61, 12, 22/ix/61 (Crowe); 13/viii/61 (Dunn). POLK CO.: 5 mi. W of Monmouth, 30/v/64 (McCorkle); Monmouth, 18/ix/64 (McCorkle).



EXPLANATION OF PLATE II

Coenonympha tullia ampelos Edwards, (Eastern Oregon)

Top row: First generation males. Left to right: Owyhee R. nr. Three Forks, Malheur Co.; same, ventral; Viewpoint Rd., Ochoco Mts., Crook Co. Second row: First generation females. Left to right: Devine Cn., Harney Co.; same, ventral; nr. Warm Springs, Jefferson Co. Third row: Second generation males. Left to right: Frenchglen, Harney Co.; same, ventral; Frenchglen, Harney Co. Bottom row: Second generation females. Left to right: nr. Hines, Harney Co.; same, ventral; Emigrant Cr., Harney Co.

WASHINGTON CO.: 3 mi. N of Hillsboro, 22/viii/61 (Ludwig), 3/ix/61 (Crowe); Gales Creek, 22/vi/65 (Ferguson). YAMHILL CO.: Sheridan, 23/ix/61 (Crowe); McMinnville, 19/vii/29 (Fender); Dayton, 3/vii/37 (Aldrich).

This subspecies, *C. tullia eunomia* (plate I), inhabits the Willamette Valley of western Oregon and ranges northward into Washington. It is

double brooded and the wings are totally devoid of ocellations. Seen in series, the first generation specimens have a dorsally darker cast than those of the eastern Oregon ringlets, and the males possess a wider zone of black scaling at the base of the wings. Ventrally, the secondaries tend to be darkly ferruginous in ground color except for a peripheral zone of white and black scales which produce a gray-green marginal effect, also seen on the apices of the forewings; the basal and body scales are very hairy; and the yellow-bordered vertical rays crossing the middle of the fore- and hindwings are greatly reduced and sometimes absent entirely. The late summer generation is characterized by a lighter ground color dorsally; the likewise lighter ventral surface is tannish brown and practically devoid of greenish margin; and the vertical rays tend to be more fully developed.

COENONYMPHA TULLIA AMPELOS Edwards, 1871

The yellow ringlets east of the Cascades (plate II) differ substantially from *eunomia*. While there is variation between individuals, the range of this variability is much the same in all populations. A dimorphic condition, as in *eunomia*, exists between early and late broods. These ringlets, as discussed above, must now be regarded as *C. tullia ampelos* Edwards. Their apparently close relationship to *C. tullia elko* Edwards (northern Nevada) remains to be clarified, but in any case, *ampelos* is the older name and was applied to Oregon specimens.

The first brood of these ringlets from east of the Cascades has the following characteristics. The wing coloration dorsally is lighter than in *eunomia*. Ventrally, all populations include a majority of individuals (about 80 percent) in which ocellations are variably developed on both fore- and hindwings; the ground color of the secondaries is basically gray-green rather than ferruginous, due to heavy dusting with black scales; the vertical rays tend to be strongly developed and widely bordered with yellow. The second, or late summer, generation of this butterfly is, as in the case of *eunomia*, a paler form, and generally less abundant than the first. The wing color ventrally is particularly distinctive, being almost straw yellow, with sharp restriction of the black scaling usually to the discal region, hence little or no suggestion of a green hue. The ocellation pattern resembles that of the first generation, as does the development of the rays which often reaches completion.

ORECON RECORDS (see fig. 1) as follows. BAKER CO.: Baker, 21/vi/56 (Baker); Durkee, 7/ix/40 (Motley), 13/vi/47 (Aldrich), 15/vi/62 (Shepard); nr. Huntington, 18/v/58 (Baker); Spring Cr. NW of Baker, 10/vi/56, 12/vi/60 (Baker); Pine Cr. NW of Baker, 7/vii/63 (Aldrich); North Pine Cr. nr. Halfway, 10, 20/vi/59 (Jewett); Indian Cave, 25/v/64 (Crowe); Burnt R., 24/v/64 (Crowe). CROOK CO.: Cornez



Fig. 1. Distribution of *Coenonympha* in Oregon. Solid triangles indicate *C. tullia* eunomia; solid circles indicate *C. tullia ampelos*; open circles indicate *C. tullia* eryngii.

Cr., 19/vi/58, 22/vi/59 (Dornfeld); Viewpoint Rd. off Marks Cr., 8/vii/60, 2, 12/vii/61, 14/vii/65 (Dornfeld); 16 mi. E. of Prineville, 7/vi/58 (Jewett); Big Summit Pr., 8/vi/58 (Jewett), 1, 6/vii/63 (Aldrich); Maury Mts., 15/vii/64 (Newcomer). GILLIAM Co.: Lonerock, 7/vi/61, 8/viii/61 (Bauer). GRANT Co.: Izee, 2/v/34 (Jewett); Bear Cr., 7, 9/vii/64 (Crowe); nr. Seneca, 5/vii/64 (Crowe), 12/vi/47 (Aldrich). HARNEY Co.: Frenchglen, numerous records v to viii (Jewett, Dornfeld); Blitzen Valley 16/v/36 (Jewett); Malheur Refuge Hdq., 22/v/56 (Hansen); Alvord Hot Spg., 28/v/60 (Jewett); Burns, numerous records v, vi & viii (Crowe); nr. Hines, 7, 16/viii/64, 5/ix/64 (Crowe); Cricket Cr., 22/v/64, 7/viii/64 (Crowe); Devine Cn., numerous records v to viii (Crowe); Stancliffe Cr., 16/v/64 (Crowe); Deer Cr., 16/v/64 (Crowe); Buchanan, 25/vi/64 (Crowe); Emigrant Cr., 20/viii/64 (Crowe); Stinkingwater Mt., 25/vi/64 (Crowe); Silvies R. Dam, 14/viii/64 (Crowe); Fish Lake, 15/vii/53 (Aldrich), 18/vii/64 (Crowe). JEFFERSON Co.: Warm Spgs., 14/v/54 (Jewett), 27/iv/64 (Crowe); Metolius R., 11/vii/52 (Jewett). KLAMATH Co.: Hwy 232 at Sand Cr., 10/vii/62 (Dornfeld); Bly, 13/vi/45 (Aldrich); Klamath Falls, 18/viii/38 (Jewett). LAKE Co.: Hart Mt., 9/vii/37 (Jewett); Adel, 12/vi/62 (Newcomer); Crump L., 23/vii/64 (Newcomer); Silver Lake, 26/v/57 (Aldrich). MALHEUR Co.: C-Ranch, 19/v/58 (Storm); Owyhee R., 21/v/58 (Storm); Jordan Valley, 30/v/60 (Jewett); Beulah Dam, 26/vi/64 (Crowe); Beulah Reservoir, 26/vi/64 (Crowe); 5 mi. E of Beulah Dam, 27/vi/64 (Crowe); nr. Juntura, 28/vi/64 (Crowe). MORROW Co.: Rock Cr. S of 8-Mile, 7/vi/61 (Bauer); Hardman, 29/vi/61 (Bauer); Willow Cr. S of Heppner, 30/vi/61 (Bauer); Cutsforth Mdws., 9/vii/61 (Bauer). UMATILLA Co.: Hermiston, 11/v/61 (Goeden); 10 mi. E of Pendleton, 1/vi/60 (Jewett); Hinkle, 29/iv/60 (Jewett). UNION Co.: 15 mi. S of La Grande, 10/vi/65 (Goeden); Elgin, 18/viii/37 (Jewett). WALLOWA CO.: Wallowa L., 25/vii/64 (Shepard); Horse Cr., 28/vi/64 (Shepard). WASCO CO.: nr. Sherar Falls, 17/v/53 (Jewett); Juniper Flat, 26/v/64 (Newcomer); nr. Tygh Valley, 20/vi/64 (Newcomer); Wapanitia, 10/vi/57, 16/vi/61 (Aldrich); Maupin, 5/ix/60 (Woodley). WHEELER CO.: Mitchell, 17/v/62 (Goeden); Horseshoe Cr., 8/vi/61 (Bauer).

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BOOK REVIEW

A LIST OF THE BUTTERFLIES OF MALAWI, by D. Gifford, 1965. The Society of Malawi, Blantyre, Malawi, Africa. 151 pp., 12 figs., 9 colored plates, 1 map. 50 shilling sterling (=\$7.00).

This is the first comprehensive list of the butterflies of Malawi (formerly Nyasaland) ever compiled and is therefore an important contribution to knowledge of the African fauna. The author, now with the University of Edinburgh, spent five years in Malawi as a forester and has a good understanding of the local ecology and butterflies.

The book is arranged as a running key to facilitate identification, a scheme that can be disasterous: in this case it is excellent. Distributional and bibliographic data are given for each of the 531 species listed. The valvae of 12 species of Lycaenidae are figured and there are good colored photographs of about 142 species from all families. The index and bibliography running to 20 pages add greatly to the value of this book as a reference.

Gifford has taken the proper step by reducing most names of sexual and seasonal variants, genetic oddities and "forms" to treatment in the discussion paragraphs, though a few persist in the main list. The revi-