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CHARIDRYAS FLAVULA
BARNES AND McDUNNOUGH
(NYMPHALIDAE):

A QUESTION OF IDENTITY¹

CLIFFORD D. FERRIS²

Bioengineering Program, University of Wyoming,
Laramie, Wyoming 82071

and

MICHAEL S. FISHER

6521 South Logan Street, Littleton, Colorado 80121

INTRODUCTION

THE PALLA BOISDUVAL COMPLEX of species in the Melitaeinae has been referred to a number of genera including: *Lemonias* Hübner, 1806 [not Felder and Felder, 1859] by Dyar, 1902; *Melitaea* Fabricius, 1807 by Barnes and McDunnough, 1918; *Chlosyne* Butler, 1870 by Higgins, 1960; *Microtia* Bates, 1864 by dos Passos, 1964; *Charidryas* Scudder, 1872, 1875 by Bauer in Howe, 1975. The Bauer treatment seems reasonable and recognizes nine species in *Charidryas* [Type Species *Melitaea nycteis* Doubleday] composed of a six-species western (*palla*) group which lacks the dorsal postmedian series of black spots on the hindwings found in the three-species eastern (*harrisi* Scudder) group. In addition to the maculation, there are differences between the two groups in pupal morphology. Because of phenotypic differences in the imagines between the northern *Charidryas* and southern *Chlosyne*, we choose to treat the former as a full genus, rather than a subgenus as did Bauer.

The taxonomic status of *C. flavula* Barnes and McDunnough, 1918 has been clouded since its original description. McDun-

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²Research Associate, Allyn Museum of Entomology, Sarasota, Florida 33580; Museum Associate, Los Angeles County Museum of Natural History, Los Angeles, California 90007.

nough (1938), Higgins (1960), and dos Passos (1964, 1969) offered divergent opinions concerning its position relative to *C. palla* (Boisduval) and *C. acastus* (W. H. Edwards). Apparently some further study is indicated concerning the affinity of *flavula* to these two species. The purpose of this paper is to review the past treatment of the taxon and to assign it to what we feel is its proper position for permanent reference in the nomenclature.

TAXONOMIC CHARACTERS

Barnes and McDunnough (1918) indicated, before formally describing *flavula* as a full species, that it might prove to be a form of *palla*. McDunnough (1938) retained *flavula* as a full species. Higgins (1960) extensively revised the *palla* group and placed *flavula* as a subspecies of *gabbii* Behr. dos Passos (1964) listed it under its original status, but later (1969) placed it as a form of *acastus*.

The Barnes and McDunnough description does clearly compare the differences between *flavula* and *acastus*, but their study material was limited and generally incompletely labeled. Based upon the stated localities from which they had specimens, they apparently worked with Colorado material from both east and west of the Continental Divide. The type series contained 13 males, 11 of which were labeled simply "Colorado", and were probably collected by David Bruce. Two specimens were labeled respectively "Glenwood Spgs., [Garfield Co.] Colo." and "Hall Valley, [Park Co.] Colo." Brown (1957) observed on page 79: "Since no other specimens of *flavula* have been found on the eastern slope, I assume that the Hall Valley label was inadvertently attached to a Glenwood Springs specimen. On this basis I believe it best to designate Glenwood Springs as the type locality of *flavula*."

In the original description, *flavula* was compared with California and Colorado *palla*, and *acastus* from Glenwood Springs. Reference was also made to Utah and Wyoming specimens, but no conclusions were drawn. An examination of an extensive series of the *flavula* phenotype from western Colorado, where *flavula* and *acastus* are sympatric, indicates that there are distinct characters which place *flavula* in the *C. palla* complex.

There are several characters that reliably separate *flavula* from *acastus*. As noted by Barnes and McDunnough, *flavula* is smaller than *acastus*, but it is also much darker. The brownish-

black areas of the wings are more extensive, producing, in most specimens, a reduction in the checkered maculation. This maculation is distinctly more contrastingly bi-colored, reddish-to-yellowish dorsally than in *acastus*. Ventrally, the checkered maculation on the hindwings is buff-white, separated by fine black lines along the veins. By comparison, *acastus* is clearly flat white to pearly-white, with broader black lines. The basal area of both wings is more solid reddish in *flavula*, while in *acastus* it is mottled extensively with white and black on the hindwings and orange-buff on the forewings. On the whole, *C. palla flavula* differs from its congener, *C. palla calydon* (Holland) by its smaller size, brighter colors above, and larger spot-bands on the hindwings beneath. The differences are illustrated in Figures 1-14.

DISTRIBUTION

C. palla flavula occupies a fairly narrow geographic zone in the plateau country of western Colorado and eastern Utah with an extension into southern Wyoming. It is locally common in dry habitats at an altitude range from 6000-8000' (1830-2440m) where Sagebrush (*Artemisia tridentata* Nutt.) is the dominant plant species. It does occur, however, in similar habitat up to 9500' (2895m). The larval foodplant is probably Indian Paintbrush (*Castilleja* species) as it is for *calydon*. *C. acastus* occurs in semi-arid lowlands in this same region and meets *flavula* in and around Glenwood Springs. *C. p. flavula* is the more montane of the two insects and replaces *acastus* completely in similar habitats at higher elevation.

The *flavula* phenotype should also occur in northwestern New Mexico since it occurs in adjacent areas in Colorado. Barnes and McDunnough stated: "We have it from Utah (Provo, Salt Lake) and also from the Yellowstone Park region." The Yellowstone citation undoubtedly refers to *calydon* based upon specimens that we have examined from western Wyoming. Holland did not describe *calydon* until 1931. We have also examined a short series of *palla* collected north of Salt Lake City in Cache Co.; these do not match the *flavula* characters defined above. The same is true of material from Emigration Canyon and Lamb's Canyon in Salt Lake Co., Utah. This material is more unicolorous above, and in terms of maculation, similar to *acastus*. Figure 15 indicates the presently known distribution for *flavula*.

Brown (1957) discussed the type material of *flavula* as noted above. Contrary to Bauer in Howe (1975), the specimen figured

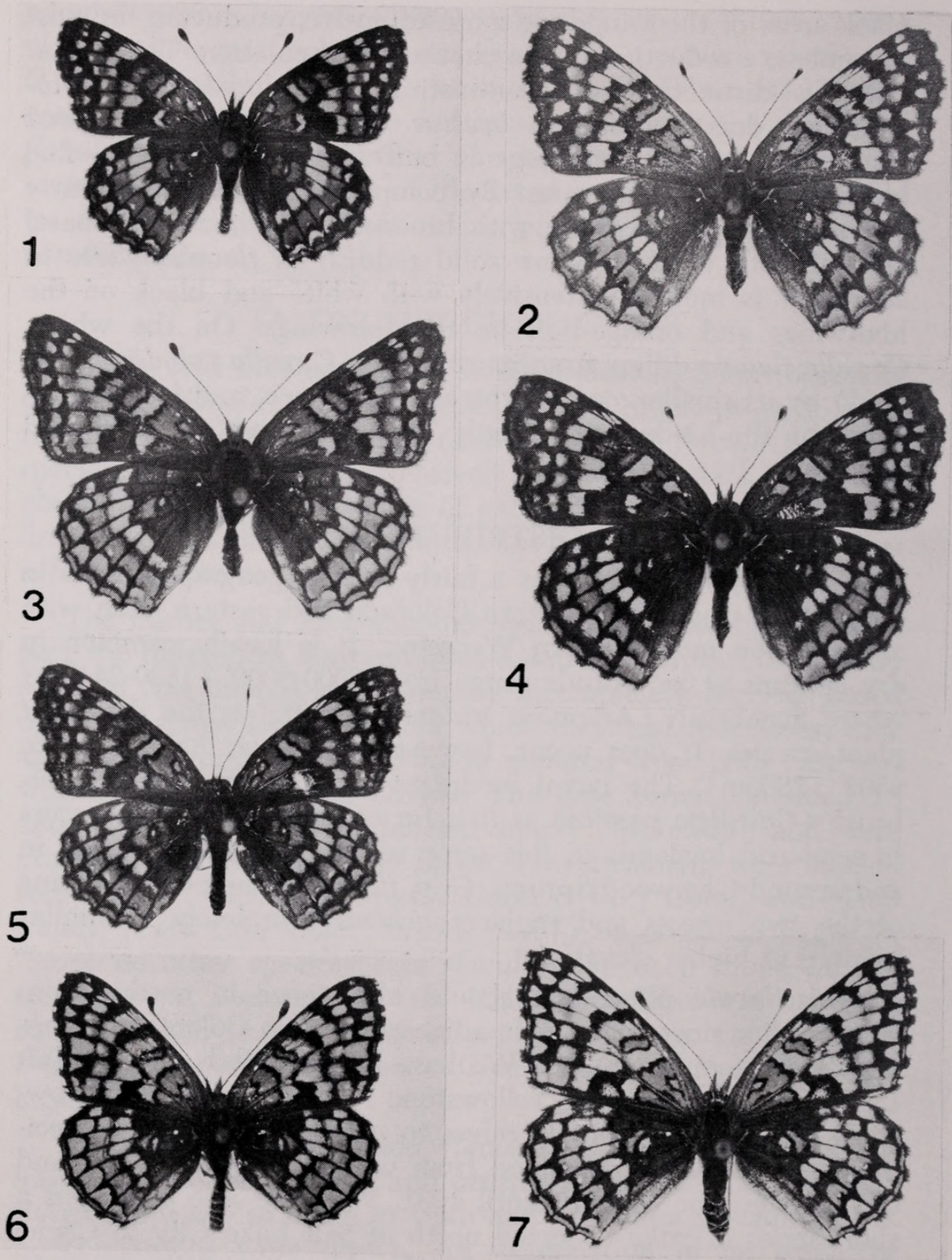


Fig. 1.—*C. p. flavula*, male upper, nr. Snowmass, Pitkin Co., Colorado, 13-vi-74.

Fig. 2.—*C. p. flavula*, female upper, Rabbit Ears Pass area, Routt Co., Colorado, 12-vii-74.

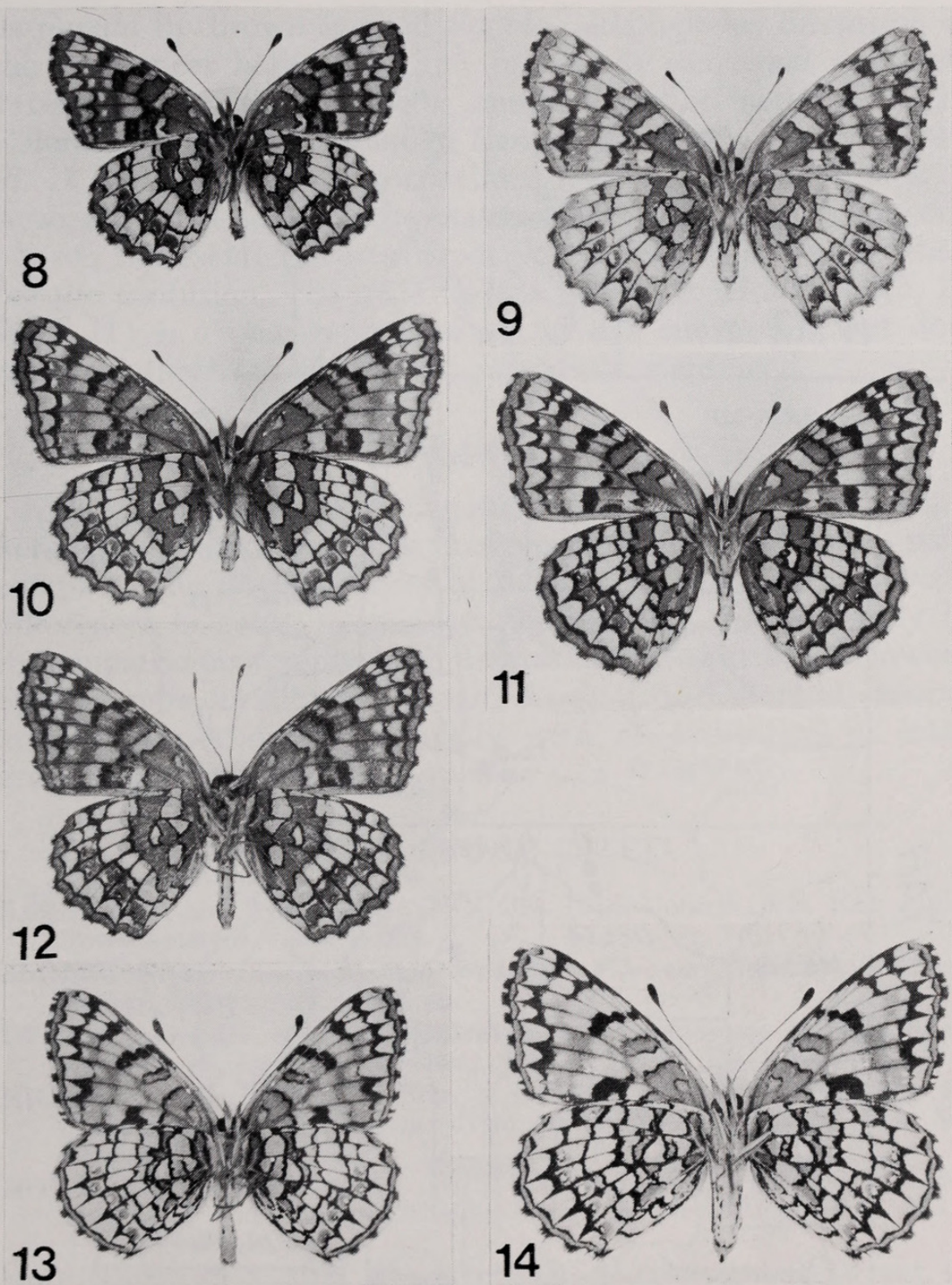
Fig. 3.—*C. p. calydon*, male upper, nr. Nederland, Boulder Co., Colorado, 22-vi-74.

Fig. 4.—*C. p. calydon*, female upper, same data as male in Fig. 3.

Fig. 5.—*C. p. calydon*, male upper, South Turkey Creek Canyon, Jefferson Co., Colorado, 2-vii-68 (Topotype).

Fig. 6.—*C. acastus*, male upper, Coalmine Point, Black Ridge Breaks, Mesa Co., Colorado, 26-v-71.

Fig. 7.—*C. acastus*, female upper, same locality as male, 29-v-70.



Figures 8-14 respectively are the undersides of the specimens shown in Figs. 1-7.

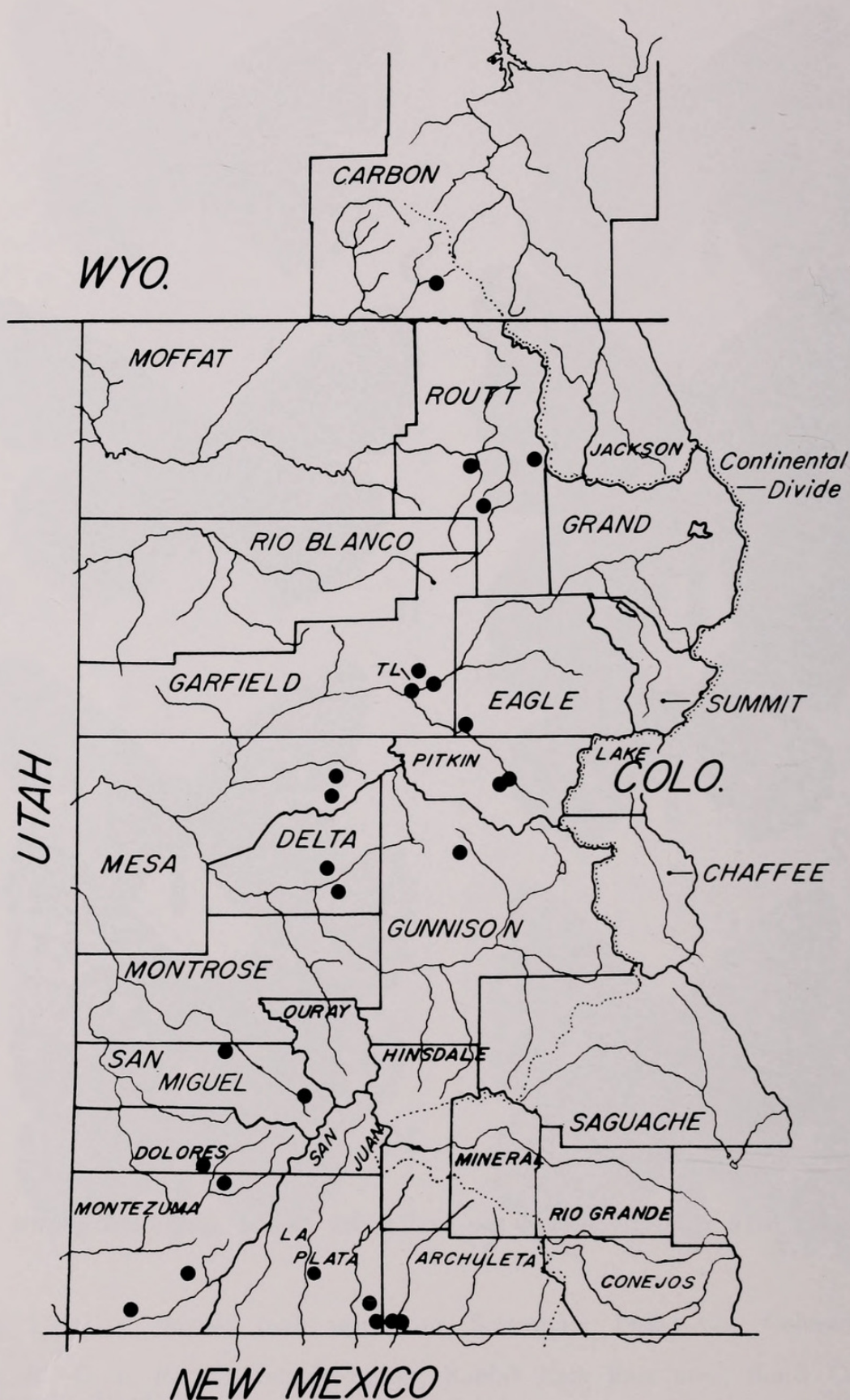


Fig. 15.—Known distribution of *C. palla flavula*. Locality data appear in the Appendix.

as *flavula* by Brown is good *flavula*, although his discussion of the differences between it and *calydon* is somewhat confused. Brown did not figure *acastus* and it was not included in the Colorado species list, although Barnes and McDunnough (1918, Pl. 11, f. 13) illustrated a specimen from Glenwood Springs. It is possible that some of the material that Brown used for comparison represented *acastus* from *flavula* localities, thus furthering the confusion. The male *flavula* figured in Howe (1975, Pl. 72, f. 11) is a poor representation of this subspecies, but does represent the Utah population previously mentioned.

SUMMARY

The Barnes and McDunnough name *flavula* is presented here as a valid subspecies assigned to the *Charidryas palla* complex. The distinctiveness of *flavula* is supported by specific differences in color, maculation, distribution, and especially by its sympatric occurrence with *acastus* at and near the Glenwood Springs type locality. At Basalt, Eagle Co., Colorado, *acastus* and *flavula* occur sympatrically with no indication of intergradation between the two species.

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APPENDIX

Distribution data for the points indicated on the map (Figure 15) are given below. We would like to thank Scott Ellis, Ft. Collins, Colorado and R. E. Stanford, Denver, Colorado for supplying data. The localities listed on page 79 of Brown (1957) are also included.

COLORADO: Archuleta Co.: nr. Allison, 27-30-v; Arboles, 6100', v-37. Delta Co.: Leroux Ck. Rd., 8000' 8-vi-62; Smith Fk. Ck., 2 mi. E. of Needle Rock, 29-vi-61. Dolores Co.: Jct. W. Dolores Riv. Rd. and cutoff to Norwood-Dolores Rd., San Juan Nat. For., 7800', 25-v-72. Eagle Co.: 2 mi. E. of Basalt, 13-vi-70, 10-vi-76. Garfield Co.: Glenwood Springs (Type Locality); No Name Ck., Glenwood Canyon, 6400', 1-vii-67; Grizzly Ck., Glenwood Canyon, 6400', 12-vii-68; French Ck., Glenwood Canyon, 11-vi-76. Gunnison Co.: Anthracite Ck., vic. Kebler Pass Rd., 14-vi-74. La Plata Co.: Durango, 12-vi-72; La Posta, 23-v-34; Tiffany, 6200', 11-14-v. Mesa Co.: Love Mesa, Uncompahgre Plateau, SW of Escalante Canyon, 8000', 6-vii-62; Grand Mesa, Lands End Rd., 1 mi. S. of Lookout House, 9600', 2-vi-72. Montezuma Co.: Taylor Ck., N. of Dolores River, vic. Hwy. 145, 8000', 15-vii-67; Mesa Verde Nat. Park: Head of Navaho Canyon, 7800', 26-v-72; Headquarters Canyon, 12-vi-51; Mesa Verde, 27-v-37; Ute Mtn. Pitkin Co.: vic. Aspen, 7900', 13-27-vi; Maroon Ck., 29-vii-50; Maroon Lake Rd., 27-vi-76 (leg. W. B. Wright); Snowmass, 13-vi-73, 13-vi-74. Routt Co.: Rabbit Ears Pass, 4-vii-48, 24-vii-72, 22-vii-73, 12-vii-74. San Miguel Co.: Bear Ck., Wilson Peak Rd. nr. Sawpit, 8500', 18-vii-65; Hwy. 141, 4.5 mi. S. of Hwy. 145 nr. Gurley Reservoir, 8400', 26-vi-67. WYOMING: Carbon Co.: Battle Ck. Campgd., Medicine Bow Nat. For., 13 mi. ENE of Slater, 21-vi-73.

Scott Ellis has reported that *flavula* and *acastus* are sympatric at Mesa Verde in Montezuma Co., Colorado. He has collected one specimen that appears to be a hybrid between the two species.



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