

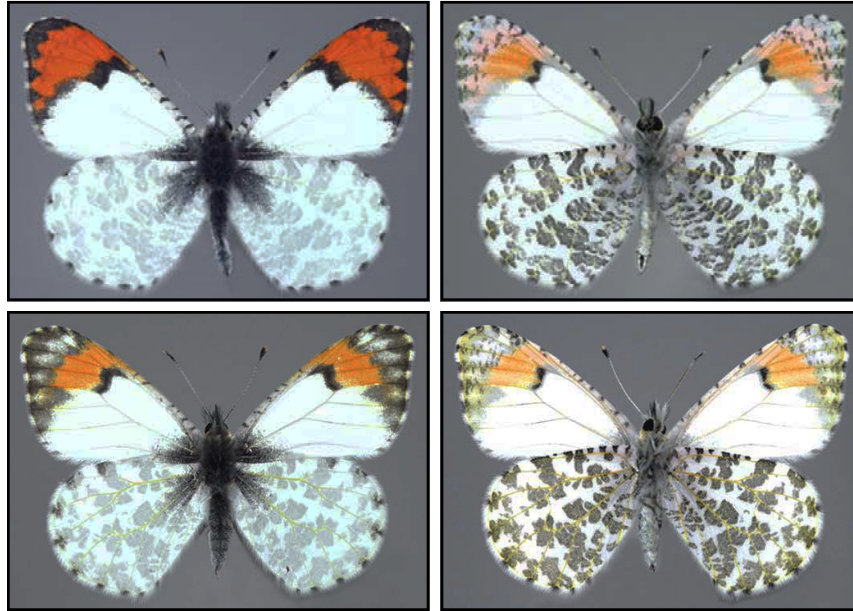
***Anthocharis julia prestonorum* T. L. Stout**
New Subspecies from Western Colorado

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***Anthocharis julia prestonorum* T. L. Stout, New Subspecies from Western Colorado**

Description of Types: Holotype Male: Forewing length = 32mm (range of paratypes measured is 30-34mm). The width of the black discal cell bar on the male forewing is 1.3MM (average 1.0 to 1.3mm). Allotype Female: Forewing length = 34mm (range of paratypes is 25-34mm). Dorsal surface coloration is white with no visible yellow. The types are illustrated on the following page (<1.7x>). The ventral hind wing mottling in both sexes is distinctively light grayish green as compared to green on nominotypical *julia*. This coloration and fully dorsal white ground color on females is both diagnostic and consistently different than that of any other representative populations or subspecies of *Anthocharis julia*. On some individuals the light gray/green ventral hindwing mottling shows more green towards the margins. The types are illustrated on the following page (paratypes on, p. 10).

Type Material and Type Disposition: Holotype Male: COLORADO: Garfield County, Grizzly Creek Rest Area, Glenwood Canyon, 4.1 miles ENE of Glenwood Springs, 6100 ft. (north side of Interstate 70), ex larva collected 24 May 2008 reared on *Descurainia pinnata*, emerged 5 January 2009. Allotype female: Same data and source except emerged 8 January 2009. The type specimens will be deposited at the McGuire Center for Lepidoptera and Biodiversity, Gainesville, Florida. Paratypes: The following specimens from the type locality: One male, 13 April 2005 (Ray E. Stanford - CSU Collection, Ft. Collins, Colorado); one male and one female, 28 May 2007, eleven males and one female, 19-21 May 2008 (Floyd and June Preston collection); sixteen males, 16-17 May 2010 and one male and one female, 26 May 2011 (Michael S. Fisher collection); two males and six females, reared from ova and larvae collected on the *D. pinnata* (also *Arabis retrofracta*) emerged Jan., 2009 (retained in the Todd Stout collection); six males, 24 April 2012 (leg. M. Fisher in Todd Stout collection) and three males and two females, 30 April 2012 (leg. T. Stout and collection). Additional Garfield County Paratypes: One male, Hanging Lake Trail, Glenwood Canyon, just east of the type locality (Floyd and June Preston collection); No Name Creek (canyon 1-2 mi w. of the type locality), 61-6600 ft., twenty males, 16-17 May 2010; three males except 27 May 2011 and seven males and two females except 24 April 2012 (all in M. Fisher collection except five males from 2012 in T. Stout collection); seven males, one female 30 April 2012 (T. Stout collection); one female, data tag reads, "1 mi. W. Carbondale, 6200 ft.,.... 22 April 1967" (Scott L. Ellis - identified by MSF - in the CSU Collection, Ft. Collins, Colorado); two males and one female, Edgerton Creek, 2.8 mi. W. of Carbondale, 6900 ft., ex ova, reared by Todd Stout, males emerged 2 and 4 January female emerged 9 January 2009 (retained in the Todd Stout collection).



Anthocharis julia prestonorum, new subspecies, Above: Holotype ♂ and Allotype ♀. Below: Comparison of fifth stage pre-pupation larva and pupae from their respective type localities: *A. julia prestonorum* (top left and at left to right); *A. thoosa colorado* bottom left and far right (see p. 17).



Name and Range: This new subspecies is named in honor of Floyd and June Preston (Lawrence, Kansas) in appreciation for all of their field work with the *Anthocharis sara* complex both within and outside of Colorado and for first bringing to my attention adults from the type locality which prompted my immediate investigation. *A. julia prestonorum* occurs in western and southwestern Colorado on the western side of the Continental Divide. It flies in an extensive range from just east of the TL (Eagle Co.) then southward encompassing counties in the Elk Mountains (Pitkin and Gunnison), the San Juan Mountains (Ouray) and southwest to Dolores Co. Populations found in Montezuma, La Plata and Archuleta County and Rio Aribba Co., New Mexico are presently considered as “near” *prestonorum*

because of a combination of factors (discussed below). *Anthocharis julia prestonorum* borders *A. julia julia* populations that fly near to the Continental Divide on the western side (Summit and Grand Counties), on its eastern side (Lake and Chaffee Cos. along the Sawatch Range) and is reported southward in Saguache Co. **Diagnosis and Discussion:** This butterfly has been confused with both *A. thoosa colorado* (Fisher and Scott, 2008) and *A. julia julia* (W.H. Edwards, 1872) but mostly confused with *A. thoosa colorado* for several reasons. First, the ventral hindwing mottling on worn specimens of *prestonorum* appears to be a dull greenish-gray and are superficially similar to *colorado*. Second, the width of the black discal cell bar on the male forewings of *prestonorum* can vary and be as wide on *colorado*. Third, females of *prestonorum* are consistently white whereas females of *colorado* also are white (some *colorado* show a flush of yellow on the hindwings). Fourth, in part of its distribution of *prestonorum* (prior page) there are areas where it flies in close proximity with *A. t. colorado*. Such a location in Montezuma County is within nine miles and the another in La Plata County within three miles. At the latter site, the coloration of the ventral hind wing mottling on *prestonorum* is slightly darker on some individuals. This may be the result of possible hybridization with *A. thoosa colorado*. The paratype herein reported as *A. sara thoosa* in the Lepidopterists' Society Season Summary for 2005 (published annually) has been examined and identified as *A. julia prestonorum* (MSF).

What differentiates *A. julia prestonorum* from *A. thoosa colorado* are the following characters. First, there are consistent differences in the coloration of last instar larvae. Similar to the differences of all other studied subspecies of *A. thoosa* (ssp. *thoosa*, *inghami*, *colorado* and *coriande*) as compared to all other studied subspecies of *A. julia* (ssp. *julia*, *browningi*, *sulfuris*, *stella*, *flora* and *alaskensis*), fifth instar *prestonorum* larvae have a broader white lateral stripe with a lighter green ground color as compared to *A. thoosa colorado* (see Stout, 2010). The thickness of the white lateral stripe, as it extends and connects towards the head is much more pronounced as compared to *colorado*, whereas the thickness of the white lateral stripe tends to fade considerably as it connects with the head in *colorado*. This character does vary and is not always so well pronounced. At the same time, the blended color change from the white lateral stripe to the green base color of *prestonorum* is more subtle as compared to larvae of *colorado*. Second, there are consistent differences in the curvature of the pupal cone. The curvature of the cone of *prestonorum* is bent back 8 to 25 degrees (similar to other *julia* subspecies including *julia*, *browningi*, *sulfuris*, *stella* and *flora* but not *alaskensis*) whereas the curvature of the *A. thoosa colorado* pupal cone is basically erect (0 to 5 degrees) and is virtually identical to those of ssp. *inghami* and *coriande*. Third, *A. julia prestonorum* and *A. thoosa colorado* normally occupy different habitats and elevations. In Colorado, *A. julia* occur in mountainous coniferous forest primarily above 7000 ft., lower where conditions allow (such as where the type locality of *prestonorum* is situated). The habitat preference of *A. thoosa colorado* in Colorado is mainly juniper-piñon pine forest at 6000 to 7500 ft. *A. thoosa coriande* is found farther south (mostly in New Mexico) and occurs into forest of the same mixed with Ponderosa Pine and oak to around 8000 ft.

In spite of the diagnostic differences between *A. julia prestonorum* and *A. thoosa colorado*, adults of *A. julia* from Montezuma County, La Plata County, Archuleta County, and Rio Arriba County, New Mexico (mentioned earlier) are treated here as *A. julia* near *prestonorum* and merit discussion. Although most examined adults are similar to toptypical *prestonorum*, there have been some individuals that

exhibit possible *A. thoosa* characters such as a more pure white dorsal ground color, broad black apical borders which connect with thick discal cell bars, darker gray ventral hindwing mottling, as well as white females with a small amount of yellow coloration on the dorsal hindwings. I am presently unable to ascertain whether these traits are the result of population variation, subspecies variation, or gene exchange with nearby populations of *A. thoosa colorado*. *Anthocharis julia* nr. *prestonorum* occur within nine miles of *A. thoosa colorado* in Montezuma County and within three miles at Durango in La Plata County. The larval and pupal characters of all examined immatures from these populations (immature sample size = 53) have shown little variation and are more consistent of *A. julia* as described. The average number of years it took pupae to emerge after overwintering is 1.05 years, similar to all other populations and ssp. of *A. julia* I recognize. Similarly, the average number of years it took *A. thoosa colorado* pupae to emerge after overwintering is 2.82 years (immature sample size = 17) which is similar to all other ssp. of *A. thoosa* from the Great Basin and SE Arizona with reared *A. julia* and *A. thoosa* pupae exposed to identical lab overwintering conditions. It is clear that more research including DNA and genitalia studies might be helpful in understanding the relationship between *A. julia* and *A. thoosa* in SW Colorado and Northern New Mexico.

Anthocharis julia prestonorum can also be confused with *A. julia julia* because of the following reasons: First, the coloration of last instar larvae of both taxa are very similar to each other as well as to other ssp. of *A. julia*. Second, the variation in the curvature of the pupal cones of both taxa are similar. Third, both subspecies fly in similar habitat and elevation preferences in Colorado where *prestonorum* inhabits mostly the western side of the Continental Divide (within the middle Colorado River Drainage and southward) and nominotypical *julia* inhabits the eastern side (but west of the Divide in the upper Colorado River Drainage and northward). Fourth, the white dorsal surface coloration and variation of the black discal cell bar width is similar when comparing males of both subspecies.

Only thorough examination of the color of the ventral hindwing mottling can one distinguish adults of *A. julia prestonorum* from *A. julia julia*. Also, the amount of coloration on the dorsal surface of nominate *julia* females vary from mostly yellow with a hint of white toward the dorsum of the dorsal forewings to entirely white, thus are similar to *prestonorum*. However, fully white female *A. julia julia* represent a very small percentage in any given population unlike *prestonorum* females in which all known females are fully white and thus uniquely identified by this trait.

Lastly, the dorsal surface of female *prestonorum* can resemble some white females of *A. thoosa coriande* which have a thin discal cell bar (some *coriande* female females have wider discal cell bars similar to *A. thoosa colorado*). However, topotypical *coriande* larvae and pupae have been examined and they have the characters of *Anthocharis thoosa* and not *A. julia*. Also, the farthest south *A. julia* nr. *prestonorum* appears to have been recorded is in extreme northern New Mexico (nr. Dulce Lake, Rio Arriba County). This is approximately 10 to 15 miles south from of the border with Colorado (Archuleta County), approximately 100 miles NNW of the type locality of *coriande* (Santa Fe County, New Mexico).

Acknowledgments

Special thanks to Dr. Andy Warren, Collections Manager at the McGuire Center for Lepidoptera and Biodiversity (Gainesville, Florida) for guiding me through their innumerable orangetip specimens; to Mike Fisher for his input on the *Anthocharis sara* complex in Colorado and western Colorado geography and to James Scott (Lakewood, Colorado) for my participation and for records published in Papilio #12.