

CATOCALA BENJAMINI UTE N. SSP. FROM SOUTHEASTERN UTAH
(NOCTUIDAE: CATOCALINAE)

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ABSTRACT. *Catocala benjamini ute* n. ssp. is described from the high deserts of southeastern Utah. The three known locales in the vicinity of Moab, Utah represent a significant eastward range extension for the species. The new subspecies presumably feeds on *Quercus x pauciloba*, the principal oak growing at the locations where adults were collected.

Additional key words: *Catocala andromache*, *Catocala chelidonia*, *Quercus x pauciloba*.

Catocala benjamini was named by A. E. Brower in 1957 as a race of *Catocala andromache*. Its taxonomic status was essentially unchanged in Franclemont and Todd's (1983) checklist, wherein *benjamini* was recognized as a subspecies of *andromache* and grouped within the *Catocala delilah* complex of species—a group of about a half dozen, mostly western Nearctic, medium to small, yellow-winged, oak-feeding underwings. In 1982 Brower elevated *benjamini* to full species status, after noting that *Catocala andromache* and *C. benjamini* flew sympatrically over portions of their respective geographic ranges. In his treatment of the *delilah* group, Hawks (1986) also regarded *benjamini* to be a full species that ranged from desert mountain areas in California to southwestern Utah south through much of Arizona (presumably the insect occurs further south into Mexico). Here we extend the known geographic range of *benjamini* to eastern Utah (Fig. 9) and describe a phenotypically distinct geographic segregate that is associated with stands of *Quercus x pauciloba* [= *gambelii* × *turbinella*].

Catocala benjamini ute Peacock & Wagner new subspecies
Figures 1–3, 9

Diagnosis. Adults, especially females, average somewhat larger than the nominate subspecies and some Arizona populations (see Table 1). The orange-brown ground color of the forewing distinguishes most individuals—there are fewer charcoal, gray, steel-blue, and white scales or scale patches contributing to the forewing patterning (Figs. 1, 2, 4, 5). The subreniform spot tends to be pale orange and irrorated with dark scales; in the nominate subspecies the subreniform is

consistently whiter (paler). The adterminal line in the forewing tends to be evenly undulate, and bounded distally by pale orange spots that frequently fuse (there are decidedly fewer black scales in the adterminal and terminal areas of the wing than in the nominate taxon); likewise on the underside of the forewing the adterminal area tends to be pale orange with reduced black scaling, and is rarely checkered as in the nominate subspecies (Figs. 5, 6). In about half the specimens we had for study, the forewing tends to be more triangular with a more acute apex (Fig. 1) than typical *Catocala benjamini benjamini* (Fig. 4). The venter of both wings tends to be a warmer (more saturated) pale orange than that of both nominate and Arizona populations (Figs. 3, 6). There are fewer dark scales suffusing the basal area of the hindwing common to other races of *benjamini*.

Description. *Forewing length:* male 22–23 mm, mean 22.4 mm, s.d. 0.5; female 24–27 mm, mean 25.3 mm, s.d. 1.1. Ground color: peach-orange-brown, with little charcoal, gray, and steel-blue scaling; white scales sparse on all wing surfaces. *Forewing:* nearly always with short basal line that ends over Cu; antemedial band double; running obliquely to inner margin, though often broken across lower half of wing; reniform spot small, diffusely margined with black; subreniform spot usually differentiated, peach-orange, lightly peppered with dark scales (white scales present in other populations absent); postmedian band complete, dodging outward distad to reniform spot, then running obliquely inward to costa; diffuse dark patch just distad of where pm line meets costa; subterminal line present as two blurry teeth near M1 and M2.; often small cluster of dark scales at forewing apex; scales mostly peach-orange distal to evenly scalloped adterminal line; venter with adterminal and apical areas decidedly peach-orange with reduced gray scaling (relative to the nominate subspecies). *Hindwing:* basal portion of wing with reduced dark scaling relative to the nominate subspecies; outer black band broad, at least twice the width of the inner black band; anal spot well developed, usually free of outer dark band; inner band often with well-developed anal hook that dodges toward inner margin above anal spot; fringe checkered where M and Cu reach margin. *Thorax:* dorsum warmer brown, not gray brown as in nominate subspecies. *Abdomen:* dorsum yellow-orange



FIGS. 1–6. *Catocala benjamini* adults. (1) *Catocala benjamini ute* holotype male, Arches Natl. Park, Grand Co., UT. (2) *Catocala benjamini ute* female, SR 313, Grand Co., UT. (3) *Catocala benjamini ute* male venter, Arches Natl. Park, Grand Co., UT. (4) *Catocala benjamini benjamini* male, Hualapai Mtn. Rd., Mohave Co., AZ. (5) *Catocala benjamini benjamini* female, near Payson, Gila Co., AZ. (6) *Catocala benjamini benjamini* male venter, near Payson, Gila Co., AZ.

with dark scales absent or sparse (compare Figs. 2 and 5).

Holotype male (Fig. 1): UTAH: Grand Co., Arches National Park, Balanced Rock Area, 1610 m, 7–8 June 2000, J. W. Peacock, 15W blacklight bucket trap, PMNH, Yale University, New Haven Connecticut.

Paratypes: 9 males and 17 females, 2 unsexed. UTAH: Grand Co., SR 313, 2.75 km W of jet. US 191, 7–8 June 2004, 1550 m, J. W. Peacock, bait trap, 1 female (JWP); Arches National Park, Balanced Rock area, 1550 m, 7–9 June 2000, J. W. Peacock, 15W blacklight bucket trap, 1 male, bait trap, 1 male, 1 female (JWP); Arches National Park, Rock Pinnacles area, 1550 m, 7–8 June 2000, J. W. Peacock, bait trap, 1 male, 1 female (JWP); Arches National Park, Courthouse Rock area, [1280 m], 7–9 June 2000, J. W. Peacock, 15W blacklight bucket trap, 1 male, 3 females, bait trap, 1 male, 6 females (JWP); Arches National Park, vicinity of Courthouse Rock, 1435 m, 7–8 June 2004, at bait, 1 male, 1 female (JWP); Arches National Park, Courthouse Wash area, [1250 m], 7–8 June 2000, J. W. Peacock, bait

trap, 1 male, 2 females (JWP); Arches National Park, Petrified Dunes area, 1550 m, 7–9 June 2000, J. W. Peacock, bait trap, 2 males, 2 females (JWP). UTAH: San Juan Co., Canyonlands National Park, Squaw Flats Campground, 1710 m, 4 June 1994, B.C. Kondratieff and P.A. Opler, at light, 2 adults. All JWP on indefinite loan from Arches National Park.

Etymology. The subspecies is named after the Native Americans who most recently lived in this portion of Utah.

Life History Notes. *Catocala benjamini ute* is a denizen of high deserts and canyonlands of southeastern Utah (Figs. 7, 8). Our collection sites are from transitional areas between high desert sage communities and the lower reach of the juniper belt.



FIGS. 7–8. Habitat of *Catocala benjamini ute*. (7) JWP hanging bait trap at type locality: the low-lying green shrubbery at JWP's feet is the presumed host oak, *Quercus x pauciloba*. (8) Typical canyonlands habitat in Arches National Park, Moab, Utah.

Trees (junipers and oaks) are widely scattered, if present (Figs. 7, 8). The most widespread, and in some cases only oak at the collection sites is *Quercus x pauciloba* (= *Quercus undulata*) (Fig. 9), a tree of hybrid origin derived from *Q. gambelli* and *Q. turbinella* (USDA, NRCS, 2009; Michael Kuhns personal communication), a narrowly distributed large-acorned, scrubby oak of southeastern Utah and Arizona. We have not taken *benjamini ute* from stands of gambel oak in Arches and other nearby sites. Our collecting dates are all from the first ten days in June, and over these dates adults at light and in bait traps were in good to very good condition, indicating that adults had not been on the wing for long. Elsewhere the species is known to fly from late May through July with stragglers taken into September

(Hawks 1986). Adults were relatively common in bait traps in 2000—eight to twelve adults were found in each of several bait traps after a single night of collecting. Numbers approached those of *benjamini* taken in bait traps in the Hualapai Mountains near Kingman, Arizona and in the Santa Rosa Mountains in Riverside Co., California in the same year. Fewer moths of both sexes were taken in the light traps run at the same locations. Numbers were lower when JWP returned in 2004—few moths were taken in either bait traps or at light despite comparable sampling intensity.

DISCUSSION

Catocala benjamini shows substantial differentiation across its geographic range in the American Southwest.



FIG. 9. Known distribution of *Catocala benjamini ute* (stars), *Quercus turbinella* (solid circles), and *Quercus x pauciloba* [*Q. gambelli* × *turbinella*] (open circles). Map reproduced from on-line version of Albee *et al.* (1988): <http://earth.gis.usu.edu/plants/index.html> (accessed January 2009).

Table 1. Forewing measurements for three populations of *Catocala benjamini* (in mm).

Taxon	Males				Females			
	no.	range	mean	s. d.	no.	range	mean	s. d.
<i>benjamini benjamini</i> (Mohave and Gila Counties, AZ)	14	20–23	22.3	0.8	13	21–25	23.8	1.2
<i>benjamini "benjamini"</i> (Riverside Co., CA)	6	20–22	21.0	0.9	6	21–24	22.8	1.0
<i>benjamini ute</i> (Grand Co., UT)	10	22–23	22.4	0.5	16	24–27	25.3	1.1

Hawks (1986) proposed manuscript names for three new subspecies from California and southern Arizona and here we describe a distinct phenotypic segregate from the most northeasterly portion of the moth's geographic range. The forewings of *Catocala benjamini ute* are more evenly yellow-orange and by comparison have fewer black, gray, and white scales, and the larger wingspan also distinguishes some females of this subspecies (Table 1). The three known localities for *C. b. ute* represent an eastward range extension for *benjamini* which was previously known only from Washington County, Utah, in the southwestern corner of the state.

It is not known if and to what extent the populations of *benjamini ute* in eastern Utah are disjunct from those of the nominate subspecies. JWP visited three other locations with *Quercus x pauciloba* in search of *benjamini ute* without success. These included seemingly suitable habitat in Canyon de Chelly, Apache County, Arizona; near Monument Valley Navajo Tribal Park, San Juan County, Utah; and a desert scrub area approx. 8 km W of Bluff, San Juan County, Utah. *Catocala chelidonia*, which JWP has collected in association with *benjamini* near Kingman, Arizona and *benjamini* in the Santa Rosa Mountains, California was common in bait traps at all three of these other locations (Canyon de Chelly, Monument Valley, and Bluff). While our failure to find *Catocala benjamini ute* at these three sites is (weakly) suggestive that *benjamini* from Grand County, Utah represents an outlying population, it is also true that many areas in southern Utah and northern Arizona have not been adequately surveyed. Elsewhere *Catocala benjamini* is associated with shrub live oak (*Quercus turbinella*) (Hawks 1986), one of the presumed parental lineages from which *Quercus x pauciloba* is derived (USDA, NRCS. 2009; Michael Kuhns personal communication). Johnson (1985) reared both *Catocala andromache* and *C. benjamini* ex ova on *Q. turbinella*, and wild populations of *C. benjamini* in California are often taken near stands of oak. As noted

above, we have not yet found *C. benjamini ute* in gambel oak stands, and distributional data indicate that this host is not utilized (by members of the *Catocala delilah* complex).

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