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Notes on the Santa Monica Mountains hairstreak *Satyrium auretorum fumosum* Emmel and Mattoni

Since naming this subspecies (Emmel, J. and R. Mattoni. 1990. *Jr. Res. Lepid.* 28:105-111) several new observations have been made that bear on its conservation biology. Although the life history remains to be formally described, one rearing cycle has been observed in captivity by J. Emmel from eggs laid by a captive female taken 16 June 90 on *Eriogonum fasciculatum* at Carlisle Canyon, Los Angeles Co., CA. The female producing these eggs was confined by Pasko with scrub oak, *Quercus berberidifolia*, but the c. 25 ova recovered were all found embedded in the depressions of the paper toweling lining the bottom of the box. Egg diapause was followed by 15 larvae emerging in late spring with all larvae feeding to pupation and eclosion. The 10 larvae retained by Pasko were reluctant to start feeding on the fresh but mature shoots of *Q. berberidifolia* provided for food. The earlier hypothesis of Emmel and Mattoni asserted that the butterfly was restricted to scrub oaks, mostly *Q. berberidifolia* in the Santa Monica Mountains, a relative of the known scrub oak foodplant of the nominate subspecies. Adults were never observed on or around scrub oak in the Santa Monica Mountains. Until now *fumosum* appeared to have a highly limited distribution and was also very sparse where found. This represents an unusual pattern for an insect taxon unless it were near a terminal stage of extinction.

Initial field observations noted that adults were rarely found nectaring, and when nectaring was observed the source was always common buckwheat, *Eriogonum fasciculatum*. On 29 May 1993 Pasko again observed several flight worn *fumosum* nectaring at the small isolated patch of *E. fasciculatum* in Carlisle Canyon where the 1990 specimens were taken. Nearby were two small scrub oaks and several large trees of coast live oak, *Q. agrifolia*. Upon tapping the branches of both oak species, one male *fumosum* was obtained from *Q. agrifolia*. Further searching led to the discovery of several of both sexes on another *Q. agrifolia* several hundred feet away from the first tree. No additional adults were observed from ten other trees in the vicinity. On 23 April 1994 Pasko confirmed *Q. agrifolia* as the correct foodplant by collecting eight last instar larvae in the field at the Carlisle Canyon site. These larvae were taken by beating the lower terminal branches that bore young and tender new growth leaves.

At this Carlisle Canyon site a group of about 25 mature *Q. agrifolia* trees form an isolated patch as an oak savannah association within which *fumosum* larvae were found on only four trees. Many of these trees, however, are large and cannot be adequately sampled for either larvae or adults. Ants were always present, but specimens were not retained for identification and no specific ant-larvae interactions were seen although the species is known to be strongly attractive to ants (G. Ballmer, pers. comm.). Large numbers of microlepidoptera larvae were also present that could account for the presence of the large number of ants.

Five of the eight larvae were parasitized by an unidentified species of small Diptera. The three survivors located pupation sites within two days and eclosed

indoors between 12 and 15 May 1994. Several visits to the Carlisle Canyon site failed to produce sightings of adults until 28 May. In 1993 most adults were flight-worn by this date. On May 28 two adults were found on the same tree that yielded the 1993 females and the 1994 larvae. On 4 June 1994 five additional adults were taken and four more seen, again on the same tree with none on any other tree at the site. The small *Eriogonum* patch was just starting to bloom and no adults were observed.

The following day, with knowledge of foodplant and flight time confirmed, another live oak savannah stand was visited near Lake Malibu (*fumosum* type locality) in the Santa Monica Mountains National Recreation Area. Tapping the lower branches of several live oak trees quickly yielded adult *fumosum*. As at Carlisle Canyon, adults are sedentary and fly up only when disturbed. However, they return to perch within a few seconds, a behavior more pronounced for females. Males were occasionally observed to engage in short chases with one another before settling. A colony of the copper *Tharsalea arota nubila* occurs at this site and many males simultaneously perched on the outer branches of the live oaks. The male coppers, easy to discriminate by their larger size and lighter color than *fumosum*, tended to fly somewhat longer after disturbance. At this site *fumosum* is more abundant than at Carlisle, but by no means common. Butterflies were observed on seven trees out of 20 examined. A number of additional trees were present but not examined because of the hilly terrain and heavy understory.

Several males were observed nectaring in two separate small *E. fasciculatum* patches. A second visit on 11 June resulted in the observation of three males and five females on the oaks and four males nectaring on *Eriogonum*. A final visit on 17 June provided no observations at this site or at any of four other live oak savannah assemblages in the vicinity. No adults were observed on the few scrub oaks in the area. From observations over the past four years, nectaring usually occurs between 1100 and 1330 hours, although on hot days they may be observed nectaring as late as 1600.

Although *Q. agrifolia* is abundant and widespread across the northwest slopes of the Santa Monica Mountains, many trees are on private property or other disturbed land where much of the undergrowth, including *E. fasciculatum*, has been altered or removed. What effect this may have on *fumosum* populations is unclear. The advent of frequent anthropogenic fires in the area is another potential threat since ova diapause on oak branches.

As a further note to adult feeding, Mattoni earlier observed *S. auretorum spadix* near Lebec, CA imbibing on excretions from scale insects found on its scrub oak host at that locality. Several adults were observed simultaneously feeding in this manner on two scale colonies. Adults were rarely seen at floral nectar sources and were generally thought to be scarce.

In summary: 1) Adults of the subspecies *S. auretorum fumosum* spend most of their time perching only on coast live oak trees *Quercus agrifolia*. 2) Populations seem to be restricted to only a few "choice" trees with succulent leaves when a number of trees are available. 3) Individual adults appear highly sedentary. 4) The populations appear structured as a series of metapopulations with minimum interchanges among colonies, each delineated by an individual tree. 5) There is not a uniform population continuous with the live oak savannah of the region. 6) Adults rarely nectar, and when they do they were observed only on *Eriogonum fasciculatum*. Adults may take sustenance from scale insect secretions or possi-

bly sap runs and slime fluxes. 7) Larvae require very young tender shoots for survival.

We thank the National Park Service, Santa Monica Mountains National Recreation Area for their cooperation in permitting this work. We strongly urge the listing of the species as endangered for the reasons cited.

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New courtship posture in females of two Chilean butterflies: Rejective or receptive?

Two species of *Hylephila* Billberg inhabit the large lawns of the Chilean air force academies at the "comuna" El Bosque of Santiago. *H. fasciolata* (Blanchard) Gay and *H. signata* (Blanchard) Gay are on the wing from late August to early May in successive broods. Both are common, successfully surviving the blades of the lawn mowers. The males are typical perchers, using the taller grass blades, flowers of *Taraxacum officinale* (L.) Webb., *Leontodon taraxacoides* (Vill.) Merat, *Bellis perennis* L. (all Asteraceae), and bare soil as perching sites from which they intercept passing *Colias vautieri*, *Tatochila mercedis* and their congeners. In mating couples the female carries the male when disturbed (see *H. signata* couple in Figure 1 with male hanging below). The females have a special way of laying their white, hemispherical, smooth eggs: they walk on the grass with their abdomen curved below and forward, searching for the proper oviposition sites with the exploratory tip of the abdomen.

October 27, 1993 was a typical clear, warm, late spring day in Santiago (air temperature about 28 C). At 14:00 hrs, high flight activity was observed over the lawns. In the air, only a few cm above the grass, a male *H. fasciolata* courted a female. The female landed on the ground on the edge of a small opening in the lawn about 3 inches in diameter. The male landed immediately after her and about 1.5 inches behind. He approached the female in small jumps, each time fluttering his wings in what looked like a showy, ritual "dance." It is possible that the fluttering released pheromones from his front wing androconial patches. During the male's courtship, the female was totally passive and did not move, but when the male got closer, the female suddenly began to vibrate both her hind legs in an up-and-down motion, in effect creating an impenetrable barrier. The behavior appeared to be an effective new repulsive posture. The vibration was too fast to detect whether the legs moved together in parallel or in a scissors-like movement. When the male got closer and was only a few mm behind and to her side, the female flew away.

A few days later (November 1, 1993), 150 km to the north, at Pichicuy, on the Pacific coast, at 15:00 hrs, a low courtship flight of the dwarf blue *Pseudolucia benyamini* Balint was observed. The flight was not more than 30 cm over the ground and among the cushion-like food plants *Chorizanthe vaginata* Benth (Polygonaceae). The female landed on a flowering head and started to walk on it with the male following close behind her. Once again I saw the hind legs vibrating in the female, but within about five seconds they copulated. Thus, it is



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