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A LATE-SEASON EMERGENCE OF *CALLOPHRYS* (*SANDIA*) *MACFARLANDI* (LYCAENIDAE)

Callophrys (*Sandia*) *macfarlandi* Ehrlich & Clench is extremely restricted in larval foodplant utilization, although it is widely distributed and often common in much of New Mexico east of the Continental Divide (Holland, 1974, J. Lepid. Soc. 28:38–52). It appears to be an obligatory feeder on *Nolina texana* Wats. (Liliaceae). In the small portion of New Mexico which is south and west of Truth or Consequences, *N. texana* is replaced by *N. microcarpa* Wats., seemingly without intermediate forms. The two species of *Nolina* never occur together in New Mexico, although they come within 30

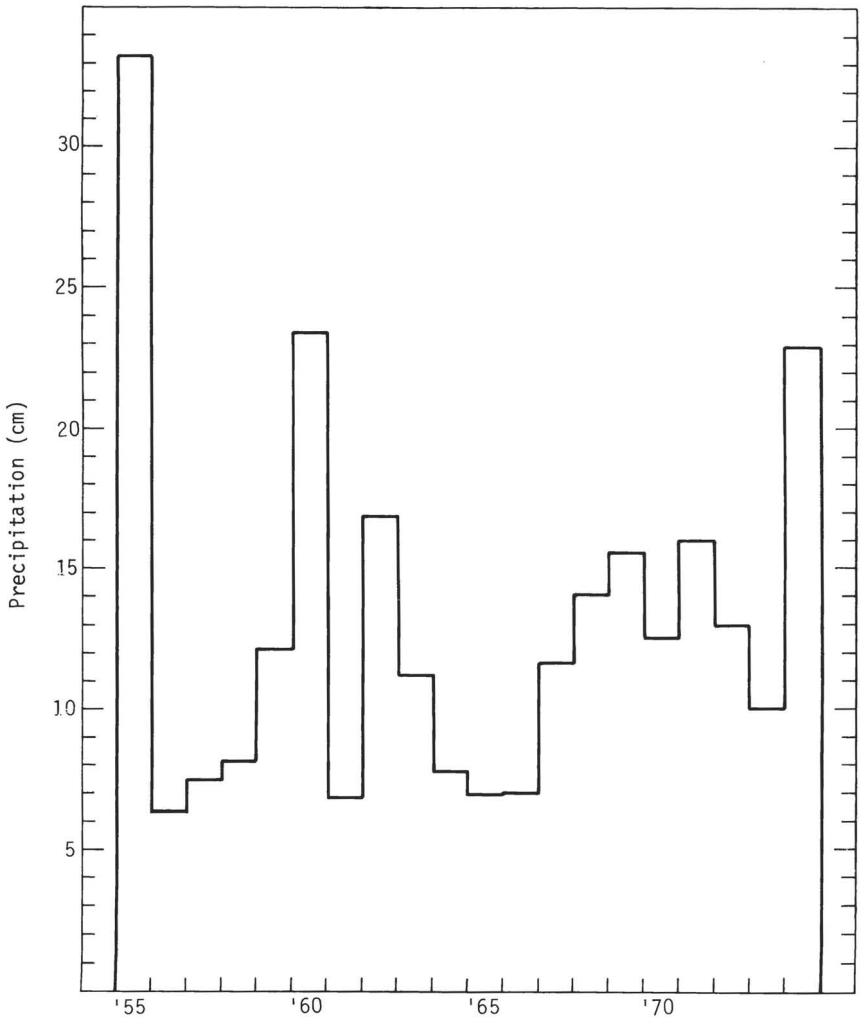

FIG. 1. July rainfall at Sunspot, NM, for 1955–1974.

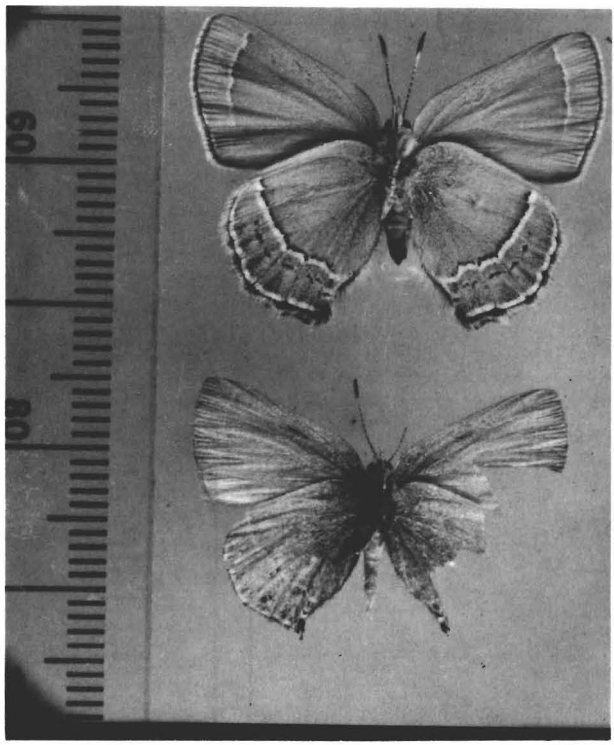

FIG. 2. ♀ **(upper)** and ♂ **(lower)** *Callophrys* (*Sandia*) *macfarlandi*, ventral surfaces, 19·VIII·74, Grapevine Can., Sacramento Mts., Otero Co., NM, 6000′ (1640 m).

mi. (50 km) of contact in some places. *Callophrys macfarlandi* has never been observed in association with *N. microcarpa*. On the other hand, whenever one locates a stand of *N. texana*, no matter how isolated from other stands, one can nearly always find *macfarlandi*. It has not yet been determined whether *macfarlandi* will accept *microcarpa* in captivity when no choice is offered. The most obvious distinguishing feature between the two species of *Nolina* is the height of the inflorescence. In *texana*, the inflorescence is about the same height as the leaf, while in *microcarpa* the inflorescence is approximately twice the leaf height. This gives *microcarpa* some resemblance to *Yucca*, a genus closely related to *Nolina*.

Callophrys macfarlandi larval feeding is restricted not only to *N. texana* but, in particular, to the bloom of the plant. *Nolina texana* normally blooms in April or early May, depending on the location. Fresh *macfarlandi* have been captured from 15 February to 29 June, however, with no clear pattern of discrete broods. This seasonal distribution raises some difficult questions. First, it is uncertain how many generations of *macfarlandi* occur in a given year. Blooms stay fresh long enough and the *macfarlandi* larval stage is brief enough that two complete generations may be possible. However, there is definitely no bloom available under any circumstances in June. This seemed to mean the late May and June emergers are either a "suicide brood" or the species is able to pass the fall and winter as ova. One would normally expect natural selection to act very swiftly against genotypes with a "suicide brood" proclivity. This viewpoint would favor the fall-winter, ova-diapause hypothesis. The problem with that

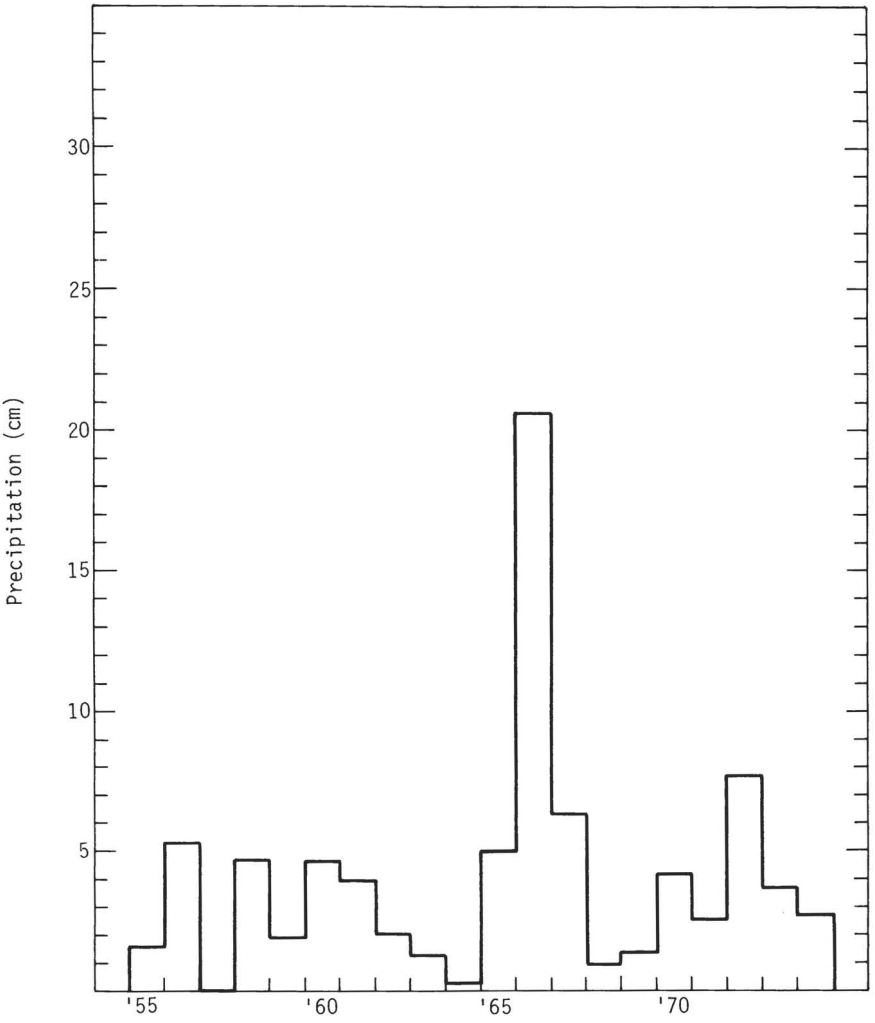

FIG. 3. June rainfall at Sunspot, NM, for 1955–1974.

hypothesis is it is incompatible with the February flight, unless *macfarlandi* can diapause either as ova or pupa.

A purely speculative explanation for these observations may be found in a series of events which took place in 1974. This year was marked by an exceptionally wet July around Alamagordo, Otero Co., NM. Rainfall records were kept for a 20-year period from August 1954, to July 1974, at Sunspot, NM, high in the Sacramento Mts. near Alamagordo (Demastus, 1976, A twenty-year summary of Sacramento peak weather—August 1954 through July 1974, Sacramento Peak Observatory, Air Force Geophysics Laboratory, Hanscom AFB, Massachusetts 01731, AFGL-TR-76-0096, Special Report No. 196). July rainfall at Sunspot is graphed in Fig. 1 for these years. It may be seen

that July 1974 was significantly wetter than any other July between 1964 and 1974. (These eleven seasons include the ones in which I had been active in New Mexico and consequently, for which I have overlapping data both on rainfall and Lepidoptera.)

In August 1974 around the Sunspot-Alamagordo area, the *Nolina* did a very unexpected thing, apparently in response to the extreme wetness of July: Many of the plants bloomed a second time. The August inflorescence was quite dwarfed compared to the normal bloom; its height was perhaps one fourth of the height of the spring inflorescence.

On 19 August 1974, I checked a summit in the Sacramento Mts. foothills about 5 mi. (8 km) SE of Sunspot. This particular summit has often produced interesting hilltopping specimens, although *macfarlandi* does not usually hilltop. In this case however, I was rewarded by the capture of a fresh female and an extremely worn male (Fig. 2). Despite the tattered condition of the male, it seems unlikely this small lycaenid could have been on the wing since June.

If we again refer to Fig. 1, we see that the July 1955 and 1960 precipitation was also great enough at Sunspot to have caused the *Nolina* to bloom again in August, had anyone been there to look. I, thus, suggest that the *macfarlandi* which emerge in June may be favored by virtue of their progeny being able to utilize the August flowering of their foodplant if very heavy July rains intervene. If this strategy is successful three years out of twenty, as our limited data here indicates, the selection pressure against June emergence would, at least, be considerably mitigated. Normally, June is far drier than July in the Alamagordo area; however, highly unusual rains in June 1966, could conceivably have triggered a second blooming of *Nolina* that year also (see Fig. 3). If this indeed occurred, the odds for the June emergence successfully completing a life cycle without diapausing as ova improve to four in twenty.

On the other hand, it is fully possible that the "suicide brood" concept is actually correct. For instance Shapiro (1967, J. Res. Lepid. 6:181–183) has demonstrated that in Pennsylvania *Colias* and *Pieris* are subject to suicide eclosions just before the onset of lethally cold weather. Also, the presence of a female *macfarlandi* exhibiting hilltopping (mate-seeking) behavior implies the number of available males at that time and place must have been very low. Whether by accident or adaptation, however, the unseasonal concurrence of *Nolina* bloom and *macfarlandi* eclosion in August 1974 is a most interesting example of desert survival.

The American Museum of Natural History has *macfarlandi* specimens of both sexes taken by F. H. Rindge at Sitting Bull Falls near Carlsbad, Eddy Co., NM, on 27 and 29 July 1964. I am not personally familiar with that site and feel unqualified to speculate on a relationship between this record and my own observations.

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J. McCaffrey formerly of Sunspot, NM, and now at New Mexico State University, Las Cruces, succeeded in tracking down the obscure Air Force precipitation report which made a cohesive presentation of these items possible.

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