OBSERVATIONS OF *EUPACKARDIA CALLETA* IN SOUTHERN TEXAS (SATURNIIDAE)[1]

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Eupackardia calleta (Westwood) is known to occur in southern Texas from the area of Victoria and Beeville south into the Rio Grande Valley and westward into the Big Bend Area (Collins & Weast, 1961; Ferguson, 1971–72). During the latter half of 1974, while temporarily assigned to Fort Sam Houston, San Antonio (Bexar County), I was able to make field observations and rear this interesting and little reported saturniid.

From 9 August–4 December, populations of *E. calleta* were studied at 13 locations in 7 southern Texas counties (Karnes, Goliad, Bee, Live Oak, McMullen, Jim Wells and Duval), primarily by observing immature stages on one of this species' known food plants, cenizo, *Leucophyllum frutescens* (Berland.).

Fifty-seven cocoons were collected from 9 August–28 September. These contained: 18 viable pupae (15 ♂; 3 ♀); 37 pupal cases (15 ♂; 15 ♀; 7 undetermined sex) from which the adults had emerged; 1 parasitized female pupa; and 1 dried, intact larva. All of these cocoons, with viable pupae or otherwise, had a very worn, smooth surface and it was not possible to use the appearance to estimate the cocoon age. Likewise, the age of the cocoon could not be estimated by determining whether or not the silken attachment had ligatured the stem of the food plant, since this condition was observed for some of the cocoons with viable pupae and some without. However, these observations of the appearance of the cocoon surface and the ligaturing of the food plant stems suggest that some of the cocoons with viable pupae were probably as old as some of those from which the adults had emerged.

The eighteen viable pupae were kept outdoors at San Antonio and the adults emerged in 1974 as follows: 14 Sept. (1 ♂); 15 Sept. (1 ♂); 17 Sept. (1 ♂); 18 Sept. (1 ♂); 24 Sept. (2 ♂, 1 ♀); 26 Sept. (2 ♂); 2 Oct. (1 ♂); 7 Oct. (2 ♂); 9 Nov. (1 ♂); 10 Oct. (1 ♀); 11 Oct. (1 ♂, 1 ♀); 13 Oct. (1 ♂); 29 Oct. (1 ♂). Although these pupae were removed from their original collection locations, it is probable that the period of emergence at San Antonio generally coincided with the period of natural

[1] The opinions contained herein are the private views of the author and should not be construed as official or reflecting the views of the Department of the Army.

emergence farther south, since, as noted later, naturally-occurring males were observed in Jim Wells and Live Oak counties on 28 September.

An additional 47 cocoons collected between 26 October and 29 November included 27 with viable pupae (15 ♂, 12 ♀). The 20 cocoons without viable pupae were not examined to determine the nature of the contents, but all had the same smooth, worn appearance mentioned earlier, indicating that they were not recently formed. The cocoons with viable pupae were of recent origin because they were white and powdery in appearance, and had short, loose silken threads on the surface or silken networks still attached to various parts of the food plant. Observations of the larvae reared at San Antonio during 1974 showed that they spin a silken network upon which they construct the typical teardrop-shaped cocoon. After the cocoon has taken form, the larva secretes a white fluid which, upon drying, imparts the powdery appearance. The silken threads and the powdery appearance evidently disappear with weathering and their presence is a reliable indicator of recent formation.

Several naturally occurring adult males of *E. calleta* were observed in two instances in southern Texas. The first instance relates to the female that emerged at San Antonio on 24 September. This female was transported to Live Oak Co. on 28 September and set out at 0845 CST. Seven males were attracted from the surrounding cenizo fields within 5 minutes. The eggs from this mated female were used to colonize this species at San Antonio. This method of survey for adult males would have been used more extensively if there had been more females among the viable pupae collected up to 28 September. The second instance was in Jim Wells Co. on 28 September where binoculars were used to observe males flying over the extensive cenizo fields that occur along U.S. Highway 281. The straight-line flights of 3 males were observed for some time in the hope that the moths would pause, circle, or drop into the vegetation and possibly indicate the presence of a naturally occurring female. No such behavior was observed, and the males eventually flew out of sight.

Since no observations were made between 28 September and 16 November, the dates of occurrence of early instar larvae were not determined. However, 4th- and 5th-instar larvae were observed in Goliad and Bee counties between 16 November and 4 December. Larvae observed on 16 and 29 November were inactive, with only a few feeding or spinning cocoons. This was probably due to the cool temperatures (6–7° C) prevailing at the time. The last observations in Goliad and Bee counties were made on 4 December. At that time a few more cocoons had been formed, but most of the larvae were still inactive and

not feeding. Eighteen 5th-instar larvae were collected on 4 December and transported to San Antonio where they were kept on cenizo cuttings. Some of these larvae began spinning in transit; all had spun cocoons by 7 December. The fact that these larvae began spinning within hours after being placed in a warm environment suggests that they might have remained inactive on the plants in Goliad and Bee counties (as they had from 16 November–4 December) until the return of warm weather in early spring. Unfortunately, follow-up observations of these natural populations could not be made.

Although the foregoing observations provide specific records of the occurrence of *E. calleta* life stages in southern Texas, they are from scattered areas and chronologically incomplete. As such, they provide only limited insight into some aspects of the biology of this species. One interesting observation is that certain of the cocoons, with or without viable pupae, were very similar in surface appearance; and that cocoons of both types had ligatured the food plant stems. This suggests that for individuals of a single generation there is considerable variation in the time period between cocoon formation and adult emergence. In this regard, Kendall (1974) has observed that some *E. calleta* pupae remain in diapause for up to 22 months. Thus it is understandable that confusion exists concerning generations represented by the reported annual bimodal emergence (March and September–November) of *E. calleta* in southern Texas. Collins & Weast (1961) reported that *E. calleta* emerges in southern Texas from late October through November, with a partial second emergence occurring the following March. Ferguson (1971–72) reported that there is a partial emergence of *E. calleta* in March in southern Texas, followed by a larger emergence which takes place from September–November. Although these authors do not specifically refer to these emergences as generations, this is alluded to in later statements concerning the fact that *E. calleta* is known to emerge in Arizona only in August, and that there may be only one generation of this species in Arizona. Annual bimodal emergences are known for other saturniids, such as *Hyalophora cecropia* (Linnaeus). In Illinois, *H. cecropia* has two distinct periods of emergence which are very close together (May–early June and late June–July). However, these two periods of emergence are known from an intensive 3-year study by Sternburg & Waldbauer (1969) to represent a single generation. In the case of *E. calleta*, the March and September–November emergences may represent individuals from two or even three earlier generations, but this situation requires considerably more detailed study to be understood. The observation that larvae remain inactive on the food

plants during cool periods in late November and December could represent a mechanism whereby the development of individuals from a single generation becomes out of phase; with the adults eventually emerging during one or the other of the annual bimodal periods. Certainly, there was considerable variation in the progress of development among individuals that might be considered to represent a "fall" generation; some had formed cocoons and pupated as early as 16 November in Karnes Co.; others were still in the 4th instar as late as 29 November in Bee Co.

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