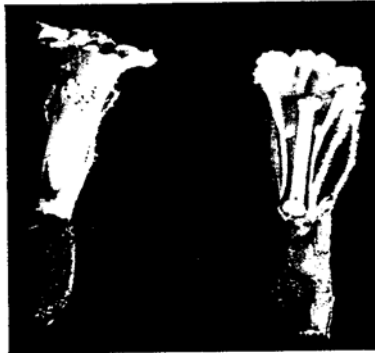


Bull. S. Calif. Acad. Sci.  
20.1.1939



A.

B.

PLATE 26

*Pholisma paniculatum* flower, enlarged x 2¼.

- A. Flower showing glandular hairlines on calyx and outside of limb of corolla.
- B. Vertical section of flower showing the extent to which the stigma protrudes beyond stamens, and also the subtending bract.

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3. A NEW BOTANICAL RECORD FOR CALIFORNIA

By BONNIE C. TEMPLETON

PLANTAGO INDICA L. (*Plantago arenaria* W. & K.)

The plants were found growing densely in the stabilized areas of the El Segundo sand dunes. This species should not be confused with *P. psyllium* L., which has its lower bracts short acuminate simply carinated while those of *P. indica* L. are long acuminate and the carina is scarcely distinguished from the lamina.

Robt. Pilger, in his revision of the genus *Plantago* in Pflanzenreich IV, June, 1937, page 418, reduced *Plantago arenaria* W. & K. to a synonym of *P. indica* L. This plant was first collected in this area August 4 of this year (1938).

#### 4. THE BLACK WIDOW SPIDER AND ITS PARASITES

By W. DWIGHT PIERCE, PH.D.

The black widow, *Latrodectes mactans* (Fabricius) has attracted, justly, much attention in California in late years, because of its growing abundance, and the numerous cases of serious, often fatal bites. An excellent bulletin on its life history was published by W. B. Herms, S. F. Bailey and Barbara McIvor as Bulletin 591, California Experiment Station.

Three parasites have been recorded: a chloropid fly, *Pseudogaurax signata* (Loew) (*Gaurax araneae* Coquillett), found in California, which deposits its eggs on the outside of the egg sac, and the larvae entering, feed upon the spider eggs; an ichneumonid, *Gelis* sp., found in California, which is also a predator in its larval stage; and a scelionid, *Baeus latrodecti* Dozier, of Haiti, which has not been found elsewhere.

Our work on the sand dunes, in which Dorothy Pool and Charles A. Fleschner were associated, has resulted in finding the *Pseudogaurax* and a new *Baeus* parasitizing the black widow egg balls, which are very numerous in clumps of cactus, *Opuntia occidentalis littoralis*. The *Pseudogaurax* is already known in Los Angeles County, through the excellent work of George Elwood Jenks, who published a beautiful series of photographs in Natural History for June, 1938.

The *Baeus* is a tiny creature with wingless female, and winged male. The female might have great difficulty reaching spider egg balls, if it were not for the fact that she is a great jumper, being able to jump at least two inches, which is over 65 times her length. For this purpose her hind legs are considerably longer than her body.

Dozier was able to keep *Baeus latrodecti* females alive eight days, and males four days. We have done better with *B. californicus*. On August 12, 1938, a lot of parasites issued, and many were alive ten days later, the last one dying on the fourteenth day having received no food whatever. An egg capsule collected August 17 yielded parasites on August 24, and some were alive ten days later when a mite infestation necessitated fumigation and loss of the colony.

In all, between August 10 and 24, 38 egg balls were found in cactus clumps on the dunes. Of these all but five had hatched, but examination of the balls readily discloses whether parasites had been present. *Baeus californicus* was bred from two of the five balls.

By direct observation of parasites entering the balls, and also of finding adults in a ball in which no eggs had yet hatched, we know that the female cuts her way into an egg ball and parasitizes the eggs. She must oviposit separately in each egg, and from the observations noted below it will be seen that she does this very effectively.

The finding of an egg ball with a hole in it does not prove that the spiders have issued. If the ball is heavy it is probably parasitized.

Of the 38 balls, 26 were unparasitized, while 9 yielded *Bacus californicus* (23.7%), and 2 *Pseudogaurax signata* (5.2%), a total of 28.9% parasitism of balls.

But the parasitism within a ball is not necessarily complete. The *Pseudogaurax* fly oviposits on the outside, and the larvae must penetrate the egg ball and consume the eggs; in one case 11 flies, and in the other 28 issued, but the evidences showed that many spiders also issued, and I calculated less than 50% parasitism.

The *Bacus* has a better record, as we obtained in the cases counted 401 out of 403 (99.5%); 278 (100%); 207 (100%); 236 (100%); 396 out of 408 (97.05%); 274 out of 279 (98.20%); 232 out of 248 (93.54%); and 361 (100%); a total of 2,385 out of 2,420 (98.55%). Thus the number of eggs per ball ranged 207 to 408.

Thus it can be seen that *Bacus californicus* and its relative *B. latrodecti* are the most effective parasites of the black widow yet known, and we can hardly expect greater effectiveness within an egg ball than 98.55%, although we do expect the percentage of parasitized balls to increase.



PLATE 27

Section of egg ball of *Latrodectes mactans* with empty puparia of *Pseudogaurax signata*. Enlarged approx. x 7.

Photo by Cobb.

The females greatly outnumber the males, by about 10 to 1 (264 to 25 in observed case), and the females seem to issue first, but copulation was observed immediately after emergence, and it is quite probable that many are fertilized before coming out.

An attempt will be made to propagate this valuable parasite.  
Description of the new species:

*BAEUS CALIFORNICUS* n. sp.

A parasite of the eggs of the black widow spider, *Latrodectes mactans* (Fabricius), found on the sand dunes at El Segundo, Los Angeles County, California. Type material found by Charles A. Fleischner, Dorothy Pool and W. Dwight Pierce.



PLATE 28

Eggs of *Latrodectes mactans* from which *Baeus californicus* as issuing. Magnified approx. x 15.

Photo by Cobb.



PLATE 29

Face of female *Baeus californicus*.  
Magnified approx. x 77.

This species is slightly larger, darker and quite differently proportioned from *Baeus latrodecti* Dozier, a parasite of the same spider in Haiti; and it differs from *B. minutus* Ashmead, *B. niger* Ashmead, *B. piceus* Ashmead, *B. clavatus* Provancher, and *B. americanus* Howard, all spider egg parasites, by virtue of its lengthened first funicular joint, as well as other characters.

Female: Length 0.766 mm., breadth of head 0.55 mm.; breadth of thorax 0.45 mm.; breadth of abdomen 0.55 mm.; dorsal length of head 0.6 mm., thorax 0.3 mm., abdomen 0.36 mm.; length of antennal scape 0.166 mm., funicle 0.141 mm., club 0.175 mm.; width of club 0.0766 mm. Thus the club is decidedly shorter than the combined scape and funicle. In general, the color of the head, thorax and venter (using Ridgway color standards) is walnut brown; eyes black; abdomen dark Vandyke brown; antennal club and legs cinnamon buff to cinnamon and ochraceous tawny; scape and funicle almost concolorous with head, except that the apical half of the first funicular joint is almost black. Face broadly elliptical, eyes ovoidal, granulate faceted; surface of head finely reticulately carved, with three ocelli, the lateral ones adjoining vertical margin of eyes. Antennae seven-jointed, with stout scape, 5-jointed funicle with first joint almost as long as the four following moniliform joints; club oval; each funicular joint bearing fine apical hairs, and club sparsely clothed with fine white hairs.

Prothorax a narrow band; mesothorax large, metathorax very narrow. The surface of thorax and abdomen is finely reticulate and sparsely setose. The legs being used for jumping, are longer than the body; the anterior measuring 0.86 mm., median 0.93 mm., and posterior 1.08 mm. The posterior femora are toothed at inner apex, tibiae elongate, first tarsal about as long as second and third together, claws very slender.

The first two abdominal segments are very narrow, the abdomen being mainly composed of the third segment. The posterior abdominal segments are fringed with white hairs.

Male: Length 1.083 mm.; divided as head 0.166 mm., thorax 0.5 mm., abdomen 0.416 mm.; length of antennal scape 0.141 mm., funicle 0.40 mm., club 0.010 mm. The male is darker than the female, with eyes and dorsum of thorax black; face, sides and venter of thorax, and abdomen Kaiser brown; antennae and legs clear antimony yellow.

The antennae appear to be only 11-jointed, the funicle being composed of 9 joints, of which the first is longest, the second next, the third the only one not longer than broad; the club is but slightly wider and 1-jointed.

The venation is as described for *B. latrodecti*.

The holotype female and allotype male and numerous paratypes are deposited in the collection of the Los Angeles Museum of History, Science and Art, while paratypes will also be distributed to other museums.

## STUDIES IN THE METAMORPHOSES OF SIX CALIFORNIA MOTHS

By JOHN A. COMSTOCK and CHARLES M. DAMMERS

### ERINNYIS ELLO L.

The early stages of this Sphinx moth have been described by numerous writers in several publications, most of which are not available to the average American student. These references are noted in our bibliographic footnote.

Henry Edwards' description in *Entomol. Amer.*<sup>3</sup> covers the fourth and fifth instars, and the prior description by Dr. Holland in the *Canadian Entomologist*<sup>4</sup> gives the mature larva in both of its color phases, and corrects some misconceptions of earlier writers. There are, however, no available illustrations, and our own rearing of the species enables us to somewhat amplify the previously published records.

This insect has a wide range through tropical America and extends northward along the eastern seaboard into Florida. Strays have been taken as far north as New York and Massachusetts, but it is doubtful if it overwinters north of the frost line.

The larva is dichromatic, there being a green and a brown form. In California the green form predominates, if we may judge from our somewhat inadequate breeding experiments.

The authors were fortunate this year (1938) in being presented with two lots of larvae, the first, taken in San Diego by Capt. W. P. Medlar, and the second (six examples) received from Mr. and Mrs. Carl W. Kirkwood of Santa Barbara. Both lots were taken on Poinsettia.

Egg: This has been described as "dark green, deposited on the under side of the leaves of the foodplant."

Larva; first instar. Holland describes this as "purplish brown."

Larva of 13 mm. length.

Body, green. Mid-dorsally there is a broad longitudinal band of very dark green, bordered laterally with narrow yellowish margins.

The lateral and abdominal surfaces are clear green. The entire body is covered with small round white dots.

Caudal horn 3 mm. long, slightly upcurved, and of a black shade.

Legs, greenish, tinged with reddish brown. Prolegs, green. Anal prolegs green, tinged with orange.

Head, green, with a slight russet cast.

Duration of instar, four days.