

THE LARVAL STAGES OF *SPHINX FRANKII* (SPHINGIDÆ)

by JOSEPH MULLER

Luckily, I find a few of the extremely rare *Sphinx frankii* (Neum.) every year on the light in my own backyard and also on restaurant lights in the neighborhood. Three years ago, I found two females, which were put in paper bags to lay eggs. Having no results after one day, I took them out and tried everything under the sun to make them lay eggs. One laid no eggs at all. From the other female I got six eggs. But all six larvæ died after the second molt. Last year I found two more females, but still not knowing of any better way to obtain eggs I again put them in bags. As before, no eggs were laid the first day. Before changing to any other methods, I left them in the bag for a second day. To my surprise, I found eggs the second, third, and fourth day.

Larvæ started to emerge from the eggs from one female on the fifth day, from the other on the seventh day. Eggs are laid singly. The color of the eggs is not as green as that of other sphingids; instead, it is a yellowish green. On the second day they turn dark yellow and on the fourth and fifth day light yellow. Larvæ were put on elm. For a whole day they did not eat but crawled restlessly over the food plant without stopping. They spun silken threads on which they let themselves down, in the same manner as some geometrid larvæ do. After ash was added, all larvæ immediately settled on it and quieted down and fed. As healthy elm leaves are hard to find, I was glad of this outcome. Detailed descriptions were made of living larvæ in each instar, and these follow.

1st INSTAR (2-3 July): the emerging larva eats either one-half, three-quarters, or the whole eggshell; the color of the larva is chrome lemon yellow, except the caudal horn which is brown with a black tip.

2nd INSTAR (4-6 July): on the first day the larva looks the same, except that the chrome yellow has turned greenish; the next day the larva has grown rapidly and shows yellow lines on the four last abdominal segments; the third day all eight abdominal segments are now yellow lined, the black tip on the caudal horn is split forming a V, and there are two longitudinal yellowish addorsal lines which start at the mesothorax, where they are close together, and run parallel to the base of the caudal horn.

3rd INSTAR (7-9 July): the larva has an all-over bluish appearance now, with the head apple green with two yellowish green bands on each side of the face and covered with minute yellow tubercles; the horn, yellowish laterally, and brown ventrally and dorsally, is covered with minute black tubercles; the two addorsal lines are more open now at the mesothorax and are whitish, and the segment lining is whitish instead of yellow; for the first time a subdorsal line is showing, also whitish; the addorsal lines are covered with minute white tubercles, sixteen between each segment, eight on each side, and the whole body of the larva is covered with numerous white granules giv-

ing it a granulated appearance; the anal plate has yellow edging; a yellow line goes from the horn to the tarsus, and yellowish obliques are faintly visible; the true legs are light yellow. By the end of this instar seven whitish obliques are visible, the last oblique much wider than the rest and going all the way to the black tip of the horn; the bands on the face are yellowish; the segment lining has disappeared.

4th INSTAR (10-14 July): the yellowish face bands are now prominent; all of the caudal horn is green, and the V on the tip is missing; the true legs are green; the last oblique goes halfway to the horn; the addorsal lines reach to the head instead of the mesothorax; the anal plate is lined with white; a whitish subventral line shows through on the meso- and metathorax; the whole body of the larva is granulated; for the first time, the larva is raising the anterior portion of the body when at rest; all markings become more prominent later in the instar.

5th INSTAR (15-20 July): all of the larva looks whitish blue; the addorsal lines narrow from the prothorax to the head but do not join, and the tubercles on the addorsal lines have the same bluish ground color as the larva, except on the thoracic segments, where they are yellow and twice as high as on the abdomen; the horn is bluish dorsally and greenish ventrally; the head between the yellow bands is apple green and bluish behind the bands; the yellowish obliques, still faintly visible, are lined with green cephalad; the edging on the anal plate is yellow; the spiracles, hardly visible, are pinkish, as are the true legs; the ventral tubercles are yellow.

6th INSTAR (21-27 July): at first the face bands of the larva and the edging on the anal plate have changed to greenish; the spiracles are plainly visible now and are pinkish yellow; from each oblique, minute golden yellow granules form a line down to the feet; the subventral line through the meta- and mesothorax is formed by the same colored granules; golden yellow granules cover the body of the larva laterally and ventrally. By the fourth day a blue line has appeared dorsad along the addorsal lines; the cephalad green line on the upper half of the obliques has also turned to blue; plainly visible now is a whitish subdorsal line, thinning out at the thoracic segments; the obliques just about cross this line, except that the last one runs to the base of the horn now and is the most prominent, being twice as wide as the others; the minute granules on the thoracic segments and venter have turned white. When full grown, the larva has a smooth appearance; the color of the larva dorsally and laterally is bluish white; the face of the larva is apple green and the face bands dark green as is the edging of the anal plate; the anal plate and prolegs are apple green and granulated; the caudal horn is greenish and granulated; the dorsad lines along-side the addorsal lines and the cephalad line on the oblique have turned to prominent blue green; the size of the tubercles on the addorsal lines differs somewhat among larvæ, on some being shorter and on others higher; there are only six tubercles on the prothorax now instead of eight, and they are yellow and only half as high as on the two other thoracic segments; on the meta- and mesothorax there are now twelve yellowish-white tubercles; there are sixteen white tubercles on the abdominal segments, and

these tubercles are much shorter and thinner than before; the spiracles are brown ochre; the true legs are pink; the thoracic segments are dotted ventrally with minute yellow granules; three to four granules of the same size form a zigzagging white subventral line on the base of each oblique from the sixth to eleventh segment inclusive.

Just before burrowing, the larva has lost the bluish white color and has a watery greenish color now; the dorsad addorsal lines are much wider and dark green. The larvæ burrowed after twenty-five days of feeding.

On 25 August about forty percent of the pupæ hatched, indicating a partial second brood. Sorry to say, wings of adults were not expanded, as I did not expect a second brood and therefore was not prepared for them.

The full grown larva of *Sphinx frankii* was described in 1912 by ELLISON A. SMYTH, JR. (*Ent. News* 23: p. 9). Professor SMYTH described the larva as pea green dorsally and laterally. This description differs from mine, as I found the larva bluish white dorsally, greenish white laterally, and greenish ventrally. Only the head, anal plate, and prolegs are apple green.

The full grown larva was also described recently by W. T. M. FORBES (*Lepidoptera of N. Y., Part II*: p. 190). Professor FORBES' description differs from mine also in color. Besides, the foodplant was given as elm. My larvæ refused to touch elm but fed readily on ash. Furthermore, he describes the larva as having rough subdorsal lines, which I can't find.

R. D., Lebanon, N. J., U. S. A.

#### A REQUEST FOR SPECIMENS OF A PUZZLING *PAPILIO* POPULATION

While studying specimens of *Papilio rutulus* and *Papilio multicaudatus*, I came across a series of specimens that seemed to have some characteristics of both species; i.e., the *rutulus* have some characteristics of *multicaudatus* and the *multicaudatus* have some characteristics of *rutulus*.

The series available to me for study is too small to solve the problem. With this in mind, I would like to request specimens of these two species from Central California (San Luis Obispo-Bakersfield-Fresno-Yosemite National Park-Sacramento-Marysville-Fort Bragg). Of primary interest are specimens from the Coastal Range. The center of the problem seems to be Mount Diablo, east of Berkeley.

In the event a new subspecies is described, the specimens loaned will be incorporated in the type series and then returned to their original owner. A small portion may, with the owner's approval, be retained for further study or for distribution to museums.

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