THE LIFE HISTORY OF ATRYTONE AROGOS (HESPERIIDAE)

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Among millions of acres devoted to cultivation and grazing in the central midwestern United States, it is still possible to find widely scattered areas of original virgin prairie. These prairie locales are all that remain of the characteristic flora which once covered vast portions of the region. Those surviving meadows provide the entomologist with a rich treasure of insect life. Here are found many elusive species unable to adapt to a radically changed environment. Lepidopterists in particular are keenly aware of these insect oases and keep careful record of their locations. Several of our most distinctive butterflies have found their "last stand" here, and with the eventual destruction of the prairie will disappear from our insect fauna. The regal fritillary *Speyeria idalia* (Drury) is perhaps the best-known example of this group.

One of the lesser known species is the small orange hesperid, Atrytone arogos (Boisduval & LeConte). While intensely local, arogos has periodic increases in numbers, becoming rather common in its limited habitat. The superficial resemblance to Atrytone deleware (Edwards) probably accounts for its being passed over by many collectors. With their bright orange coloration, the adults are easily sighted sitting atop the large purple cone flowers (Echinacea), the most characteristic flower of the prairie. Catching this skipper, however, is an entirely different matter. The males are wary and easily startled making their capture difficult. Females are not quite as wary and are prone to fly slower and for shorter distances than the males. The primary flight period occurs during early June with a less numerous second brood in early September.

The 1964 season was exceptionally good for this species, providing ample opportunity for observations and life history studies. The host plant selection of wild females is beard grass (*Andropogon*), in this instance *A. gerardi* Vitm. The genus *Andropogon*, a favored host by the subfamily Hesperiinae, serves for at least five other species in this area. Females of *arogos* lay their eggs singly on the undersides of grass blades two or three inches below the tips. A female taken from a meadow five miles west of Lawrence, Kansas, in June, produced 17 ova from which 13 larvae were reared. Four of these larvae completed development and produced imagines in September. The remaining larvae began hibernation shortly after entering the fourth instar. These hibernating larvae remained in their tube tent on the host plant during the rest of the



EXPLANATION OF PLATE

Life stages of *Atrytone arogos* (Boisduval & LeConte). Upper: Egg, lateral and dorsal aspect. Middle: Mature larva, dorsal aspect and enlarged, anterior aspect of head capsule; pupa, ventral and lateral aspects. Lower: Adult male and female, from prairie meadow, 5 mi. W Lawrence, Douglas Co., Kansas.

summer, fall, and following winter. The final instars were completed the following spring, with adults emerging in June.

It is interesting to note that an unpublished water-color painting by John Abbot depicts a male and female *A. arogos*, a pupa and a larva feeding on a species of *Panicum*, presumably in Georgia. If the association is correct then grasses belonging to the genus *Panicum* may augment or replace *Andropogon* species as a host in some areas.

The following descriptions are based on the series reared from Lawrence, Kansas:

Ecc. Hemispherical, slightly flattened on top with micropyle protuberant. Height 1.10 mm, width 1.20 mm. Creamy white, circled by two pale red, irregular bands; lower band faint or broken in some examples.

On the sixth day there is a slight darkening of the micropyle. Eclosion occurs on the seventh day. The entire eggshell is devoured upon emergence.

FIRST INSTAR LARVA. When freshly emerged, pale creamy white with a few long white setae, mostly on anal segment. Prothoracic shield dark brown. Head pale orange-brown. Mandibles, labrum, and lines of epicranial suture dark brown. A few pale setae scattered over head.

The first action of the larvae is the construction of a small tent about 10 mm in length along the side or at the tip of a grass blade. Larvae begin eating the second day after emergence, with small notches taken from the leaf edge above or below the tent. Shortly after feeding the general body color changes to a pale translucent green.

SECOND INSTAR LARVA. Body pale grayish green dorsally, abdominal regions very pale grayish white. Anal and thoracic segments pale yellowish white. Prothorax white, prothoracic shield marked with a very narrow light orange-brown band. A few white setae on anal segment. Head pale orange-brown with grayish white bands; stalk of epicranial suture brown with a parallel narrow white band at each side; a wide grayish white band follows outer edges of epicranial plates to apex. Back of head white with a very narrow orange-brown band circling prothorax. Frons orangebrown with two short vertical white dashes. Mandibles dark brown. No noticeable setae on head.

THIRD INSTAR LARVA. Body dull grayish green, prothorax and anal segments paler. Prothoracic shield with a very pale orange-brown band; a narrow white spiracular, lateral line and a dark green middorsal line, fading out in thoracic region. A few short, white setae present on anal segment. Head pale orange-brown; outer edges of epicranial plates widely ringed with grayish white, becoming narrower at vertex, intersected by two narrow bands that parallel suture lines. Frons edged inwardly with white, containing two small, vertical, white dashes. A few short, white setae visible on head, mostly around outer edges of epicranial plates.

By this stage the larvae live in a tent of about 40 mm length, composed of two leaves drawn together and sealed tightly, open only at the bottom.

FOURTH INSTAR LARVA. Body pale grayish green. Anal segment and prothorax pale cream colored. Prothoracic shield with a very narrow, brown, dorsal line; a dark green middorsal line and a narrow white spiracular, lateral line. Integument translucent, spiracles inconspicuous. No noticeable setae with exception of a few white ones on dorsal area of anal segment. Head grayish white with orange-brown bands as follows: a narrow band circling outer edges of epicranial plates, beginning just above the ocelli; arms and stalk of epicranial suture bordered by narrow lines, stopping just short of vertex, with a wider band parallel to sutures; frons grayish white with narrow edging and vertical dash of orange-brown extending a short distance into suture line. Labrum pale orange-brown, mandibles black, ocelli dark brown. A few pale setae scattered over head.

FIFTH INSTAR LARVA. Body pale grayish green with dark green middorsal heart line fading at thorax. Intersegmental folds bright yellow. Integument translucent, covered with very fine white setae, a few longer hairs on anal segment. Prothorax pale cream colored, prothoracic shield inconspicuous, pale orange-brown. Head white with orange-brown bands and markings: arms and stalk of epicranial suture bordered by narrow bands, stopping short of vertex and ocelli, wider opposite vertical stalk of suture; epicranial plates bordered by a narrow band; each epicranial plate with a median, vertical streak of orange-brown, broad at base, with an arm extending into suture band, tapering to a thin point at upper end, stopping short of vertex. Frons white with a narrow outward tracing and central dash of orangebrown. Labrum pale brown, mandibles black. Head slightly granulose with minute white setae visible.

FINAL INSTAR LARVA. Length 33 to 36 mm, width 5 mm, width of head capsule 4 mm. Body pale yellowish green dorsally with yellow intersegmental folds. Anal segment and abdominal regions light green without yellowish tint. Prothorax paler green. Prothoracic shield inconspicuous, tan. Thoracic and anal spiracles visible as white dots, other spiracles not noticeable. A dark green middorsal heart line. Integument translucent with a very smooth appearance. Only a few setae visible under $20 \times$ magnification. Head grayish white, covered with scattered white setae. Frons edged with a narrow, orange-brown line and containing a short central dash of the same color. Suture lines outlined with bands of orange-brown which stop short of vertex; a band of orange-brown circles outer edges of epicranial plates, stopping short of the bright orange ocelli; A large vertical dash of orange-brown in center of each epicranial plate, wide at bottom where it joins suture band, tapering to a narrow point where it ends below vertex. Labrum pale orange-brown, clypeus darker brown, mandibles dark brown and black. Setae are not noticeable except along lower edges of epicranial plates.

In the final instar the larval tent averages 50 to 70 mm in length. An odd feature of larvae in the fourth, fifth, and final instars is the sealing of the tent during moulting, with a two-day time lapse occurring during this procedure. This peculiarity has not been observed for other Hesperiidae, but it undoubtedly gives a great degree of protection during this vulnerable period of the larval development.

The cocoon is constructed between two large grass blades near the top of the leaves, often three to four feet above the ground. The leaves provide the basis of the cocoon, which is made up of a thin lining of silk and a cap of fluffy silk which covers the head of the pupa as it rests in a vertical position.

PUPA. Length 18–20 mm, width at wing cases 4.5 mm. Pale yellow with thorax and dorsal side of abdomen brighter yellow; wing cases, tongue case and two final abdominal segments white. Tongue case detached, extending only 3 mm below wing cases. Thoracic spiracles prominent, bright orange-brown. A few inconspicuous, gray markings about head and eye cases; scattered reddish setae over head. Entire abdomen covered by these setae, most numerous on last three segments. Cremaster short, bluntly rounded, lacking any distinguishing projections; lateral edges thickly lined with reddish setae; cremaster white, only slightly curved ventrally.

Larvae completing development within one summer followed a concise schedule. Instars one through five requiring eight days each while the final instar, surprisingly, required 18 days. Pupation occurred two days after construction of the cocoon. Imagines emerged in 12 days. Larvae which hibernated in the fourth instar sealed themselves into a small case between two grass blades on the plant. These tents were allowed to remain open until mid-September when they were sealed at both ends in preparation for winter.

Acknowledgment

I would like to express my thanks to William H. Howe of Ottawa, Kansas, for the illustrations of the life history which accompany this article.

A NEW SPECIES OF AGATHYMUS FROM TEXAS (MEGATHYMIDAE)

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In making a study of the various complexes present in the genus *Agathymus* it was discovered that there are a number of species present in the *remingtoni* complex other than *estelleae* (Stallings & Turner) and *comstocki* (Harbison), most of which are found in Mexico. After carefully studying the morphology of specimens collected in the general vicinity of Del Rio, Texas it was found that this population represents an undescribed species in this complex. For several years I have been associating these specimens with *estelleae* from General Bravo, Tamaulipas, Mexico. After collecting rather extensively over Mexico during the past three years in association with the Stallings & Turners, I found that I had been connecting these specimens with another species. Actually, in many respects, they show a closer relationship to the mountain species *remingtoni* (Stallings & Turner) than they do to *estelleae*, which is a plains species. They show less relationship to *comstocki* than to either of the other two species.

¹ I would like to express my appreciation to the National Science Foundation for research grants G-9900 and GB-398 which has made this research possible.