

ANTENNAL POSITIONS IN RESTING PYRALID MOTHS (LEPIDOPTERA: PYRALOIDEA)

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ABSTRACT.— Adult Pyralidae are found to have distinctive resting postures in regard to antennal position; typically, the antennae in various subfamilies are held in varying forms of a parallel position to the thorax and abdomen. Antennal resting position in this family is diagnostic in quickly identifying moths as members of the family.

KEY WORDS: *Atasthalistis*, *Arichanna*, behavior, Chrysauginae, Crambidae, Crambinae, *Dichomeris*, Epipaschiinae, Ethmiinae, Galleriinae, Gelechiidae, Geometridae, Midilinae, Neotropical, Noctuidae, Nymphulinae, Odontiinae, Oecophoridae, *Ostrinia*, Phycitinae, Plutellidae, Pyralidae, Pyralinae, Pyraustinae, *Salebriaria*, Schoenobiinae, South America, Stenomatinae, Taiwan, taxonomy, Tineidae, Venezuela.

When Lepidoptera are at rest, they show a specific way of holding the wings, legs, antennae, etc., and these kinds of characters have been mentioned for possible use in taxonomic research (Munroe, 1972), at least in being diagnostic for various groups. Nevertheless, these characters are infrequently cited in the entomological literature. The resting postures noted herein refer to moths fully at rest, not those that are aroused to danger or poised for flight, whereupon the antennae usually are brought up and forward for use.

After many years of field work and observing moths in different environments, both in the Northern Hemisphere and in the tropics, we noticed that the adults of Pyralidae (now split into Crambidae and Pyralidae by some authors) always hold the antennae in a specific way when they are at rest. The antennae in these moths are always situated on top of the thorax or at the edges of it (usually parallel to it) in varying ways (Fig. 1-6), but never in positions other than over the body plane. These resting postures have been observed by us in the following subfamilies: Midilinae, Pyraustinae, Crambinae, Galleriinae, Pyralinae, Odontiinae, Glaphyriinae, Chrysauginae, Epipaschiinae, Nymphulinae, Phycitinae and Schoenobiinae. This behavior has also been observed in one unidentified Noctuidae species collected at Rancho Grande, Henri Pittier National Park, Aragua State, Venezuela, but this is not known in other Noctuidae species or typically in other Lepidoptera families. Other rare examples from East Asia include Gelechiidae from Taiwan that hold the antennae as in Pyralidae (*Atasthalistis* sp., see Park, 1995; and *Dichomeris bucinaria* Park, 1996) and at least one Oriental Geometridae (*Arichanna jaguararia* (Guenée) from Taiwan and East Asia).

Pictures showing antennal positions of some Pyralidae are in Watson *et al.* (1975), Goater (1986), and Heppner (1995), and herein in Fig. 1-6. Neunzig (1988) shows a Nearctic *Salebriaria* phycitine Pyralidae in profile where the antennae are over the thorax and the antennal tips actually are beneath the folded forewings. Pinhey (1975) illustrates one pyralid from South Africa with the characteristic resting posture with antennae back over the wings. In a book by Covell (1984), *Ostrinia nubilalis* (Linnaeus) was not illustrated as having the dorsal antennal position, so we consider this to be a misleading illustration about the resting posture of this species.

To see if this kind of character can be used as a diagnostic taxonomic tool, entomology students (undergraduate and graduate) at the Facultad de Agronomía, Universidad Central de Venezuela, in Maracay, Aragua State, Venezuela, were asked for the past several years to look for and collect all the individuals that were attracted to a mercury vapor light and which showed this kind of behavior. Most collections and surveys were conducted at Rancho Grande (1150m), in the mountains north of Maracay. In all cases, the students always collected pyralid moth species and no specimens from other Lepidoptera families were taken. This demonstrates that the antennal position alone can be used as a diagnostic character to identify the moths of this family to a high degree of accuracy. This is especially useful as a quick method to identify members of these moths when they are alive and at rest in the field.

It will be very interesting to look for variations of this behavior in different species to see if there are other patterns of resting posture for antennae. Most moths hold their antennae towards the front or along the margins of the forewings. Also, it will be important to see how this type of behavior varies among the other Lepidoptera families: for example, in some families, like Plutelli-

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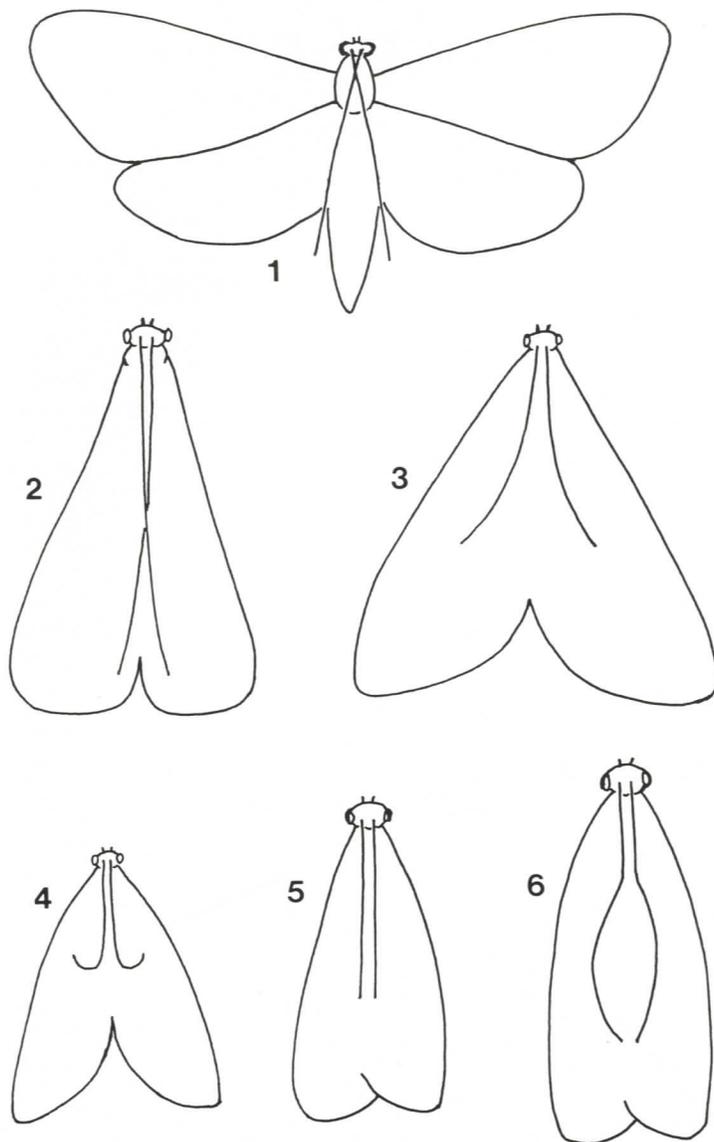


Fig. 1-6. Resting postures of some Pyralidae showing antennal position: 1) Pyraustinae. 2) Chrysauginae. 3) Pyraustinae. 4) Pyraustinae. 5) Crambinae. 6) Pyraustinae.

dae, antennae are typically held porrect (or projecting) in front of the head when the moths are at rest, while in other families there are various other postures. Some similarities in antennal position are found, for example, among some Oecophoridae (e.g., Stenommatinae and Ethmiinae) and Tineidae, which hold their antennae along the sides of the body when at rest, and at least some Gelechiidae as noted above. However, we have found that generally the antennal posture for Pyralidae is diagnostic enough to allow persons searching for this family under field conditions to easily distinguish these moths. Although some rare exceptions are noted above from the Old World, experience has shown that in student use this field identification method can be 99% effective in identifying live resting moths to the family Pyralidae.

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LITERATURE CITED

- Covell, C. V., Jr.**
1984. *A Field Guide to the Moths of Eastern North America*. Boston: Houghton Mifflin. 496pp.
- Goater, B.**
1986. *British Pyralid Moths. A Guide to their Identification*. London: Harley Books. 175pp.
- Heppner, J. B.**
1995. Introduction. In *Atlas of Neotropical Lepidoptera. Checklist: Part 2. Hyblaeoidea-Pyraloidea-Tortricodea*, xi-liv. Gainesville: Assoc. Trop. Lepid. 243pp.
- Munroe, E. G.**
1972. Pyraloidea. Pyralidae (Part). In R. B. Dominick, *et al.* (eds.), *The Moths of America North of Mexico. Fasc. 13.1A*. London: E. W. Classey. 134pp.
- Neunzig, H. H.**
1988. A taxonomic study of the genus *Salebriaria* (Lepidoptera: Pyralidae: Phycitinae) in America north of Mexico. *N.C. Agric. Res. Serv., Tech. Bull.* (Raleigh), 287:1-95.
- Park, K. T.**
1995. Gelechiidae of Taiwan, I-II. *Trop. Lepid.* (Gainesville), 6:55-85.
1996. Description of a new species of *Dichomeris* Hübner (Lepidoptera, Gelechiidae). *Tinea* (Tokyo), 14:230-233.
- Pinhey, E. C. G.**
1975. *Moths of Southern Africa*. Capetown: Tafelburg. 273pp, 63 pl.
- Watson, A., P. E. S. Whalley, and W. D. Duckworth**
1975. *The Dictionary of Butterflies and Moths in Color*. New York: McGraw-Hill. 296pp.