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A NEW RECORD OF A MOTH ATTACKING SAPODILLA, WITH DESCRIPTIONS OF FEMALE GENITALIA AND THE LAST INSTAR LARVA

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ABSTRACT

This paper reports a new record of a moth species, *Zamagiria dixolophella* Dyar (Pyralidae: Phycitinae) attacking sapodilla (*Manilkara zapota* van Royen) in Southern Mexico. This is the first report of this species in Mexico. The female genitalia and the last instar larva are described and illustrated.

Key Words: Pyralidae, *Zamagiria dixolophella*, Sapodilla, *Manilkara zapota*, Mexico

RESUMEN

Un nuevo registro de una especie de palomilla atacando al chicozapote (*Manilkara zapota* van Royen) en el sur de Mexico es reportado. La palomilla fue identificada con *Zamagiria dixolophella* Dyar de la familia Pyralidae, subfamilia Phycitinae. Esta especie es reportada por primera vez para Mexico. La genitalia femenina y el ultimo estadio larvario es descrito e ilustrado.

The sapodilla (*Manilkara zapota* van Royen) is a fruit tree native of the south of Mexico and Central America, and is found from the Yucatan peninsula to Costa Rica. Sapodilla is grown commercially in India, the Philippines, Sri Lanka, Malaysia, Mexico, Venezuela, Guatemala, and other Central American countries (Mickelbart 1996). The entomofauna associated with sapodilla trees has been reported from Venezuela, Puerto Rico and India (Rubio-Espina 1968, Butani 1975, Sandhu & Sran 1980, Medina-Goud et al. 1987). For example, in India, over 25 species of insects have been recorded causing damage to sapodilla (Butani 1975, Sandhu & Sran 1980), but the main insect pests are a galechid caterpillar (*Anarsia achrasella*) and the pyralid caterpillar, *Nephopteryx engraphella*. The former species is a bud borer, while the latter feeds on the leaves, flower buds and young fruits. Unfortunately, the entomofauna associated with sapodilla in its area of original distribution has not been studied. In Mexico and Central America, the main insect pest of this tree seems to be the fruit flies of the genera *Anastrepha*, particularly *A. serpentina* (Norrbom & Kim 1988). For several years the sapodilla producers of the Soconusco region of Chiapas state, Mexico have been reporting a bud borer moth, which has been causing problems in their plantations. This work was undertaken to identify the moth as a first step towards further studies on the biology, ecology and control of this species.

MATERIALS AND METHODS

The biological material was collected from several sapodilla farms located in the municipalities of Tapachula and Suchiate of the Chiapas state, Mexico. The pupae from tender young shoots and fruits were taken to the laboratory and placed in screen cages (20 × 20 cm) for adult emergence at 25 ± 1°C, 30-50% RH and a photoperiod 16: 8 (L: D) h. After adult emergence, the insects were killed and mounted for identification. Larvae were killed immediately after collection. They were fixed in Pampel liquid and preserved in 70% ethyl alcohol. For morphological studies the larvae were cleared with lactic acid. The terminology used to describe the setae and other characters is adopted from Stehr (1987).

RESULTS

The moth species was identified as *Zamagiria dixolophella* Dyar (Pyralidae, Subfamily Phycitinae). This species represents the first report in Mexico. The original description of this species was based on males collected in Corazal, Panama, in 1914 (Heinrich 1956). The female has not been described and is very close to *Zamagiria pogerythus* Dyar (Neunzing & Dow 1993, Heinrich 1956). However, the female genitalia of *Z. dixolophella* has some differences: the ductus bursae is short and narrow, while in *Z. pogerythus* it is wide, as wide as the bursae. The ductus seminalis of *Z. dixolophella* is located in the apical part of bursae, whereas in *Z. pogerythus* it is located in the basal part of the bursae (Figs. 1 A and B).

Description of Adults

In general appearance this insect is a small gray moth, resting with the wings folded along

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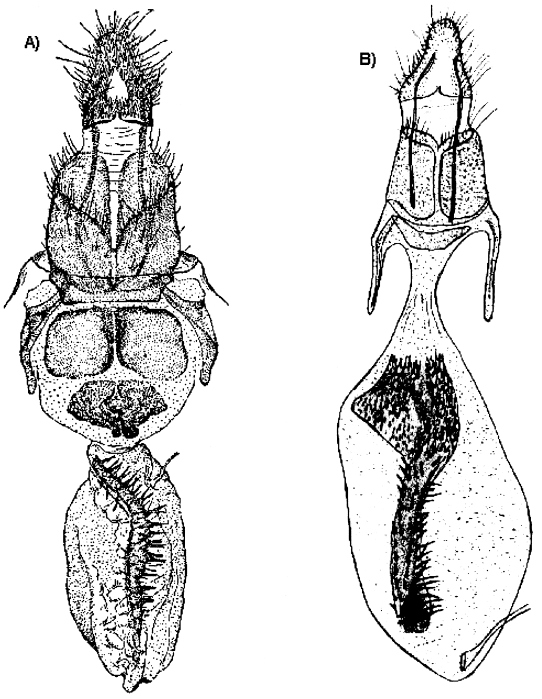


Fig. 1. A) Female genitalia of *Z. Pogerythrus* (redrawn from Heinrich 1956). B) Female genitalia of *Z. dixolophella*.

the body. The forewings are dark smoky gray, with raised scales, colored brown and dark gray. The hindwings are gray transparent, with the costal area covered with gray scales. Male and female wing span is 19 mm. Males may be distinguished by a bushy, forward-projecting labial palp and the presence of an aigrette of the maxillary palps, which are reddish in color. Male antennae have a basal sinus covered by strongly developed gray scale tufts.

Female genitalia (Fig. 1B): signum developed as a longitudinal, elongate, narrow and sinuous form, armed with strong spines extending the length of the bursa. The bursa has a plate armed with strong spines near the junction with the ductus bursae. The ductus seminalis extends from the apical part of the bursa and it is slightly sclerotized. Ductus bursae are short and narrowed.

Description of Full Grown Larva

The total length of the last instar larva 15-16 mm and it is pinkish in color. The head is notable for the presence of dark spots located on the dorsal and lateral surfaces of the frontal area (Fig. 2). The stemmatal area is a semicircle and formed by six stemmata (Fig. 3). Stemmata 3-5 are located in straight line and higher with respect to the other stemmata with the border sclerotized. Stemmatal seta S1 is situated between stemmata 2 and 3. Stemmatal seta S2 is near the opening of the stemmatal semicircle and placed in front of stemmata 4. The length that divides S2 from the stemmata 1 is close to 2/3 of the distance between this same seta and stemmata 4. S3 is placed outside of the stemmatal semicircle. The length that separates S3 of the stemmata 6 is similar to the distance between S3 and S2. Pore Sa sited between stemmata 6 and S3. The length that separates the pore Sa from stemmata 6 is the twice that of the distance from S3. The substemmatal seta SS1 is situated near to the mandible and separated from it by a quarter of the length that exists between this seta and stemmata 5. SS2 is placed below stemmatas 5 and 6 and with the same distance separating both stemmata. The distance that separates SS2 of SS1 is the twice that of the distance between SS2 and stemmata 5. SS3 is placed below SS2 and forming a straight line between them and stemmata 5. The distance that separates SS2 and SS3 is the same as that between SS2 and stemmata 5. Pore Ssa is situated inside of substemmatal area. The length that divides Ssa from SS1 is the twice of the distance between the same pore and SS2. The anterior seta A1 is placed in front of stemmata 2 and 3, anterior seta A2 is situated directly above A1. The length that separates A1 from A2 is similar to that which divides A1 from stemmata 3.

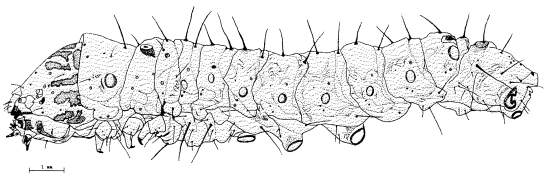


Fig. 2. Mature larva of *Z. dixolophella*, lateral view.

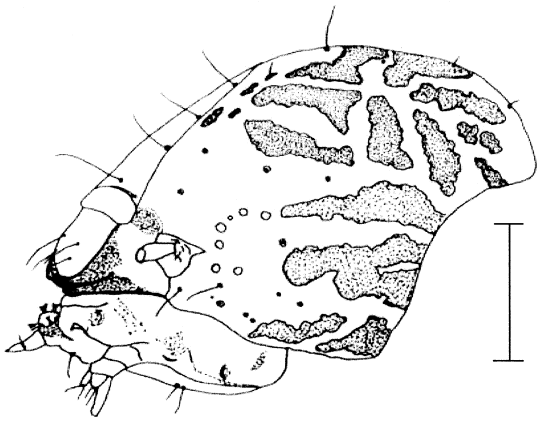


Fig. 3. Larval head of *Z. dixolophella*, lateral view.

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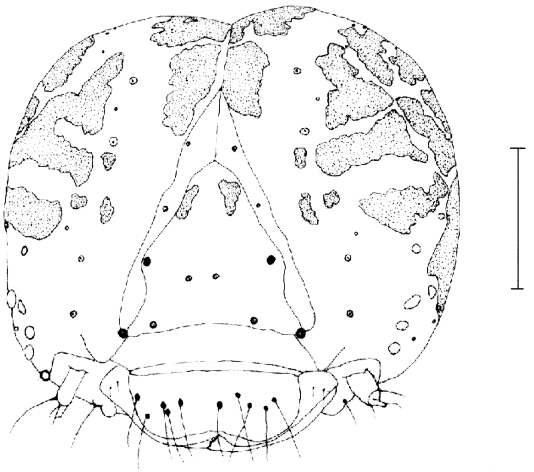


Fig. 4. Larval head of *Z. dixolophella*, frontal view.

Pores Aa are placed above of A2. The length that divides Aa from the ecdysial line is twice that which separates A1 from the ecdysial line. The frontal setae F1 is situated near the adfrontal lateral suture. Pores Fa are situated in the middle part of the front. The distance between adfrontal setae AF2 with respect to F1 is twice that which separates AF1 and AF2. Lateral setae L1 is placed anterior to A3 and the separation between both is the half of the length between L1 and stemmata 3. The Postdorsal pore Pb is separated by the same distance that exists between Pb1 and Pb2 setae. The clypeus has a pair of medium setae C1 and a pair of lateral setae C2, the latter sited in the intersection of the ecdysial line and the projection of the adfrontal lateral suture and the dividing line between clypeus and the anteclypeus. The labrum is incised with three pairs of medium labial setae and two pairs of lateral setae. The mandibles bear the characteristic tridentate structure with two basal setae. The intermediate tooth projects beyond teeth, the oral surface concave. The submentum carries two medium setae and a bilobed posterior border, recurved towards the dorsum. A well developed spinneret is present.

The thoraxic segment T1 with L group is bisetose. Segment T2 bears a sclerotized very dark pinaculum and evident on the base of the SD1 seta. Segment T3 has a pinaculum on the SD1 seta but is less conspicuous than in T2. The thoraxic spiracle is semicircular and larger than the abdominal spiracles, except for the spiracle on segment A8, which is the same size and form as the thoraxic spiracle.

The prolegs are well developed in the abdominal segments A3-A6 and A10 (caudal). Each proleg carries many crochets. The crochets are arranged in an uniserial biordinal semicircle from A3-A6. The internal face of prolegs measures approximately 0.51-0.82 mm. The pinaculum of SD1 seta of A1-A8 has a circular aspect. Spiracle A8 is very large in comparison to the other abdominal spiracles and clearly directed towards the dorsocaudal position. Segment A9 with SV group bisetose and L group trisetose. In segment A10, the V setae are separated from each other by about half of the distance that they are separated from the V setae of segment A9. The V setae of A10 are longer or equal to twice the length of the V setae of A9.

Discussion

Ten species have been described in the genus *Zamagiria*. The related *Z. pogerythrus* is distributed from Campeche state, Mexico to Chejel, Guatemala. The best known species of this genus is *Zamagiria laidion* (Zeller), whose larvae also feed on the leaves and flowers of *M. zapota*, as well as on *Manilkara emarginata* (Sapotaceae) and *Eriobotyra japonica* (Rosaceae). This moth has been collected from the United States (Florida), Guatemala, Panama, Colombia, Bolivia, Venezuela and Brazil. Another species of this genera that feeds upon Sapotaceae is *Zamagiria fraterna*, which has been reported in Cuba attacking *Bumelia microcarpa* (Heinrich 1956).

Oviposition of *Z. dixolophella* occurs on the buds of sapodilla. Larvae feed upon the ovaries and the petals of the flowers but frequently bore into tender young shoots. Also, the larvae are sometimes found inside sapodilla fruit. Preliminary observations have shown that insect infestation persists almost throughout the year, however, the highest populations are found during the peak of flowering.

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References Cited

Butani, D. K. 1975. Insect pests of fruit crops and their control, sapota. Pesticides 9: 37-39.

Heinrich, C. 1956. American Moths of the subfamily Phycitinae. United States National Museum Bulletin 207. Smithsonian Institution, Washington, D.C.

Neunzig, H. H., and L. C. Dow. 1993. The Phycitinae of Belize (Lepidoptera: Pyralidae) Technical Bulletin 304. North Carolina Agricultural Communications. North Carolina State University. Raleigh, NC.

Medina-Goud, S., F. Gallardo-Covas, E. Abreu, and R. Ingles. 1987. The insects of nispero (*Manilkara*

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zapota (L.) P. van Rogen) in Puerto Rico. J. Agric. Univ. P.R. 71: 129-132.

MICKELBART, M. V. 1996. Sapodilla: a potential crop for subtropical climates, pp. 439-446. *In* J. Janick [ed.], Progress in new crops. ASHS Press, Alexandria, VA.

NORRBOM, A. L., AND K. C. KIM. 1988. A list of the reported host plants of the species of *Anastrepha* (Diptera: Tephritidae). U.S. Dept. Agric. APHIS-PPQ.81.52.

RUBIO-ESPINA, E. 1968. Estudio preliminar de los insectos perjudiciales a los árboles de níspero (*Achras zapota* Linneus) en el estado Zulia, Venezuela. Revta. Facul. Agronomía 1: 1-24.

SANDHU, G. S., AND C. S. SRAN. 1980. New records of Lepidoptera on sapota. FAO Plant Protection Bulletin 28: 43-44.

STEHR, F. W. 1987. Inmature insects. Volume I. Kendall/ Hunt Publishing Co. Dubuque, IA.

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