STUDIES ON THE FAUNA OF CURAÇAO AND OTHER CARIBBEAN ISLANDS: No. 21.

THE FRUITFLY ANASTREPHA SERPENTINA IN CURAÇAO

by

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On a private collecting trip to the Netherlands Antilles, in the winter of 1948–1949, I had the opportunity of studying an infestation of the sapodilla, caused by a well-known kind of fruitfly, *Anastrepha serpentina*, which, however, has never before been reported from these islands. The identification was kindly confirmed by E. McC. CALLAN, Imperial College of Tropical Agriculture, Trinidad; specimens were compared by him with material named by A. STONE, deposited with the collections of the I.C.T.A.

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Anastrepha serpentina (Wiedemann, 1830) Schiner, 1868
[Fig. 31]

Dacus serpentinus WIEDEMANN, 1830, p. 521 "Flavidus; thorace vittis duabus abdomineque fuscis: maculis duabus transversis baseos vittaque apicali flavidis, alis fusco pictis. Gelblich, mit zwei Rückenschilds-striemen und Hinterleib braun, dieser mit zwei gelblichen Querflecken und Spitzenstrieme; Flügel braun gezeichnet. — Länge $3^1/_2$ Linien ♀. — Aus Brasilien."

Leptoxys serpentina (Wied.) MACQUART, 1843, p. 216 [Brasil].

Urophora vittithorax MACQUART, 1850, p. 286, tab. 26 fig. 11 (wing) [♀ "De l'Inde."].

Anastrepha serpentina (Wied.) SCHINER, 1868, p. 263 [indicates *Dacus serpentinus* as type of new genus *Anastrepha*]; BALLOU, 1912, p. 85 ["Lesser Antilles"]; HENDEL, 1914, p. 14, tab. 1 fig. 10 (wing) [Brasil, Perú]; TAVARES, 1915, p. 52 [first record as pest of *Achras sapota*, in Bahía]; COSTA LIMA, 1915, p. 99,

fig. 9 [Brasil; non viso!]; GREENE, 1929, p. 497, fig. 2E (larva), 3J (mouthhooks), 5E (pupa), 6J (wing) [Panamá]; EMMART, 1933, p. 184, tab. 7–8 (egg) [Mexico]; DAMPF, 1933, p. 254, fig. 1, 6, 12 (ovipositor) [Mexico]; BATES, 1933, p. 160 [W. Indies; non viso!]; GREENE, 1934, p. 142, tab. 19 fig. 1 (wing) [Perú]; COSTA LIMA, 1934, p. 494, fig. 1–2, tab. i fig. 11, 65 fig. 9 (wing) [Bahía]; STONE, 1942, p. 27, fig. 2C (ovipositor), tab. 2D (wing) [Texas, Mexico, Brasil, ?Dominica]; BAKER & STONE & PLUMMER & MCPHAIL, 1944, p. 125, fig. 61 (spiracles of larva), 70B (ovipositor), 71 (claspers of ♂), 79 (egg). SHAW & STARR, 1946 [development in relation to temperature]; SHAW, 1947 [hosts and distr. in Mexico].

Trypeta serpentina (Wied.) LOEW, 1873, p. 226, tab. 11 fig. 25 (wing) [Perú; proposes to change the name *Trypeta* in *Acrotoxa*, p. 227].

CURAÇAO: *Hofje Groot Piscadera*, 10.I.1949, Station 334a, reared from infested fruits of Achras sapota, 19 ♂♂ 24 ♀♀; *Hofje Groot St. Joris*, 18.I.1949, Sta. 323Bb, reared from the same, 14 ♂♂ 9 ♀♀. (Material in the Zoological Museum of Amsterdam.)

Adult: Body dark brown, with orange yellow marks; large, brown banded wings; tip of ovipositor with two lateral rows of teeth; wing with a distinct hyaline spot in cell R_1, reaching vein R_{2-3} or R_{4-5}; only proximal arm of V-band present; costal and S-band connected.

Wing (fig. 31a). Vein M_{1-2} turns upwards to apex of R_{4-5}. Proximal arm of V-band, starting at the ventral border of Cu_1, covering m, and extending as far as R_{4-5}. Costal band from wing base between costal vein and R_{4-5} till apex of R_1. S-band starting at the wing tip between R_{4-5} and M_{1-2}, following the dorsal wing margin, filling the distal end of cell R_1, curved along the hyaline area ventrally over crossvein r-m, ending in a black area in cell Cu_1. No junction between distal V-band and S-band.

Head. Greatest width × length (from top of head to middle of epistome) 2.1 × 1.6 mm. Eye greenish iridescent, red in dried specimens; 10–12 facets on 0.3 mm. Antenna about 0.75 mm in length, the two basal parts together two-third of third part. First and second part pubescent, with a great number of larger black setae; third part brownish yellow, pubescent. Arista 1 mm long, with microscopical hairs. Front yellowish, often with a rounded black spot above the lunule, extending up to the second pair of frontal bristles. Vibrissae not present.

Ovipositor (fig. 31*b–d*) brown chitinized; total length 2.3–2.8 mm; width at base 0.22–0.25, in the middle 0.09–0.13, near the tip 0.12–0.13 mm. Point obtuse, with two rows of 17–26 teeth, extending as far as 0.19–0.24 mm from the top. Tip of ovipositor with, latero-ventral, on each side 3 peg sensoria, and 11–16 sensoria ending on the ventral, 3–6 on the dorsal side; total number of sensoria 30–40. At a distance of 0.22–0.26 mm from the top 2 lateral tubes widening towards their bases. Aperture of the oviduct a slit surrounded with microscopic hairs, 0.25 mm from the top. Proximal to the aperture 9–11 short, sensory like ducts, widely scattered on each side laterally, at right angles to the axis of the ovipositor.

Pupa 5.6 × 2.6 mm, barrel shaped, yellowish to reddish brown. Segments 11. Anterior spiracles at lateral side of first segment, visible as dark brown ridges with a row of little knobs; posterior spiracles blackish brown, chitinized, with 3 entrances. Anal lobes visible as dark spots, cventral on last segment. On the ventral side of the pupa the fusiform area of the larva is clearly visible.

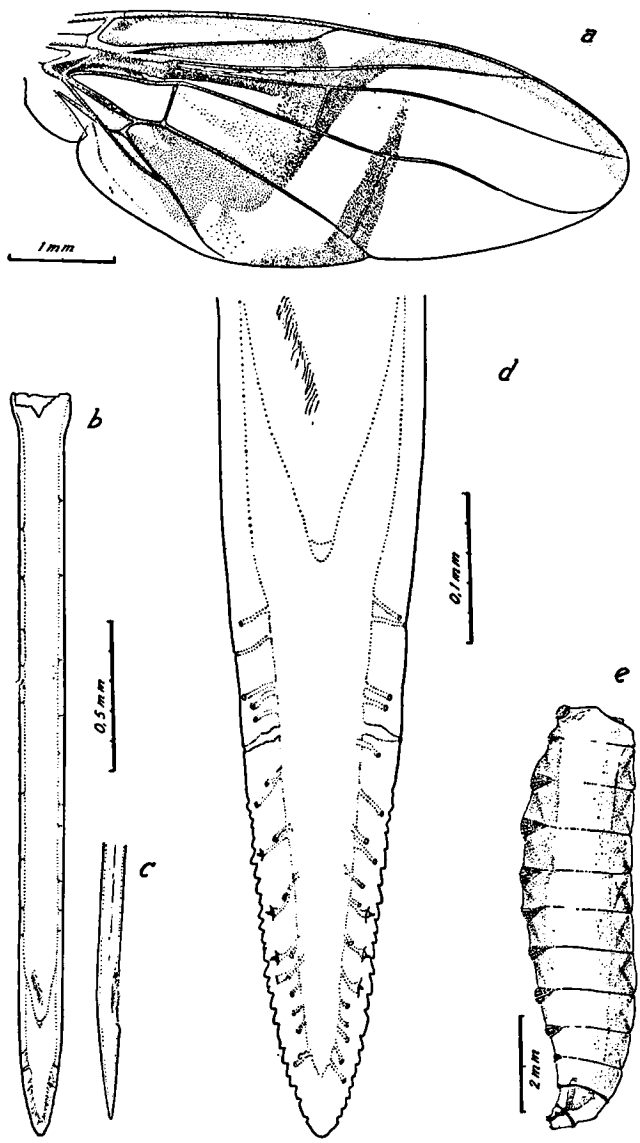

Fig. 31. *Anastrepha serpentina* from Curaçao: *a* wing; *b* ovipositor, ventral side; *c* tip of ovipositor, lateral side; *d* tip of ovipositor, ventral side; *e* side face of larva, the ventral side turned to the left.

Larva (fig. 31*e*) subcylindrical, distinctly narrowing towards the anterior, posteriorly obtuse, 9.0–10.3 × 2.3–2.7 mm, cream coloured. Segments 11; greatest width at 5–6–7th segment. Anterior part of head retractile; the tip with one pair of black chitinized mouthhooks visible to the naked eye; 2 pairs of microscopical sense-organ like tubercles. Posterior part of head not retractile, separated from anterior part by rows of microscopic teeth, which are very weak on segment II and III. Segment XI with a posterio-dorsal flat, round area, bearing in its middle a pair of posterior spiracles; ventrally with an elevation with two anal lobes.

Remarks.

Length of *ovipositor* according to DAMPF 2.9–3.2 mm; width at base 0.235, at middle 0.140, near the tip 0.155 mm; as measured by STONE 2.8–3.7 mm in length.

From the literature I thought I could distinguish two types of *wings*: 1. in which the hyaline costal area touched or slightly surpassed vein R_{2-3}; 2. in which the hyaline costal area reached vein R_{4-5}. Wings of the first type are to be observed in MACQUART 1850 (material „De l'Inde"), GREENE 1929 (Panamá), COSTA LIMA 1934 (Brasil) and STONE 1942 (probably Mexico); of the second type in LOEW 1873 (Perú), HENDEL 1914 (locality not mentioned) and GREENE 1934 (Perú). Of the 66 specimens studied from Curaçao, 63 belonged to the first type, the 3 others to the second one.

In a private communication dr ALAN STONE, Division of Insect Identification U.S. Dept. Agriculture, wrote me that in his opinion the extent of the hyaline costal area may reflect population differences but does not warrant naming, unless some biological differences can be shown. He finds that in his material specimens from Trinidad and Ecuador belong to the first type. However, material from Mexico and Panamá shows the complete range from one type to the other.

Anastrepha serpentina forms a pest for the *Achras sapota* cultures on Curaçao. A great number of the sapodillas became infested by the larvae, and so losing their trade value.

The females deposit, with their flat and sharp ovipositors, their eggs under the peel of the ripening fruit. The larvae feed themselves with the flesh of the sapodillas, causing rottening and fruitfall. The old larvae leave the fruit and disappear into the soil, where they pupate. The imagines creep out of the pupae upward.

Rearing the insects on the pulp of the fruit at a temperature of 26°C, the larval period appears to be 12, the pupal period to be 15 days. Under very wet circumstances no pupae were formed after 27 days. — This agrees with the findings of SHAW & STARR (1946), who found for the same species, at a temperature of 30°C, a 12 day larval period, and a similar one for the pupae in Mexico City. — The egg period may be accepted as 4 days.

The larvae and pupae being indifferent to the commonly used insecticides, the field control method has to be restricted to the imagines. A good orchard hygiene, however, in which all fallen fruit is destroyed continually (by burning, cooking or deep burrowing), probably appears to be the first needed and cheapest method of control, which might be used on the islands.

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