

Research Note

THE IMMATURE STAGES OF *Copestylum vacuum* (F.) (DIPTERA: SYRPHIDAE), A NEW RECORD FOR PUERTO RICO^{1, 2}

Adults of *Copestylum vacuum* (F.) were reared from larvae collected during November 1975, from the cactus *Opuntia dillenii* growing near the lighthouse at Cabo Rojo. This record is an addition to the syrphid fauna of the Island. Telford³ recorded *Copestylum unipunctata* (Curran) as also breeding in *Opuntia dillenii*.

Many *Copestylum* species grow saprophytically on cactus. Most species in this genus were previously included in *Volucella*. *C. vacuum* runs to *Volucella* (which now equals *Copestylum*) in Telford's key³ to the genera of adult syrphids of Puerto Rico. The following description separates this species from the local species of *Copestylum*: medium sized, 6–7 mm; black with yellow on face, laterally on pronotum, anterior mesonotum, pleura, and scutellum; femora reddish-brown and tibia with reddish-brown basal half and black apical half; and scutellum lacking a mass of long black pile.

The lighthouse area is swept by very strong winds coming most of the time from the sea. Adults were seen flying around the cacti or very close to the ground. Larvae were collected from plants damaged by the cactus moth, *Cactoblastis cactorum* (Berg) (Lepidoptera:Pyralidae: Phycitinae) as reported by García Tudurí et al.⁴ Larvae live immersed in a slush of liquified vegetable matter at the bottom of cavities made by the larvae of the moth. The larvae pupated in the laboratory after crawling away from the plant material and burrowing a few mm in the sand at the bottom of the rearing bottles.

MATURE LARVA—(Plate I, figs. 1, 2, 4). Length 11.5–17.5 mm, width 2.0–3.0 mm, height 2.0–3.0 mm; cream-white, except light golden-brown posterior respiratory process. Head with a pair of fleshy flaps around oral opening; mouth parts without mandibular sclerites; cephalo-pharyngeal armature as in Plate III, figs. 8, 9, 10, 11; floor of pharynx with longitudinal ridges (pr). Antenno-maxillary sense organ

¹ Manuscript submitted to Editorial Board October 29, 1976.

² The authors are grateful to Dr. F. Christian Thompson, from the Systematic Entomology Laboratory, USDA, NMNH, Washington, D.C., for the identification of specimens and for his suggestions for improving the manuscript.

³ Telford, H. S., The Syrphidae of Puerto Rico, J. Agric. Univ. P.R. 57(3): 217–46, 1973.

⁴ García-Tudurí, J. C., Martorell, Luis F., and Medina Gaud, Silverio, Geographical distribution and host plants of the cactus moth, *Cactoblastis cactorum* (Berg) in Puerto Rico and the Virgin Islands, J. Agric. Univ. P.R. 44(1): 130–4, 1971.

fleshy, conical; antenna (Ant) two-segmented; maxillary palp (Mx plp) as long as antenna, both slightly sclerotized (Plate III, fig. 14). Three pairs of extruded proctodeal gills (Plate I, fig. 3) on each side of median line. Body cylindrical, slightly tapering cephalad to the false hook-like head and caudad from about midlength; each segment with 4-5 annulets; last segment with a lateral long, tapering, fleshy, unspined projection shorter than the respiratory process; penultimate segment with a shorter triangular projection produced laterad. Without segmental spines typical of the saprophytic group of syrphid larvae; many spinules arranged around anterior margin of false head, spines slightly increas-

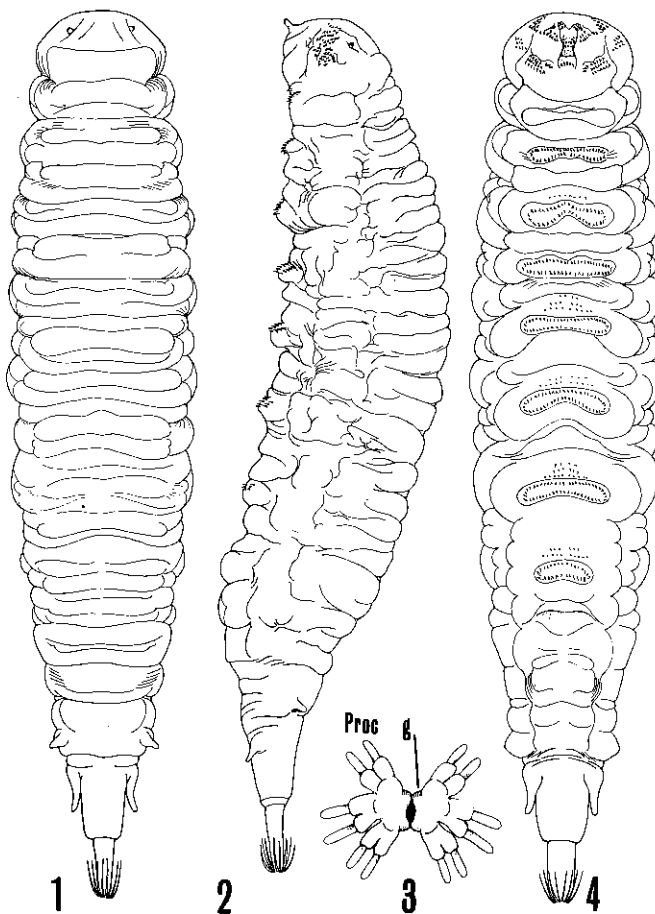


PLATE I (figs. 1-4).—*Copestylum vacuum* (F.). 1. Larva, dorsal view. 2. Larva, lateral view. 3. Proctodeal gills. 4. Larva, ventral view.

ing in size toward periphery; small areas of spinules on each side and above the mouth opening. Dorsally integument vestiture consisting of abundant microspines from behind respiratory trumpets to end of antepenultimate segment; penultimate segment with fewer similar spines, and last segment glabrous. Ventrally, spines limited to two transverse rows on false head, a double row of spines missing only on transverse annulet before the first pair of prolegs, and prolegs with crown of spines. Respiratory horn (Plate III, fig. 13), apically inconspicuously bilobed, dark banded at midlength. Posterior respiratory process relatively

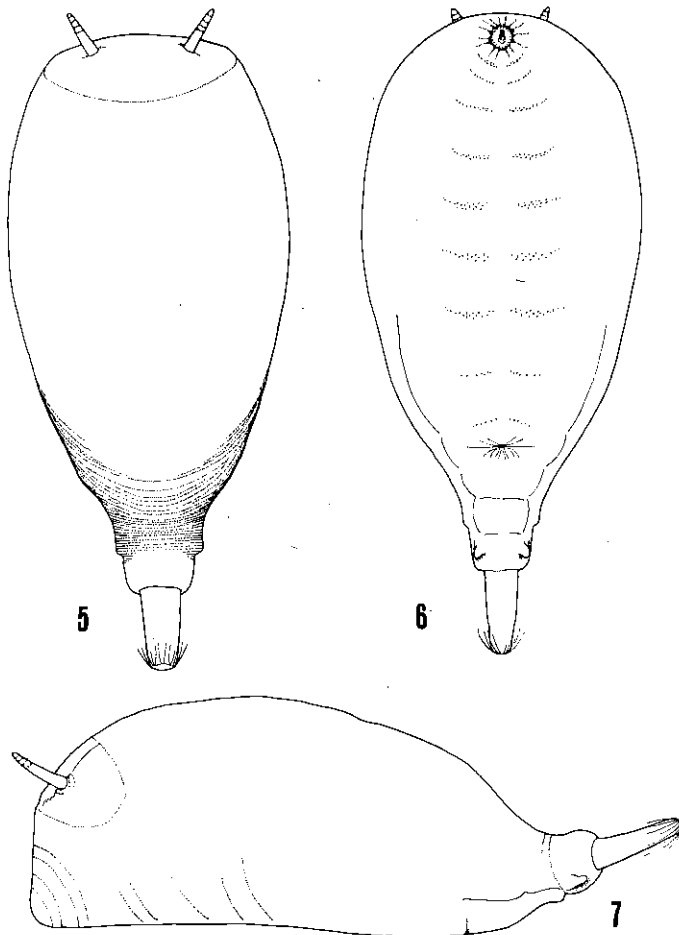


PLATE II (figs. 5-7).—*Copestylum vacuum* (F.). 5. Puparium, dorsal view. 6. Same, ventral view. 7. Same, lateral view.

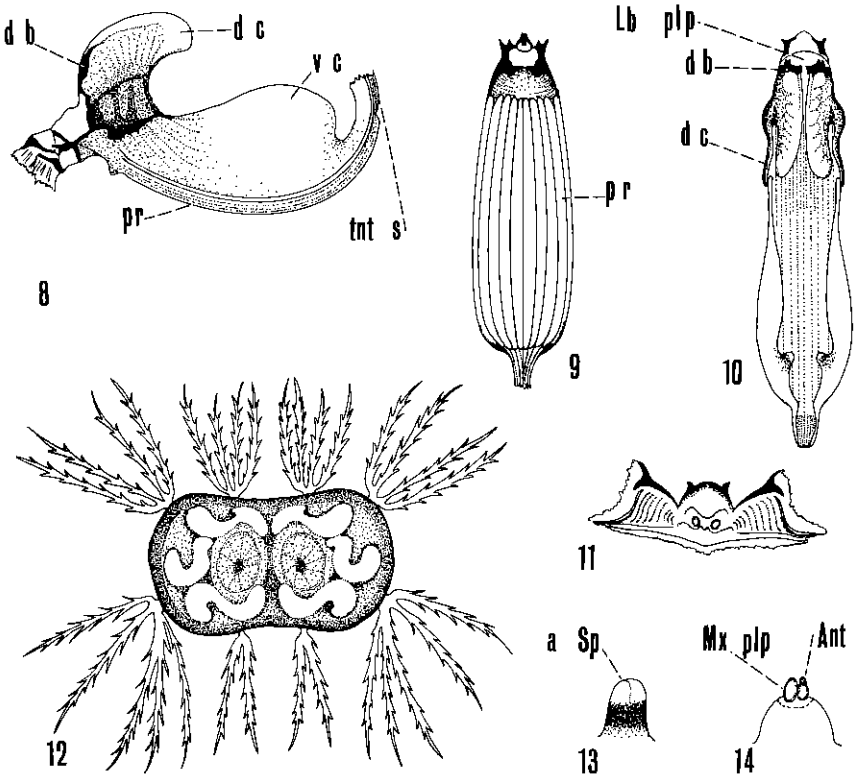


PLATE III (figs. 8-14).—*Copestylum vacuum* (F.). 8. Larva, lateral view of cephalo-pharyngeal armature showing: dorsal bridge of pharyngeal sclerite (db), dorsal cornus of pharyngeal sclerite (dc), ventral cornus of pharyngeal sclerite (vc), pharyngeal ridges of pharyngeal sclerite (pr), and tentorial stub (tnt s). 9. Same, ventral view. 10. Same, dorsal view showing: labial palp (lb plp), dorsal bridge of pharyngeal sclerite (db), and dorsal cornus of pharyngeal sclerite (dc). 11. Same, frontal view of anterior region. 12. Posterior spiracular plate. 13. Anterior spiracle (a sp). 14. Antenno-maxillary sense organ showing: maxillary palp (Mx plp) and antenna (Ant).

short, rigid, sclerotized almost from base. Spiracular plates fused into a single plate, slightly constricted medianly; spiracles S-shaped; two circular plates oval in outline, separated by a distance less than their transverse diameter; periphery with 4 pairs of 2 to 5-branched plumose or asteriform hairs (Plate III, fig. 12).

Four larvae and pupa were deposited in the collection of the National Museum of Natural History at Washington, D.C.

Runs in the generic key to the larvae of the Syrphidae of Illinois⁵ to

⁵ Heiss, E. M., A classification of the larvae and puparia of the Syrphidae of Illinois exclusive of aquatic forms, Univ. Illinois Bull. 36(1): 1-142, 1938.

couplet 21 where the absence of stout hooks on the false head take it to *Syrirta* and *Volucella* in part. The unconstricted spiracular plate and the S-shaped spiracles separate *Copestylum* from these. Now that *Volucella* has been declared a synonym of *Copestylum* the significance of these differences remains to be determined. The spiracular plate is closer to that of *Brachypalpus*, in couplet 22, but the larvae of this genus have one or more pairs of stout hooks on the false head.

PUPARIUM—(Plate II, figs. 5, 6, 7). Length 8.0–11.0 mm; width 3.0–4.0 mm; height 3.0–4.0 mm; inflated, reduced last segment ending in relatively short respiratory appendage. Color cream-white, respiratory appendage brownish, respiratory horns polished brown. Dorsally unspined, anterior end surrounded with irregular patches of microspines; ventrally with nine transverse, interrupted-medianly row of small spines. Runs in Heiss' key⁶ to *Merodon* in the first part of couplet 26 that includes *Volucella* in the second part. The different spiracular plate separates it from *Merodon* and differs from *Volucella* by the presence of only one projection near the respiratory process.

The immature stages of only a few species of *Copestylum* have been described in detail, e.g., *C. fasciatum* (Macquart) (*C. apicalis* of Wallace and Lavallee) and *C. apiciferum* (Townsend)⁷. These two species are "fairly similar", as stated by Wallace and Lavallee. *C. vacuum*, being congeneric, has the general appearance of *C. fasciatum* and varies in the absence of sinuosities around the slits of the posterior spiracular plate and the more distinctly lobed appearance of the proctodeal gills of the larva. The puparia are quite similar in general appearance but differ in the absence of thick dark spines around the anal region.

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⁶ Heiss, E. M., A classification of the larvae and puparia of the Syrphidae of Illinois exclusive of aquatic forms, 1938.

⁷ Wallace, J. B., and Lavallee, A. G., Immature stages of Milesiinae (Syrphidae) I. *Cheilosia pallipes* and *Volucella apicalis*, J. Georgia Entomol. Soc. 8(3): 187–94, 1973.