

fine spine-like processes along the dorsum of the thorax and a row of stout spines across the back of abdominal segments 2-7, with many stout spinules intermingled and anterior to them. The respiratory horns are somewhat flattened except at their base and are broadest at the middle. From near the base of this wide part of each horn, a line of dots—probably breathing pores—commences and extends to, and for a short distance hook-like over, their extremity.

From time to time a tall stalk having yielded its cluster of fruit and buffeted perhaps by sudden wind or loosed by winter flood, falls to earth, the young shoots about its base striving among themselves for the space and light thus released. And so the banana grove in its growth and in its decay supplies a convenient and sometimes a necessary shelter and sustenance for a number of insects and other invertebrates that are gathered beneath its shadows. And of all such tiny creatures none seems more at home there than the alert, smoky-winged *Campsicnemus* fly.

***Asyndetus carcinophilus* Parent (Diptera, Dolichopodidae)¹**

BY FRANCIS X. WILLIAMS
Experiment Station, H.S.P.A.

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The entrance to the holes of the common ghost crab (*Ocypode ceratophthalma* [Pallas]) of our sandy beaches is a favorite resort of several species of flies. Largest and most conspicuous of these is *Asyndetus carcinophilus* (Pl. XI, 1), a rather bristly, white-bearded fly, the generally grayish color of which is varied by reflections of greenish and bronzy. Here it finds shelter from the glare and heat of the sun as well as from cooling winds. Not venturing more than a few inches within these burrows, but stationing itself rather at the very entrance of relatively large and often abandoned ones this wary insect is able to dart out to safety at one's approach. When the danger is over it will work its way back to the selfsame or to another crab hole. Higher up on the beach the fly is also found where there are suitable depressions. Other flies, all of small size, that were observed at or near the entrances to the burrows of the *Ocypode* crab were: a grayish agromyzid, the rather similarly colored ephydrid, *Hecamede persimilis* Hend.,² an occasional dark shining species as yet undetermined but apparently also an ephydrid, a borborid, and quite rarely the very swift empid *Chersodromia hawaiiensis* Melander—described in this issue. *Asyndetus* was not

¹ Abbé O. Parent is describing this and several other species of Hawaiian Dolichopodidae.

² Determined by E. T. Cresson, Jr.

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seen preying upon any of these although sometimes it did briskly pursue its smaller neighbors. But along the moist strand, well beyond the wash of the tide the fly may often be observed usually working against the breeze, proceeding in short runs, occasionally teetering its mouth against the sand and shifting its ground by a swift low flight. It seems that here *Asyndetus* feeds upon the tiny delicate jelly-like masses—the only organic matter the writer was able to discover in a brief examination of some of this sand.

Asyndetus is easy to rear. The flies mate readily in large vials and are frequently seen pairing in the entrance of crab holes. The male fly lacks the usual tarsal claws; these may however be incorporated in the terminal pads or pulvilli which are particularly large and long (Pl. XI, 3) and are probably of use in grasping the female.

The eggs (Pl. XI, 2) are oval and measure about 0.65 x 0.30 mm. They are very pale creamy brown, tinged with yellow though dusky at the smaller extremity. Under good magnification they appear smooth and polished. Captive flies glued their eggs to the sides of the glass vials. Some of these eggs hatched in about 10 days. For rearing larvae a large glass receptacle was partly filled with moist beach sand. Several overripe to decaying guava (*Psidium guajava* L.) fruits in which drosophilid flies were likely to be breeding were then partly buried in the soil and some adult drosophilids for egg-laying were introduced. Finally, the vials with the *Asyndetus* eggs were placed mouth down on the sand. It became evident some weeks later that the resulting *Asyndetus* larvae were faring well upon the drosophilid maggots, for 10 large more or less yellowish larvae were sifted from the sand in this receptacle. The *Asyndetus* larva is of the usual cylindrical dolichopodid form, tapering at the fore end and subtruncate at the rather bulbous posterior one. At this posterior end the four large lobes are provided with the usual though in this case relatively small hair tufts. The low paired ventral swellings or pseudopods of the abdominal segments bear a row of fine beaked carinulae extending fore and aft, while just posterior to these curve lower carinulae with their margins finely setulose (Pl. XI, 7). The pharyngeal skeleton (Pl. XI, 9, V and D) is relatively stout. A pair of thoracic spiracles is present. The caudal spiracles (Pl. XI, 8, S) are situated towards the base of the upper lobes. A large moderately extended larva is about 12 mm. long. A single larva was secured well up a beach in sand in which an old flower-and-leaf garland or *lei* was partly buried. I suppose that this decaying plant tissue had attracted other flies, the larvae of which are partial to such materials and that the carnivorous *Asyndetus* was preying upon them. The 10 sifted *Asyndetus* larvae were placed in sand in metal salve boxes where upon examination a couple of weeks later, several strongly-made short-oval cocoons consisting of sand grains bound together by a delicate shining membrane-like material were found (Pl. XI, 6). Within the cocoon the larva casts its skin for the last time to

transform into a stout creamy yellow pupa (Pl. XI, 4) with segmental bands of reddish brown bristles on the back of the abdomen and a band of much larger and thicker curved ones on the metanotum. The respiratory processes anteriorly on the thorax are sharply pointed and relatively short for a dolichopodid fly. In a little more than two months after the ovipositions by the parent flies, three individuals issued from the cocoons during morning hours. The pupa armed with a sharp cocoon-piercing head process forces its way wholly or in part out of the cocoon, by movements of its spiny abdominal segments, part of the head and thoracic integument splits and the fly crawls forth. At first its abdomen is rather elongate while the wings are quite short, narrow and incurved apically. In a few minutes however, the body shortens to its normal length and the wings reach their full development.

Asyndetus carcinophilus is common on the sandy sea beaches of the Islands of Oahu, Maui and Molokai, and probably has a wider distribution than that in the Archipelago. Judging from the following observation it may not be on friendly or indifferent terms with the *Ocypode* crab, the entrance to whose burrows it so often patronizes: "Near Koko Head, Oahu, November 25, 1937. One of these flies advanced by degrees towards a small crab hole at the immediate entrance to which the occupant was posted sideways. When the fly had come almost up to the crustacean, the latter with a quick movement ran over it, seized it in its claws and then backed rapidly down its burrow."

There are at least three additional species of maritime Dolichopodidae (*Hydrophorus* 2, and *Cymatopus* 1) in the Hawaiian Islands. These however, favor different habitat areas.

ASYNDETUS CARCINOPHILUS

Explanation of Plate XI

1. Male. Length from base of antennae to tip of wings 5.15 mm.
2. Eggs. Length 0.65 x .30 mm.
3. Last joint of hind tarsus of male from above—showing highly developed pulvilli.
4. Pupa from the side. Length 4.6 mm.
5. Wing.
6. Cocoon of sand grains. Length 7 mm.
7. Serrations ventrad on abdominal segment of larva.
8. Caudal extremity of larva, hair tufts not shown. S, Stigma.
9. Pharyngeal skeleton, dissected. V, ventral portion slightly inclined from the lateral; D, dorsal portion viewed from the dorsal side.

