

**Notes on the Mexican Tachinid, *Archytas Cirphis* Curran,
Introduced into Hawaii as an Armyworm Parasite. (Diptera)**

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(Presented at the meeting of December 2, 1926)

This tachinid fly was introduced from Mexico in 1924. Mr. H. T. Osborn found it parasitizing *Cirphis latiuscula* (Herr.-Sch.) in sugar cane fields at Los Mochis, Sinaloa, Mexico. A batch of parasitized chrysalids was received from Mr. Osborn February 12, 1924, from which fifteen flies issued February 12 to 26. Nine of the flies were liberated February 25 at the Federal Agricultural Experiment Station where there were armyworms in an area of nut grass. No attempt was made at rearing them in insectary.

The first intimation that this Tachinid had become established was on February 20, 1925, when Mr. Williams observed one or two in the Experiment Station grounds not far from the original liberation. Thereafter a lookout was kept for them whenever opportunities occurred, and recoveries were made as follows, showing wide distribution on Oahu and first appearance on the other islands:

Dates and Places of Recovery

1925

- February 20. Federal Experiment Station, Honolulu. (Williams)
 " 23. Manoa Cliffs Trail on Mt. Tantalus, about 1,500 ft. (Swezey)
 March 10. Experiment Station, H. S. P. A., inside on window. (Williams)
 " 28. Thurston Ave., Honolulu, numerous on milkweed. (Rosa)
 April 21. Federal Experiment Station, very numerous on corn. (Rosa)
 May 15. Ewa Plantation, Field 9, 3 flies on weeds. (Swezey)

- June 11. 2048 Lanihuli Drive, Manoa, 1 fly in garden
(Swezey)
- June 21. Mt. Tantalus, Twin Peaks, 2 flies on Hilo grass.
(Swezey)
- " 29. Tree nursery in Makiki Valley, 2 flies on Alter-
nanthera. (Hadden)
- July 4. Mt. Tantalus, near Mrs. Swanzy's, 2 flies on
grass. (Swezey)
- " 12. Waimanalo, Olomana Needle, near summit, 1 fly.
(Swezey)
- " 19. Opaaula about 1,500 ft., in forest, several flies.
(Swezey)
- August 16. Mt. Kaala, mauka of target range. (Williams)
- October 3. Oahu Sugar Co., field 14 B. (Swezey)
- " 9. Waialua Agricultural Co., field Mill 9. (Williams)
- " 12. " " " " Gay 3. (Swezey)
- " 11. Sacred Valley, windward Oahu. (Hadden)
- " 26. Waialae Ranch. (Swezey)

1926

- March 4. Maui, Hawaiian Commercial & Sugar Co., field E,
numerous. (Muir)
- " 5. Maui, Wailuku Sugar Co., near field 97, numer-
ous. (Van Zwaluwenburg)
- " 5. Maui, near Sanatarium in Kula. (Muir)
- " 16. Wailupe, Hind-Clarke Dairy. (Hadden, Swezey)
- " 30. Kualapuu, Molokai, at G. P. Cooke's residence.
(Wilder)
- May 9. Hilo, Hawaii, Hiio Hotel garden and at cemetery,
(Swezey)
- June Molokai, in pineapple fields. (Illingworth)

1927

- February 9. Kauai, Lihue Hotel grounds. (Williams)
- " 9. " Lihue Plantation, field L 4. (Williams)
- " 10. " Kilauea Plantation, field 15. (Williams)
- " 13. " Summit Camp on Electric Power Line
trail. (Williams)
- April 3. Palehua, south end of Waianae Mts. (Swezey)
- " 10. Kolekole Pass, Waianae Mts. (Swezey)

Distribution to Other Islands

In April, 1925, when the flies appeared numerous on corn (attracted to honey-dew from aphids and leafhoppers) at the Federal Experiment Station, an attempt was made to distribute them to the other islands. A colony of 40 flies was captured and sent in a large carton by mail to O'laa Sugar Co., April 21. None of them survived the trip. No further attempts were made till July, when Mr. Van Zwaluwenburg, who was making an inspection trip to Kauai, took along 21 that had been captured. Ten of them survived the trip. These were liberated in the garden at the Lihue Hotel. Apparently these were sufficient to give them a start, for they were found in several widely separated places by Mr. Williams in February, 1926.

On September 8, 1925, and March 16, 1926, colonies were collected and sent by Mr. L. W. Bryan when he was returning to Hilo. Of these, six and eleven, respectively, survived and were liberated, and served to effect the establishment of the parasite on Hawaii. A few flies were recovered by the writer, May 9, 1926, on flowers in the Hilo Hotel garden and at the Hilo Cemetery. As yet the fly has not been recovered at any other locality on the island of Hawaii, but no doubt it is quite widely spread by this time.

No effort was made to distribute this fly to Molokai or Maui, but it reached these islands somehow, as shown by the dates of recovery above in March, 1926.

Life History Notes

No attempts had been made at rearing this fly, and its larvipositing habit was not known till on September 3, 1926, when a fly was observed to deposit a tiny maggot on leaf of Bermuda grass on a ditch bank in field Mill 9 of Waialua Agricultural Co. The leaf with this maggot was collected, and at 8 A. M. the next day it was transferred to a half-grown caterpillar of *Spodoptera mauritia*, the nut grass armyworm. The transference was made by placing the piece of grass leaf in contact with the caterpillar. As soon as the maggot came in contact with the surface of the caterpillar it became active and soon shifted to the surface of the caterpillar. It almost immediately located transversely in the segmental wrinkle anterior to the first

abdominal proleg, on the left side. It remained in this position until about 4 hours later when it was found to have penetrated half way into the caterpillar. When next observed two hours later it had entirely disappeared and there was a black dot at place of entrance. Five days later the caterpillar pupated, and later on it showed a black spot on base of right wing sheath, where it was presumed that the parasite maggot was located. However, at the end of 12 days a crippled moth issued, showing that the parasite larva failed to develop.

In September, 1926, several flies were captured in the field, and confined in a cage with growing grass, but without any caterpillars. After a few days, on examination, quite a number of the tiny maggots were found on the grass leaves. In most cases they were near the margin of the leaf and parallel to it. A number of attempts were made at rearing these maggots through to adult flies, but only a few were successful. Out of 55 of the maggots that were transferred to caterpillars of *Spodoptera mauritia*, only 4 developed to adult flies. This was sufficient, however, to indicate the length of life cycle.

In one instance, 19 of the maggots were transferred to caterpillars, one to each, on September 29. On October 5 to 6 the caterpillars were pupating. On October 17, some moths were found to have issued and died. Three chrysalids were found to contain puparia of *Archytas*, one in each. From these the adult flies issued October 26-28, making 28-30 days from the time of transference of maggot to caterpillar. In another instance it was 31 days to the emergence of the fly from the puparium.

It is known that the fly produces a large number of maggots, but it must be that a very high percentage of them perish because of the small chance of a host caterpillar coming within reach. Yet, on the island of Oahu, *Archytas cirphis* has been able to keep up its existence, even though host caterpillars are apparently scarce, as there has not been any outbreak of these caterpillars since when the first liberation of the flies occurred. It has not been determined how long the flies can live. Apparently there could be a new brood each month throughout the year, though the life cycle would no doubt be lengthened in the cooler part of the year, the same as is known with others of our insects.

Thus another armyworm enemy is permanently established and widely spread in the Hawaiian Islands and a valuable addition to the following list of introduced parasites on armyworms in Hawaii:

Tachinidae

Frontina archippivora Will., from America.

Chaetogaedia monticola (Bigot), from America.

Archytas cirphis Curran, from Mexico.

Ichneumonoidea

Amblyteles purpuripennis (Cress.), from America.

Amblyteles koebeli (Swezey), from America.

Hyposoter exiguae (Viereck), from America.

Proctotrupid egg-parasite, *Telenomus nawai* Ashm., from Japan.

Chalcid-fly, *Euplectrus platyhyphenae* How., from Mexico.