FINANCIAL STATEMENT

January 1, 1922	Amount on hand.....	\$24.60
Jan. 27, 1922	(1) 100 Large Envelopes.....	\$2.31
	(2) Mimeographed Letters.....	.85
Feb. 25, 1922	(3) Affiliation Fee to A. A. A. S.....	5.00
June 17, 1922	(4) Buying, Printing & Mailing 100 Post Cards.....	3.02
	Expenditures.....	\$11.18
June 17, 1922	Balance on hand.....	\$13.42
	Amt. due from Am. Assn. Ec. Ent.....	11.18

Following the presentation of papers, the closing business session was held. The nominating committee reported as follows:

Report of Nominating Committee:

We respectfully recommend the following as officers of this association for next year:

For Chairman H. J. Quayle, Riverside, California.

For Secretary-Treasurer E. O. Essig, Berkeley, California.

The report was duly adopted and the officers elected.

Dr. Hawley reporting on the audit of the Secretary-Treasurer report as O. K.

The Editorial Committee was appointed as follows: Chairman Harold R. Hagan, C. P. Gillette.

PART II. PAPERS

THE SUGAR-BEET ROOT-MAGGOTT (*TETANOPS ALDRICHII* HENDEL), A NEW PEST OF SUGAR-BEETS¹

BY I. M. HAWLEY

During July, 1920, fly larvae were found destroying many fields of sugar-beets near Amalga, Utah. Maggots collected at this time were reared by H. J. Pack, and the flies were later determined as *Tetanops aldrichi* Hendel of the family Ortalidae. The flies are about 6 mm. in length, glossy black, with a smoky patch on the costal margin of the wing about one-third of the distance from base to tip. Doctor Aldrich, after whom the insect was named, informed the writer in correspondence that flies of this species have been collected in the Province of Alberta,

¹Contribution from the Entomological Department, Utah Agricultural College.

Canada, as well as at Burns, Oregon, and Moscow, Idaho, and that, as far as he knows, the larval stage had not been observed previously. The maggots also have been reported as causing considerable damage locally in Idaho by Doctor Titus and in Colorado by Mr. Maxson of the Great Western Sugar Company. With the exception of a possible infestation in Emery County, the destructive work of the insect in Utah appears to be restricted to a few townships in Cache County.

The maggots of *Tetanops* are of the typical dipterous type. They injure beets by feeding on the tap root. The area around the point of attack turns black and the surrounding soil is saturated by the leakage of beet sap. When the beets are small and feeding is just beginning, the roots are often entirely eaten thru. The first indication of the presence of the pests is the wilting of the plants. As feeding proceeds, these plants die and dry up and, by midsummer, fields will show many skips and bare spots. A. H. Bateman, a field man with the Amalgamated Sugar Company, states that in 1921 three hundred and forty acres were rotated because of this pest in the Lewiston District, Utah. He further reports that in 1921 there was an estimated loss of 924 tons in the infested area—about 21 per cent of the crop. In some places 50 to 75 per cent of the plants have been destroyed. Sixty-four maggots have been found around one plant, and beets surrounded by ten to thirty have not been uncommon. A single larva may destroy a beet seedling and apparently three or four are able to kill a beet one and one-half inches in diameter. The greatest damage occurs after thinning, during the last half of June.

The life-history of *Tetanops* has been under observation since July, 1921, when a study of the insect was first undertaken by H. J. Pack and the writer. At this time the maggots were nearly full grown, and in most cases had stopped feeding. They were in an inactive condition from one to six inches from their host and at a depth of one to three inches in the ground. As the summer progressed they moved deeper in the soil and when last examined in September they were found, head downward, at depths of four to thirteen inches. Hibernation must have occurred in the larval stage, for, when fields were first examined on May 15, 1922, about two-thirds were still maggots and one-third were in the pupal stage. Puparia were never deeper than three inches and more often they were just beneath the upper crust, showing that the maggots had migrated upward before they transformed. In fact, the larval tunnels were often found in the dirt. The average pupal period had been determined as fourteen days, and it would seem

therefore that pupation in 1922 occurred mostly during the second and third weeks of May.

By May 22 flies had emerged from pupae collected on May 15, and flies containing immature eggs were taken in the field on the same day. At this time, some beets were just appearing above ground, while others were not yet planted. By May 31, flies were very common in the fields and some contained mature eggs. On June 1 eggs were found in the soil of a cage in the laboratory, and they were obtained in a beet field on the following day. In loose ground the female crawls into crevices in the soil near a plant and deposits her eggs singly or in lots of two to forty. In compact soil the eggs will be found just beneath the surface of the ground, often in contact with the plant and rarely more than an inch from it. Most of the eggs were deposited during the week of June 1 to June 8, and by June 14 most of the eggs had hatched. The egg of *Tetanops* is 1.0 mm. in length, 0.25 mm. in width, slender, slightly curved, glossy white, unmarked, and much smaller at one end. Eggs have been found around nearly every beet plant in many of the fields examined. As high as forty were present around some plants. Eggs were also abundant around lamb's-quarters (*Chenopodium album*), red root (*Amaranthus retroflexus*), and the prostrate pigweed (*Amaranthus blitoides*).

By June 14 a few small larvae were beginning to feed on the tap roots, some as deep as three inches. The characteristic black feeding spot and the soil soaked with beet sap were already present, but wilting had not yet occurred. The pre-oviposition period was found to average about ten days and the egg stage covers five days, so it may be said that maggots will begin working on the beets approximately two weeks after the flies appear.

In nearly all cases where serious infestations of *Tetanops* have occurred the soil has been sandy or a sandy loam, tho they have been found sparingly in heavier soils. Maggots seem to thrive where the moisture content is very low. Flies will oviposit in dry sand, and the resistance that larvae have to lack of moisture was accidentally shown in another way. A flower-pot containing several dozen maggots was misplaced in the laboratory, and as a result was not watered for about two months. When the pot was examined later the maggots were healthy and crawling around in the dry sand. For some reason, these maggots were still in the larval stage on June 17, as the paper is being written. Another deviation from the above life-history has been found in our rearing work. In August, 1920, and again in 1921 a small number (perhaps 2 to 5 per cent) of the larvae in our cages have

transformed to flies. A few flies were also found in beet fields on August 6, 1921. It would seem that a small second brood of flies occurs in most years.

A beet field near Lewiston which had a very heavy infestation of maggots in 1921 was fall-plowed and seeded to wheat. This spring flies were abundant and a few eggs were found around weeds in the wheat but none around the grain itself. Eggs were also present near weeds in a potato field across the road. The nearest beet field was forty rods away, and here flies and eggs were unusually abundant. It would appear that flies sometimes migrate some distance to find suitable breeding places.

The control of *Tetanops* has received little attention up to the present time. Solutions of corrosive sublimate and other materials that may act as ovicides or larvicides were placed around plants on June 6, but the action of these cannot be observed for some time. It is hoped that when we know more about the insect some cultural practice may be found which will furnish an effective and cheap control.

Tetanops is apparently a native insect which has fed on weeds for many years and which is now adding the beet to its list of host plants. We rather feel that if early indications are fulfilled, it will this year take its place as one of the three most serious insect pests of beets in Cache Valley.

METALLIC MERCURY AS AN INSECTICIDE

By A. O. LARSON,¹ Assistant Entomologist, United States Department of Agriculture

Dr. K. Kunhi Kannan of the Department of Agriculture of Mysore State, while visiting our laboratory in 1920, mentioned the fact that he had successfully prevented the hatching of Bruchid eggs in India by placing a small amount of metallic mercury in the container. While he was unable to give the identity of the Indian Bruchid, he said that it glued its eggs to the bean as does *B. quadrimaculatus*. He said that without the mercury appreciably decreasing in quantity, its presence in a container completely prevented the development of the eggs. He said that this action of mercury had been a tradition among his people.

As a result of this information three experiments with mercury and the eggs of *B. quadrimaculatus* were carried on at the same time, as follows:

¹The first experiments were conducted by Perez Simmons, and the last cowpeas were dissected by A. H. Amis.