TABLE 1. DEATH RATE AMONG *Aserica castanea* BEETLES COLLECTED AT BASE OF SPRAYED PLANTS

No. Hours Collected After Spraying	No. Beetles From Sprayed Plants	No. Beetles in Check Cage	Percentage Which Died During 168 Hours After Collection From Sprayed Plants *Per cent*	From Unsprayed Plants (Check) *Per cent*
24	569	569	55	21
48	474	474	64	22
72	158	158	64	17
120	223	223	97	10
168	153	153	92	18
192	259	259	52	17
216	277	277	69	19

NATURAL CONTROL. It is felt that, in the long run, control of the oriental garden beetle by parasitic insects will be most satisfactory. An oriental species of *Tiphia* which is normally parasitic on *Serica*, has been found to attack *Aserica castanea* readily under laboratory conditions. At the present time 6,000 cocoons of this species are being held at the Moorestown laboratory under controlled temperature and humidity conditions. These will be reared, and the adults shipped to Westbury, Long Island for liberation at a point of heavy infestation.

Scientific Notes

***Aphelinus mali* in Brazil.** In a recent letter received from Dr. A. da Costa Lima, of the Oswaldo Cruz Institute at Rio de Janeiro, occur the two paragraphs that follow:

"I have also received your paper on *Aphelinus*. When I worked in the Instituto Biologico, we, of the 'Serviço de Vigilancia Sanitaria Vegetal', through the kindness of our colleague Sundberg, succeeded in establishing permanently and successfully that parasite in Brazil.

"The initial work of acclimation was done by our Inspector in Rio Grande do Sul—Dr. Eugenio Bruck, who further sent several colonies to Minas Geraes State and to the Instituto Agronomico of Campinas (São Paulo)."

L. O. HOWARD.

A Note on the Food Habits of *Chyliza erudita* Mel. (Diptera). On September 18, 1925, the writer collected what appeared to be dipterous puparia about wounds on white pine (*Pinus strobus*) in the forest near Lake Francis, which is located just west of the Adirondack Mountains, near Number Four, New York. Two adult specimens were reared and these were identified by Dr. O. A. Johannsen as *Chyliza erudita* Mel. The puparia from which these specimens were reared were found in the pitch which exuded from the edge of wounds on the lower part of the trunk of white pine. This seems to indicate that *Chyliza erudita* feeds upon pitch in the larval stage.

LAWRENCE PAUL WEHRLE

A New Pupal Parasite of the Sugar Cane Moth Borer, *Diatraea saccharalis* Fabr. While making a survey of the sugar cane moth borer in Southeast Texas, in 1928, several pupal cases of the borer were taken from early maturing corn near Liberty,

Liberty County, Texas, and placed in jars. Moths emerged from most of the pupal cases, however, one pupa was parasitized and several hundred parasites emerged on June 29, 1928. These were sent to the U. S. N. Museum and were identified by Mr. A. B. Gahan as *Syntomosphyrum esurus* Riley. He stated that the only previous record of a pupal parasite of *Diatraea saccharalis* known to him is that of *Heptasmicra curvilineata* Cameron by Cleare in the Jour. Bd. Agric. of Brit. Guiana, Vol. 15, 1922, page 182.

J. N. RONEY, *Division of Entomology, Texas Agricultural Experiment Station*

A Parasite of the Sunflower Weevil. During some preliminary studies on the life history of the Sunflower Weevil, *Desmoris fulvus* Lec, a Chalcid parasite was reared from larval material. Sunflower seeds infested with the weevil were obtained from fields in Moultrie county, Ill., Nov. 24, 1928, and kept in common storage until about April 8, 1929. These were then brought into the laboratory. While examining the seeds April 13, 1929, during which examination each seed was broken open, an adult of the parasite was taken from one of the seeds showing weevil infestation and remnants of the weevil larva. The parasite is *Callimome albitarse* Huber. Identification was made by Dr. Gahan at Washington, D. C.

The statement was made by T. D. A. Cockerel, Can. Ent. 47, 281, 1915 that adults of *Callimome* sp. were present at the heads of sunflowers in Boulder, Colo., but I believe that this is the first definite observation of the parasitism.

J. H. BIGGER, *Illinois Natural History Survey*

Nitidulid Beetle Reared from Orange. The small nitidulid beetle, *Epuraea luteola* (Er.) [*Haptoncus luteolus* (Er.)], was recently reared by the writer from an orange taken in the markets of San Francisco, California and presented by Mr. W. Vincent, Food and Drug and Insecticide Administration, on September 2, 1929. The larvae at that time occurred in a decayed spot about an inch in diameter, which looked very much like an area inhabited by maggots of the fruit fly, on the otherwise sound orange. In fact the collector was very much afraid that he had an important find. An examination of the larvae soon dispelled all apprehensions as they were easily determined as the immature forms of a nitidulid beetle. The fruit was placed in a jar and adults subsequently reared, which were determined by E. C. Van Dyke as *Epuraea luteola* (Er.). This beetle is about 1.5 mm. long, rather wide, uniformly pale yellowish-brown, and with the posterior tip of the abdomen projecting slightly beyond the elytra.

Van Dyke has specimens reared from decayed fruits from Porterville, California (1928) and from Whittier, California (1929). He informed me that H. C. Fall had collected it in southern California several years ago. C. Leng reports it, under the name *Haptoncus luteolus* (Er.), and the synonym *H. texanus* Cr., from Central America, Texas and Florida.

E. O. ESSIG, *University of California, Berkeley, Calif.*

Notes on *Trichogramma minutum* Riley as a Parasite of *Acrobasis caryae* Grote. A few *Trichogramma* parasites were liberated on one pecan tree during periods in August and September 1929 when eggs of *Acrobasis caryae* were present. For the determination of the extent of parasitism, a total of 511 eggs of *Acrobasis caryae* were collected. The number of eggs found to be parasitized was 126, or 24.6 per cent

of the number that were examined. Adults of *Trichogramma minutum* were reared from the eggs of *Acrobasis caryae* and some of those parasites were successful later in attacking the eggs of the same species from which they were bred.

H. S. Adair and C. C. Pinkney were successful in securing parasitization of the eggs of *Acrobasis caryae* by *Trichogramma minutum* under laboratory conditions during the summer of 1928. However, they did not recover any adult *Trichogramma* from eggs of *Acrobasis caryae* collected on a pecan tree, where a previous liberation of that parasite had been made.

On September 18, 1929, 75 eggs deposited by *Acrobasis caryae* were placed in a petri dish with a few *Trichogramma* parasites which were bred from eggs of that species. Examination made five days later showed that 71 of those eggs were parasitized.

C. B. NICKELS and C. C. PINKNEY, *U. S. Pecan Insect Laboratory, Brownwood, Texas*

Hibernation of the Convergent Lady Beetle, *Hippodamia convergens* Guer., on a Mountain Peak in New Mexico. For several years the writer has observed the hibernation of the convergent lady beetle on Mosca Peak in the Manzano Mountain Range, 30 miles southeast of Albuquerque, New Mexico. Mosca Peak resembles a pyramid in form and its precipitous escarpment rises to an elevation of 9,462 feet above sea level and more than 3,000 feet above the Estancia Valley. The summit is 10 or 12 feet in diameter and is covered with scrub oak, bunch grass, and loose stone. The first visit was made to this Peak on May 26, 1925, and while not a single live beetle was to be found at this time it was apparent from the large accumulations of dead beetles that this species had been congregating on the peak to hibernate for many years. The absence of live beetles at this time could probably be attributed to the fact that those individuals which have survived the winter successfully had migrated to the valleys. The masses of dead beetles under oak leaves, around the base of trees in the bunch grass, and under stones were several inches deep. Some of the beetles had nearly the natural color of living specimens, others were bleached almost white, and there were beetles with all intermediate shades.

Another trip was made to the peak on October 25 of the same year, and as in the case of the first visit, no live lady beetles were found. Apparently the severe dry season had reduced the population of the beetles in this area to the point where they were almost extinct as was the case with the Mexican bean beetle during the same period.

The last visit to the summit of the peak was made on September 29, 1929, at which time several hours were spent noting the action of the beetles. It was observed that "thousands" of beetles had accumulated on the peak. Mating was noticed in several instances, and the beetles when disturbed would become very active. During the observation several beetles were noticed flying in to join the great colony. No other species of Coccinellidae have been noted in this colony of the convergent lady beetle. The Mexican bean beetles placed on the peak in cages failed to survive the winter. The writer has been informed by U. S. forest rangers that they have noted colonies of *Hippodamia convergens* on higher mountain peaks of the Southwest than the Mosca Peak.

J. R. DOUGLASS, *Assistant Entomologist, U. S. Bureau of Entomology, Estancia, New Mexico*

Note on a New Method of Determining Efficiency in Control. The usual method of determining the efficiency of any given control measure rests on the visual observation of the results. Generally, counts are made of the insects living and dead, and a ratio or percentage is obtained which gives a basis for statements on control. Occasionally estimates of reinfestation may be used for determining the effectiveness of control, but here too the data are accumulated by visual observations.

For three years the writers have been studying methods of combating the boxwood leaf miner. In this work several schemes of control were investigated and the results checked. The visual method of checking the efficiency of control was always relied upon. This system was used by the writers first because no other system seemed available, and also because it gave end-points in figures, which were results of the type usually sought—data of an objective kind and therefore easy to work with. Late in the course of the experimental work on fumigation with hydrocyanic-acid gas another method of determining results was accidentally discovered. This method, while hardly as exact for a final analysis as larval examination, rendered possible, early in the course of at least certain experiments, the making of better predictions than did visual observations. It consisted of auditory observation, and the examination for effectiveness of control was made by listening to the infested bush, rather than by looking at the fumigated larvae.

On sunny, fairly warm days in the spring, the healthy or vigorous larvae of the boxwood leaf miner move or squirm within their mines. This activity produces a faint but definite rustle in the bush which can be distinctly heard once an observer has accustomed his ear to note it. Larvae in infested bushes which, as later counts show, have been successfully fumigated do not produce this sound.

The value of this method of observation in estimating the efficiency of control of the boxwood leaf miner is very high, especially when the observations are made on spring-fumigated boxwood about one week to one month after fumigation. It is at this time a much more reliable criterion of the efficiency of a fumigation than larval examinations. This is true for the following two reasons: first, after fumigation, and apparently without regard to the success of the operation, boxwood leaf miner larvae are motionless when the leaves are opened for examination. Second, after the passage of a few days the stupefying effects of fumigation wear off and when leaves are then opened the larvae which eventually are going to die will squirm from the stimulus given them in opening the leaves.

This observation rests on the difference in behavior within unopened leaves of normal or nearly normal larvae and those which have had a killing dose of hydrocyanic-acid gas.

WILLIAM MIDDLETON and FLOYD F. SMITH, *U. S. Bureau of Entomology*

Suggestions for Use of Oil Sprays in 1930

The members of the Western Cooperative Oil Spray Project, comprising the experimental stations of California, Idaho, Montana, Oregon, Washington and British Columbia, and the United States Department of Agriculture, wish to make the following suggestions regarding the use of oil sprays on fruit trees in the Northwest, with particular reference to apples and pears. These suggestions are based on data accumulated from experimental work during the past three years.

OILS FOR DORMANT SPRAYS. 1. Dormant oil sprays should be applied in the spring before the bud scales separate and before the buds show green. Injury may result

if sprays are applied during the critical period (delayed dormant) of bud development. This period occurs between the time the buds first show green and the cluster bud stage.

2. There is no evidence that low temperatures following sprays applied in the spring during the dormant period result in injury.

3. Oils of relatively low sulfonation test (50–70) can be safely used.

4. Stable emulsions have proven safer than quick breaking emulsions.

OILS FOR SUMMER SPRAYS. The following suggestions are made to growers who are planning on using oil sprays for codling moth control.

1. The number of applications of summer oils should not exceed three, and under most conditions not more than two are advisable.

2. The use of oils alone has not given control of the codling moth. Oils should be used only in combination with lead arsenate or nicotine sulfate.

3. Oils in combination with lead arsenate should be applied during the height of the egg-laying period of the first brood, but if sulfur sprays are applied after the dormant period, no oil should be used in the first brood sprays.

4. Because of difficulty in removing spray residue, the oil-lead arsenate combination should not be used after July 25, but the oil-nicotine sulfate combination may be used after this date.

5. Oils ranging in viscosity from 65–75 have proven most satisfactory, except that for Newtowns or other varieties susceptible to oil injury the viscosity of the oil should not exceed 55.

6. Oils with a sulfonation test not less than 85 are satisfactory.

7. Caution: Oils in combination with lead arsenate should not be allowed to stand in pipes or spray tanks, but should be applied immediately after being mixed. Fruit sprayed with this combination after the spray has been allowed to stand in tanks or pipes for some time, can be cleaned only with great difficulty. This spray mixture is also ineffective in control.

8. For more specific recommendations regarding the use of oil, local authorities should be consulted.

The following members participated in the experimental work upon which the above suggestions are based:

British Columbia—E. P. Venables, entomologists; Max H. Ruhman, entomologist;
California—E. R. deOng, entomologist; Claude Wakeland, entomologists; Lief Verner, horticulturist.
Idaho—Claude Wakeland, entomologist; Lief Verner, horticulturist; C. W. Hungerford, plant pathologist; H. C. Magnusson, chemist; H. S. Snyder, chemist.
Montana—J. R. Parker, entomologist; W. C. Cook, entomologist; H. E. Morris; botanist; Jesse Green, chemist; S. H. Johnson, chemist.
Oregon—Don C. Mote, entomologist; B. G. Thompson, LeRoy Childs, Ento- Childs, entomologist; R. K. Norris, entomologist; R. H. Robinson, chemist; F. C. Reimer, horticulturist.
Washington—R. L. Webster, entomologist; Anthony Spuler, entomologist; F. L. Overley, horticulturist; J. R. Magness, horticulturist; W. A. Luce, horticulturist; E. L. Green, chemist; J. R. Neller, chemist; D. J. Crowley, plant pathologist.
U. S. D. A.—E. J. Newcomer, entomologist; M. A. Yothers, entomologist; D. F. Fisher, plant pathologist; E. L. Reeves, plant pathologist; H. C. Diehl, plant physiologist; C. P. Harley, plant physiologist; C. R. Gross, chemist; Jack E. Fahey, chemist; A. L. Ryall, pomologist; B. D. Ezell, horticulturist.

E. J. NEWCOMER, *Yakima, Washington, Chairman*
ANTHONY SPULER, *Wenatchee, Washington, Secretary*