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The Effect of the Miticide Neotran* Upon the Laboratory Production of *Aspidiotus lataniae* Signoret as a Coccinellid Food

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The large scale production of Coccinellids at the Fontana Laboratory, Commonwealth Bureau of Biological Control, Fontana, California, for shipment to Bermuda where they are used against the Diaspine Cedar Scale, *Carulaspis visci* Schrank has created a variety of problems. Potato tubers are being used to rear the Diaspine scales *Aonidiella aurantii* Mask., *Aspidiotus lataniae* Signoret, and *Aspidiotus hederae* Vallot for host material for the Coccinellids *Zagloba ornata* Casey, *Cephaloscyrmus occidentalis* Horn, *Microrhizea suturalis* Schwartz, *Lotis nigerrima* Casey, *Lotis neglecta* Muls., *Pharoscyrmus exiguus* Weise, *Telsimia* sp., and the Nitidulid *Cybocephalus* sp. One of the outstanding difficulties was the damage caused by several species of predaceous mites as contaminants in our production program. The elimination of these mites led to the rather novel use of miticides as a means of sanitation control. The results although effective were open to experimental error. This preliminary report deals primarily with the effectiveness of Neotran on these mites, *Hemisarcoptes malus* Schimer, *Iphidulus* sp., *Tyroglyphus americanus* Banks, the associated effect upon the production of the Diaspine scale *Aspidiotus lataniae*, and the subsequent effect on the production of the Coccinellids.

The presence of these mites on our host material, potato tubers laboratory infested with the scale *Aspidiotus lataniae*, was first called to our attention by the premature cessation of crawler production. Careful examination of the mature scale revealed a heavy infestation of *Hemisarcoptes malus*, secondary infestations of *Seiulus* sp. now thought to be *Iphidulus* sp., and *Tyroglyphus americanus*.

It was found that the mites, *Hemisarcoptes malus* and *Iphidulus* sp.,¹ appear on relatively young scale, i.e., two weeks after infestations with scale crawlers. The mite population remains relatively light until the chitinous shell of the scale is lifted to permit crawlers to emerge. This change increases the accessibility of the food supply to the mite and provides an excellent place for oviposition. Under these optimum conditions *H. malus* is by far the predominant mite. *Iphidulus* was encountered only occasionally. The sugar mite, *Tyroglyphus americanus*, does not appear in numbers until the onset of decomposition of the potato tuber. *Aspidiotus lataniae* seems to afford *H. malus* with an ideal environment for reproduction. The mites which usually feed upon the scale crawlers have been observed attacking the mature scale. The migratory form

*K1875 Dow Chemical Co.

¹*H. malus* and *Iphidulus* sp. were present in the original insectary produced stocks obtained for this project.

of *H. malus* has been observed attacking the puparia of the Coccinellid *Zagloba ornata*.

The program originally included plans to test the efficacy of three general miticides. Two of these, Neotran and K6451, are products of the Dow Chemical Co. The active compound in Neotran is Bis(p-chlorophenoxy)methane. The chemical composition of K6451 has not yet been released since it is still in the experimental stage. Neotran is sold in a 40% wettable mixture, and K6451 may be obtained in a 50% wettable mixture. The third miticide, Dimite (D.M.C.), is a product of the Sherwin-Williams Co. Its chemical composition is 2(p-chlorophenyl)ethyl carbinol, and it is available in a 25% emulsifiable solution.

Preliminary tests utilizing the above miticides on mature *Aspidiotus lataniae* proved K6451 and D.M.C. to be too toxic to mature scale and crawlers as well as to the mites to be practicable for sanitation purposes. A series of control experiments are planned using these miticides in weaker concentrations.

The preliminary trials were carried out using the following solution strengths.

K1875 (Neotran)	40% wettable	1.701 g/qt H ₂ O
K6451	50% wettable	1.701 g/qt H ₂ O
D.M.C. (Dimite)	25% Emulsifiable	1.183 ml/qt H ₂ O

I. *The effect of Neotran upon mother stock (Aspidiotus lataniae) during the period of high crawler production.*

A. Using host material free of mites.

B. Using host material infested with *Hemisarcoptes malus* and *Iphidulus* sp.

Mother stock of *Aspidiotus lataniae*, which was free of mites, and mother stock which had become infested with *Hemisarcoptes malus* and *Iphidulus* sp. were sprayed with a Neotran solution. Both samples were chosen so as to insure that the mature scale was in full crawler production. The extent of the infestation was determined by a count of the number of mites within a one-half inch square on a representative sample. These samples were sprayed until the excess solution dripped from the tubers.

This procedure demonstrated conclusively that Neotran has a residual effect, as well as a direct effect, which is very efficient in the control of a heavy mite infestation. Two days after spraying, a recount of the mite population was taken from an equally representative sample. The mite population had decreased from the original sixty to the one-half inch square to thirteen to the one-half inch square, or approximately one-fourth. Four days after the original treatment, the count decreased to six to the one-half inch square. On the sixth day, the mite population had dropped to slightly over one to the one-half inch square, or approximately one sixtieth of the original infestation.

Close examination of the mature *Aspidiotus lataniae* indicated that the miticide Neotran is lethal to a certain extent. Apparently only those scale which have settled on the covers of other scale so as to form a second layer are harmed.

II. *The effect of Neotran on scale crawlers.*

Neotran is lethal to the scale crawlers. During the progress of this series of tests, it was found that Neotran has a retarding effect upon crawler production. Crawler production by *Aspidiotus lataniae* was retarded for an average of two weeks regardless of the stage of development at the time of treatment. Mature *A. lataniae*, which was producing crawlers, was sprayed, and crawler production was inhibited for approximately two weeks. Crawlers began to appear as early as the seventh day, but the normal number of crawlers was not reached until the fourteenth or fifteenth day. Young *A. lataniae* sprayed at the end of the seventh day after the formation of the chitinous shell suffered no apparent after effects other than to retard crawler production by approximately two weeks.

III. *The effect of Neotran upon host material during the period preceding the lifting of the chitinous shell to allow the crawlers to emerge.*

Mite control measures using Neotran are more efficient when instituted after the formation of the chitinous shell and before the marginal edge of the shell is freed from the tuber epidermis to permit the crawlers to leave.

A preliminary examination of the residual effectiveness of Neotran in mite control during this stage of development was started using *Aspidiotus lataniae* which had been settled seven days. A count of the mites from a representative sample averaged sixteen to the one-half inch square. These tubers were sprayed until the excess dripped. A count taken two days later yielded an average of less than one to the one-half inch square, and two days later only one adult *Hemisarcoptes malus* could be found on the total surface of ten potato tubers.

At the time this test was carried out, the migratory form of *Hemisarcoptes malus* was observed to be on both the control and the treated trays of *Aspidiotus lataniae*. When a check was made two days later, the migratory form had disappeared from both the control and the treated stock. Therefore, no conclusion could be reached regarding the effectiveness of Neotran against this migratory form of *H. malus*.

IV. *The residual effect of Neotran upon clean, recently fumigated potato tubers with respect to the effect upon infestation with scale crawlers of ASPIDIOTUS LATANIAE.*

Clean, fumigated potato tubers were heavily sprayed with Neotran, marked, and placed in trays with untreated potatoes to be infested with *Aspidiotus lataniae* crawlers. This experiment indicated that this would be the ideal time to control mite infestations since there was little variation in the behavior of the scale infestation between the treated and the untreated potatoes. The slight decrease in the extent of the scale infestation was attributed to the residual effect of Neotran.

When this procedure was put into general practice in order to control a general mite infestation, it was found that approximately half of the scale crawlers were not settling properly and formed a fine, wax-like web instead of the expected cover. Both typical and atypical forms were present on the same tuber.

Since there were two possibilities of contamination, this procedure will be repeated under other conditions. In order to eliminate any possibility of contamination due to the inert material in the Neotran mixture, the Bis(p-chlorophenoxy)methane will be purified and used in the pure state.

The second possibility arises from the fact that the spraying equipment was used with DDT (dichloro-diphenyl-trichloroethane) in other sanitary measures. This possibility has been eliminated by the purchase of a new spray gun.

V. *The effect of Neotran on the larval stage of a predator, (Zagloba ornata).*

In order to determine the effects of Neotran on the larval stage, thirty larvae of *Zagloba ornata* were placed on treated host material. No harmful effects were noted and the puparia were transferred to another problem. As soon as the pure compound bis(p-chlorophenoxy)methane is available, this series will be repeated and continued throughout a full generation.

VI. *The effect of miticide upon predators when subjugated to a direct spray of Neotran.*

Fifty *Zagloba ornata* were placed on untreated host material and were then sprayed with Neotran. Except for two beetles which drowned in pools of Neotran, no harmful effects were noted.

VII. *The effect of Neotran upon predators which were fed with treated host material.*

Fifty *Zagloba ornata* were placed on host material, *Aspidiotus lataniae*, which had been treated with Neotran, and under experimental conditions no harmful effects were noted. Widespread use of this procedure, however, resulted in a marked drop in beetle production. These results again are inconclusive because of the possibilities of contamination and will be repeated under more carefully controlled conditions.

A New Species of *Laccocera* from Canada and Records of Other Canadian Species (Homoptera: Araeopidae)¹

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The fulgorids of the genus *Laccocera* Van Duzee were revised by Penner (1945. J. Kansas Ent. Soc. 18: 30-46), who described and figured the seven species known to occur in North America. In all, five species are represented in the Canadian National Collection. One of these is previously undescribed, and three others have not been recorded from Canada previously. The following are a description of the new species and records of other Canadian species from specimens in the Collection.

***Laccocera canadensis* n. sp.**

Length of macropterous male: to tip of abdomen, 2.6 mm., to tip of forewing, 3.4 mm.; length of macropterous female: to tip of abdomen, 2.8 mm., to tip of forewing, 3.8 mm.

Vertex (Fig. 1) as long as wide; anterior margin rounded, posterior margin straight; median cell angulate anteriorly; lateral cells large, each with two well-defined pits; basal cells large, with the carinae distinct. Frons (Fig. 2) longer than wide, widest above the middle; each half with seven pits, of which three are near the margin next the eyes and four are in a straight line parallel to the median carina. Pronotum two-thirds as long as the vertex, three times as wide as its median length; with nine pits on each side. Scutellum about twice as wide as long.

Vertex dirty yellow; face dirty yellow, slightly darker than the vertex and becoming brownish in the lateral compartments of the clypeus; head sometimes brownish at the sides below the eyes. Prothorax dirty yellow; scutellum dirty yellow to yellowish-brown, with a brownish-red suffusion in each lateral compartment. Legs light brown, with the coxae and the pleural pieces brown. Wings smoky hyaline, the veins brown. Abdomen dark brown, with the pits and the posterior margins of the segments yellowish.

Male genitalia: styles (Fig. 3) each broad basally, tapering and sinuately curving, and ending in a slight hook; aedeagus (Fig. 4) broad at proximal end, narrowed through middle, and expanded at apex, curved upward beyond the base and downward near the apex, the apical portion margined below with a row of teeth and with a band of teeth on each side extending down the shaft to the first bend, the tip being sharply pointed; processes of anal appendage short, curved, and rapidly tapering (Fig. 5).

Described from eight macropterous specimens. This species is easily recognized by characters of the male genitalia, notably the form and ornamentation of the aedeagus.

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