Moreover, BATRA (1966) described that the ambrosia propagules in mycangia were observed neither in culture nor in tunnels so far as about 48 species of ambrosia beetles were examined. Thus, it was assumed that the ambrosia fungus may be fated to form two types of the spore in its life cycle.

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Effect of Disulfoton [*O*, *O*-diethyl *S*-2 (ethylthio)ethyl phosphorodithioate] Granular on the Large 28-Spotted Lady Beetle, *Epilachna vigintioctomaculata* MOTSCHULSKY[1]

Soil application of disulfoton (Dissyton®) granular has been known as an effective method for eradicating aphids on potatoes (SCHWARTZ et al., 1961). However, it has not been investigated so far whether this method is also effective for killing chewing type insects. During the course of soil application tests of disulfoton (Disyston®) 5% granular against various insects conducted in 1964, the author found it effective in controlling both adults and larvae of the large 28-spotted lady beetle, *Epilachna vigintioctomaculata* MOTSCHULSKY, which is an important pest of solanaceous crops in Japan.

Various dosages of disulfoton 5% granular were mixed with the soil of Wagner pots ($^1/_{5,000}$ a) at the time of the plantation of potatoes or eggplants. Twenty-seven days after application in potato plants, 15 overwintered adult beetles were released in a wire-netting cylindrical cage(15cm in diameter and 35cm in height) covering the plant in each pot and mortalities of beetles were examined after 6 days from release. While in eggplant, newly-emerged adults, were released in the same manner as potato plant after 57 days from application and their mortalities were examined after 13 days (Table 1).

Larvae of different instars were fed on leaves cut from the potato plants applied with disulfoton granular by the similar method mentioned above, and their mortalities after 24 hr were examined in laboratory under the temperature of 25-27°C (Table 2).

In each test, ten larvae were used with the exception of 15 larvae in 4th-instar larvae test.

In potato field tests, the larval population and the potato yield were examined in the field designed as a randomized block having two replicates of 16 m^2-plot (Table 3). Also the effect of application time of disulfoton on the larval population was investigated (Table 4).

As shown in Table 1, disulfoton 5% granular gave high mortalities to both overwintered and newly-emerged adults. It must be worthy to note that disulfoton still had the insecticidal effect against newly-emerged adults 70 days after the

[1] Appl. Ent. Zool. 2 (3) : 170—172 (1967)

Table 1. Effect of Disulfoton 5% Granular on the Overwintered and Newly-emerged Adults of the Large 28-Spotted Lady Beetle

Dosage	Mortality of adult (%)	
g/pot	Overwintered[a]	Newly-emerged[b]
0.5	4.4	68.2
1.0	77.8	63.4
1.5	93.3	—
Control	4.4	0

[a] Test plant: potato; Soil treatment: March 25th; 3 replicates.
[b] Test plant: eggplant; Soil treatment: May 6th; 3 replicates.

Table 2. Effect of Different Dosages of Disulfoton 5% Granular on the 1-4th Instar Large 28-Spotted Lady Beetle[a]

Dosage	Mortality of larvae (%)		
g/pot	1st-2nd-instar	3rd-instar	4th-instar
0.5	100	63.0	11.1
1.0	100	80.0	66.7
1.5	100	87.1	84.4
Control	0	0	0

[a] Test plant: potato; Soil treatment: April 27th; 3 repricates. Date of tests: 1st-2nd-instar, May 23; 3rd-instar, May 26; 4th-instar, June 1.

Table 3. Effects of Different Dosages of Disulfoton 5% Granular on Larvae of the Large 28-Spotted Lady Beetle in Potato Field

Dosage	Mean no.	No. of potatoes yielded per plant		
kg/10a	of larvae	Large	Small	Total
3	101	3.96	1.30	5.26
6	39	3.75	1.15	4.90
9	96	3.54	1.59	5.13
Control	348	3.57	1.66	5.23

Soil treatment: April 28th. Examination: June 4th. No. of sampled plants: 10 per plot.

Table 4. Effects of Disulfoton 5% Granular Applied at the Different Time on the Larvae of the Large 28-Spotted Lady Beetle

Time of application	Mean no. of larvae per plant
At planting (March 19th)	15.7
When the height of potato plant is 10 cm (April 15th)	2.3
Control	228.0

Examination: June 4th.

soil application, giving the mortality higher than 60%. Good control of the larvae of various instars were also obtained, especially with the dosages of 1 g and 1.5 g per pot (Table 2). From the field tests, it is apparent that disulfoton 5% granular, when applied at the dosages of more than 6 kg per acre, reduced the larval population considerably, although the significant effect on potato yield was not obtained (Table 3). As to the effect on yield, further investigations would be necessary. Better larval control was obtained with disulfoton granular applied in the soil when the potato plant grew to 10 cm in height, rather than applied at the time of planting (Table 4).

From these results, it appears that disulfoton granular is significantly effective for controlling the lady beetle of leaf-chewing form as well as for aphids of leaf-sucking form, and for a notably long period, i.e. longer than two months.

On the basis of these data obtained in 1964 by the author, some workers conducted field tests and also obtained good results (KOBAYASHI et al., 1966; OMORI et al., 1966).

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