

## INSECTS - ENTOMOLOGY

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A survey of insects and nematode problems in sugarbeets was made in Michigan during the 1968 season. The insect problems were scattered, with growers reporting some damage from flea beetles, cut worms, spinach leaf miner and sugar beet root aphid. Some foliage aphids, leaf hoppers and tarnished plant bugs were also in the fields, but in low numbers. Bronzing of the upper leaves of the beets caused by the tarnished plant bug, was seen in Northern Ohio, however. Wire worms, white grubs, mites, and blister beetles that have been reported as damaging sugar beets in Michigan were not seen during this season.

Tests of insecticides against the flea beetles and the first generation of spinach leaf miner were made. Summaries of these tests are given in Tables 1 and 2. It should be noted that dimethoate that was effective against both pests and azinphozmethyl that was effective against the spinach leaf miner are not yet registered for use on sugarbeets and should not be used on sugarbeets until they have been approved. Endosulfan (sold as "Thiodan") performed well in these tests against both pests. Carbaryl (sold as "Sevin") was especially effective against flea beetles, and trichlorfon (sold as "Dylox") was especially effective against the spinach leaf miner. Parathion was observed to be effective against the spinach leaf miner in commercial applications.

The cut worms and flea beetles do their damage very early in the season and the spinach leaf miner appears not much later. Growers were generally slow in getting sprays on for the protection of their crops. This is a busy season of the year for them, of course, but it is strongly urged that seedling fields be frequently checked for plants cut by the cut worms, with corky spots caused by the flea beetle, and eggs or small tunnels of the leaf miner, and sprays applied if they become common. There is a chance that seed treatment with some newer insecticides may give protection to the crop during its early growth. This is being investigated. A preliminary test, summarized in Table 3, showed that the insecticides Baygon and Furadan did not seriously damage the sugarbeets when applied as seed treatments. These insecticides are not as yet approved for use. They will be field tested this next season.

The sugar nematode reduces yields and has taken some fields completely out of sugarbeet production in the area east of Bay City. The tests of fumigants and granular nematicides for its control that were started by Dr. John Knierim were continued during the 1968 season. The conventional application of fumigants (chisels spaced 10 inches apart and run about six inches deep in the soil) gave the expected good results. A deep application (chisels spaced on row centers and about 16 to 18 inches deep) gave nearly equal results while using only 40 percent to 60 percent as much fumigant as in the conventional application (see Table 4). This deep application is still not approved for use and will be more fully investigated. It appears to be very promising in reducing costs of fumigation. The recommended time for soil fumigation is in the fall. This is also the time for sugarbeet harvesting, and tests of practicality of spring fumigations for sugarbeet nematode control will be continued.

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The granular nematicides are applied in bands over the row and roto-tilled or disked in prior to planting. Temik was especially effective against the sugarbeet nematode when it was applied in this manner (see Table 5). The other nematicides tested were less effective and a few of them caused damage to the beets. The use of the granular nematicides is simpler and requires less special equipment than soil fumigation. The use of the granular materials will continue under tests this next season. An effort is being made to get Temik registered for use in sugarbeets. It may be approved by next season, but should not be used until this approval has been received.

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**TABLE 1.** Effectiveness of foliage insecticides in the control of flea beetles on sugar beets

Insecticide	Formulation	Dosage Oz./Acre <sup>(a)</sup>	% Plants Damaged By Flea Beetle <sup>(b)</sup>
Carbaryl	80 WP	24	20
Endosulfan	2.0 EC	8	32
Dimethoate	2.67 EC	8	36
Trichlorfon	50 WP	24	64
Malathion	5.0 EC	20	76
None	--	--	88

<sup>(a)</sup> Amount of actual insecticide

<sup>(b)</sup> One week after the sprays had been applied

**TABLE 2.** Control of spinach leaf miner on sugarbeets obtained with foliage sprays of insecticides

Insecticide	Formulation	Dosage Oz./Acre <sup>(a)</sup>	Avg. No. of Plants With Fresh Mines	
			7 June <sup>(b)</sup>	13 June <sup>(c)</sup>
Trichlorfon	50 WP	24	4.50	2.50
Dimethoate	2.67 EC	8	9.00	1.50
Endosulfan	2.0 EC	8	10.25	2.50
Azinphosmethyl	2.0 EC	8	11.25	2.75
Diazinon	50 WP	16	11.25	5.00
Malathion	5.0 EC	20	8.75	12.00
Carbaryl	80 WP	24	11.75	11.50
None	--	--	21.50	21.75

<sup>(a)</sup> Amount of actual insecticide

<sup>(b)</sup> Three days and <sup>(c)</sup>nine days after the sprays had been applied

**TABLE 3.** Effects of seed treatment of sugar beets with Baygon and Furadan on the germination and seedling vigor of the seeds

Insecticide	Form.	Conc. <sup>(a)</sup>	% Germination	Avg. Hgt. of Seedling	Avg. Wgt. of Seedling
Baygon	70 WP	4	88.50	34.95 mm	42.7 mgm
Baygon	70 WP	8	94.50	34.50	44.6
Baygon	70 WP	16	86.00	34.64	39.2
Furadan	75 WP	4	93.50	40.20	60.0
Furadan	75 WP	8	97.50	38.98	44.1
Furadan	75 WP	16	98.50	37.00	47.9
None	--	--	100.00	36.38	37.9

<sup>(a)</sup> Ounces of actual insecticide per 100 pounds of seed

**TABLE 4.** Average yield of sugar beets following soil fumigation for sugar beet nematode control

Fumigant <sup>(a)</sup>	Depth	Dosage Gal./Acre	Yield - Lb./100 Row-Feet <sup>(b)</sup>
DD	Conv.	30.0	207.00
Telone	"	10.0	196.25
DD	Deep	12.0	191.00
Telone	Conv.	20.0	186.50
"	"	15.0	186.00
"	Deep	8.7	180.75
Vorlex	"	8.7	179.25
"	Conv.	15.0	172.00
None	--	--	127.75

<sup>(a)</sup> Fumigants applied on April 16 and plots planted on May 1, 1968

<sup>(b)</sup> Multiply by 0.09334 to get equivalent tons per acre

TABLE 5. Average yield of sugarbeets following application of nematicides at planting time for sugarbeet nematode control

Nematicide <sup>(a)</sup>	Form.	Dosage Oz./Acre <sup>(b)</sup>	Yield - Lb./100 Row-Feet <sup>(c)</sup>
Temik	10 G	80.0	201.00
Phorate/Zinophos	7.5/7.5 G	18/18	174.50
Furadan	10 G	96.0	167.50
Chem. 68138	10 G	14.0	158.00
Chem. 68138	10 G	28.0	157.50
Dasanit	10 G	14.0	155.25
Phorate/Zinophos	7.5/7.5 G	36/36	152.50
Lannate	5 G	64.0	149.75
None	--	--	142.25
Dasanit	10 G	28.0	139.75
Di-Syston	2.0 EC	16.0	135.00
Lannate	5 G	128.0	116.50

<sup>(a)</sup> Nematicides applied April 16 and plots planted on April 17, 1968

<sup>(b)</sup> All dosages are for actual nematicide

<sup>(c)</sup> Multiply by 0.09334 to get equivalent tons per acre