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High-density cole crop maggots controlled

Bush bean selections tested for halo blight resistance

Breeding bush beans for resistance to halo blight has been one objective of the bean improvement program for several years. Many Oregon bush bean lines have had a rather high tolerance (not immunity, nor extremely high resistance) to halo blight, mainly, we believe, because of the genes inherited from Blue Lake pole beans. Pole beans, such as FM 1-K, have this tolerance - an ability to grow and produce pods free of the organism in spite of appearance of a few "halos" on leaves following inoculation.

Because of the large numbers of selections involved in the improvement program, and the need for developing
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Growing interest in high density plantings of certain cruciferous crops for processing has raised the question of root maggot control. Direct seeded, row plantings of broccoli, cauliflower, and other crops, as well as wide spaced transplantings, allow for row treatments with several chemicals for satisfactory protection against maggot attack, but row treatments in high density plantings would be difficult or impractical. Preplant, broadcast and soil-incorporated applications of diazinon and Dyfonate are registered for use on cole crops in both plant beds and direct seeded fields, and this type of treatment would seem to be the answer for protection against root maggots. However, there have been reasons to doubt the effectiveness of this type of treatment and a study was conducted in 1971 at the Vegetable Crops Farm near Corvallis to evaluate it against both root and "stem" crucifers.

Plots, 95' by 12', were established with diazinon 14% granules applied at the rates of 4,6,8 and 10 pounds active ingredient per acre (A.I./A), and with Dyfonate 10G at the rates of 2 and 4 pounds AI/A. Radishes, turnips, broccoli and cauliflower were seeded immediately through the plots for later observation
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on degree of maggot damage. No untreated check was provided, since the ubiquitous cabbage maggot can be depended upon to attack cruciferous crops heavily in this area.

The radishes, planted only in the diazinon plots, were harvested 33 days after planting, and the turnips after 60 days. Since these two crops are edible roots, a very high level of maggot control is required. By assigning the arbitrary values of 4 points for an undamaged (clean) root; 2 points if slightly injured but probably marketable; 1 point for moderate damage and 0 points for heavy damage; a rating system with values ranging from zero to 100 for a 25-plant sample was established. Direct seeded cauliflower plants were pulled for examination after 42 days, at which time they were large enough to be very attractive to egg-laying *Hylemya* females. Results are summarized in Table 1.

Table 1. Maggot damage ratings on crucifer crops planted in soil treated with insecticide, and examined for injury at indicated intervals after planting.

Granular insecticides used and rates in pounds active ingredient per acre)	Maggot damage ratings*		
	radishes (33 da.)	turnips (60 da.)	cauliflower direct seeded (42 da.)
1. Diazinon 4 lbs	65	--	37
2. Diazinon 6 lbs	67	--	12
3. Diazinon 8 lbs	52	--	12
4. Diazinon 10 lbs	84	10	47
5. Dyfonate 2 lbs	--	15	52
6. Dyfonate 4 lbs	--	28	76
7. N-2596 2 lbs	--	15	60
8. N-2596 4 lbs	--	19	82.5

*Ratings for 25 plant samples. Range, 0 (plants heavily damaged) to 100 (perfect protection from maggot injury).

Only the 10-pound rate of diazinon gave satisfactory protection for the radish plantings. Turnips, in the ground for 60 days, were so heavily damaged by maggots at the 10-pound rate of diazinon that the lower rate plots were not examined. Ten pounds of diazinon were also necessary to suppress maggot damage in the cauliflower over a 42-day period. Although the Dyfonate and N-2596 treatments failed to give protection to the turnips, the 2-pound rate of both materials gave satisfactory maggot control for cauliflower over the 42-day period.

What is the simplest and most economical procedure for chemically protecting high density plantings of cole crops from maggot losses? One possible answer which needed testing was a broadcast spray application of an appropriate pesticide, fol-

lowed by a sprinkler irrigation to wash the material off the leaves onto the soil around the stems of the plants where newly hatched maggots would immediately come in contact with it. Application of the insecticide through the irrigation system might be simpler and would accomplish the same end, but this procedure is not recommended in view of the hazards involved and the uneven distribution inherent with this system.

Two crucifer plantings (5 rows of cauliflower and 6 rows of broccoli in each) were made July 20 at the Vegetable Crops Farm with a Stanhay precision planter. Rows were 7 inches apart and plants about the same spacing in the rows. On September 8, when cabbage maggot eggs were starting to appear on the set-size plants, the plantings were divided into 45-foot plots and sprayed. Diazinon (4 e.c.) at 3 rates and Dyfonate (4 e.c.) at 2 rates were applied broadcast in about 35 gallons of water per acre with a 10-foot boom weed sprayer. Within an hour after the last plot had been sprayed, sprinkler irrigation was run for three-fourths hour. Additional irrigation and fertilizer were applied during the rest of the season to assure good growth and conditions favorable for root maggot egg-laying and survival.

The main evaluation for maggot damage was made September 24, 16 days after spraying. Samples of 25 plants of each variety were pulled at random from the plots and the roots examined for maggot injury. "Protection ratings" were assigned according to the following system: Clean, no maggot damage (4 points); Slight damage, 1 maggot or its burrow (2 points); Moderate, 2 or 3 established burrows or maggots (1 point); and Heavy, more than 3 burrows or maggots per plant (0 points). On October 16 (38 days after treatment) a second evaluation was made from one of the 2 plantings. Samples of 10 plants each were given maggot protection ratings in the same manner as described above.

Results of this test are summarized in Table 2. Analysis of the combined protection ratings from the first evaluation showed that only the low diazinon rate (1 pound AI/A) failed to give a significant degree of maggot control compared to the untreated checks. There was no difference in protection between diazinon 4-pound and Dyfonate 1-pound rates, but the Dyfonate 2-pound rate gave very good protection - significantly better than the 1-pound rate.

The second examination (38 days after application of the sprays) showed that the Dyfonate 2-pound rate was still giving excellent protection against maggots, but the other treatments were apparently no longer effective. There was a tendency for the cauliflower roots to show less injury than the broccoli at the time of the first examination. This is probably due in part to the fact that broccoli plants grow faster and thus are attractive to the egg-laying females sooner after planting. Protection ratings assigned at the 38-day examination showed no apparent differences between the 2 varieties.

Diazinon, applied broadcast in granular formulation and tilled into the soil, is marginal in effectiveness.
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Table 2. Cabbage maggot control evaluations on high density plantings of broccoli and cauliflower by use of broadcast sprays of diazinon and Dyfonate, followed by sprinkler irrigation. Corvallis, Oregon. 1971.

Materials and pounds of active ingredient per acre	Protection ratings for combined means on 16th day after spraying (100 points possible)	Crucifer variety	Protection ratings on
			38th day (40 points possible)
1. Diazinon 1 lb	30.00	Broccoli	4
		Cauliflower	1
2. Diazinon 2 lbs	41.50	Broccoli	2
		Cauliflower	6
3. Diazinon 4 lbs	63.75	Broccoli	2
		Cauliflower	2
4. Dyfonate 1 lb	57.25	Broccoli	4
		Cauliflower	8
5. Dyfonate 2 lbs	76.25	Broccoli	32
		Cauliflower	27
6. Untreated Check	19.25	Broccoli	2
		Cauliflower	3
LSD at .05	12.51		
	.01		17.78

Dyfonate curbs symphylans

The garden symphylan continues to be a major soil pest in the production of many vegetable crops grown in the Willamette Valley. Symphylans are general feeders which attack germinating seeds, plant root systems and above-ground plant parts in contact with the soil. Surviving plants are stunted and produce poorly in yield and quality.

The principal methods of control are soil fumigation or preplant soil incorporation of such pesticides as Zinophos, parathion, diazinon, or Dyfonate; the last the most recent pesticide developed for controlling symphylans. Dyfonate has been shown to be highly effective against symphylans when applied as a seasonal preplant soil treatment. With the recent granting of additional registrations on vegetables, Dyfonate can now legally provide the necessary protection required by most vegetables attacked by symphylans.

All registered uses of Dyfonate are as pre-plant, broadcast treatments incorporated immediately to a depth of 2-3 inches. The following table summarizes the current registered uses of Dyfonate.

Registered uses of Dyfonate¹, insects controlled and recommended rates of application².

Crop	Pests controlled	Rates (pound active ingredients/acre)	
		10%G	4-EC
Beans (dry and snap)	symphylans	2 lbs	2 lbs
Corn (sweet, pop, field)	symphylans	2 lbs	2 lbs
Cole crops	symphylans	2 lbs	2 lbs
	cabbage		
	maggots	2 lbs	2 lbs
Potatoes	symphylans	2 lbs	2 lbs
	wireworms	4 lbs	4 lbs
Radish	symphylans	2 lbs	2 lbs
Sweet potatoes	symphylans	2 lbs	2 lbs
Table beets	symphylans	2 lbs	2 lbs

¹Dyfonate is also registered for use against symphylans on strawberries, peppermint, spearmint and sugar beets.

²Refer to the Oregon Insect Control Handbook for tolerances and additional information.

--Ralph E. Berry
Entomology Department

fectiveness at rates below 10 pounds AI/A. Applied as a spray at the registered rate (1/2 pound AI/A for aphid and worm control) and irrigated in, it would probably be ineffective.

Dyfonate has just recently received registration for use against maggots on cole crops at the rate of 2 pounds AI/A as a preplanting soil-incorporated granular application. This type of treatment gave satisfactory suppression of maggot damage on cauliflower for 42 days, at least, in these tests. The spray-and-irrigate treatment promises to give better control, but no registration for use of Dyfonate as a spray on cole crops exists at the present time.

--H. H. Crowell
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Bush beans . . .

excellent bush beans closely approaching the Blue Lake pod in quality regardless of halo blight resistance, we have not been able to apply continuous heavy selection pressure against halo blight susceptibility in all selections.

Table 3 shows results of a recent test, in which we included lines known to have good tolerance, and lines of promise for pod and yield, but not tested prior to this date.

The Oregon 190 and 1604 lines have been tested in recent years. As shown in the table, the various sub-lines carry good tolerance to halo blight, when compared to such bush beans as Oregon 58 and Gallatin 50.

We have used Oregon 58 line to improve habit of the newer, smaller podded lines and in most cases, we have lost the high level of resistance common to a parent such as 190. Such lines as 2571, 2224-5, 2217-23, 2217-29 and 1963-1, of promise for habit, yield and sieve size, do not have as high resistance as desired.

It has been difficult to recover resistance, even with heavy selection pressure via inoculation, in lines with excellent habits of growth. The 2468-2-1 line, however, shown near the bottom of the table, does have good growth habit, and we are using it for further hybridization with lines such as 1604. In this case we expect to maintain resistance and improve habit of 1604. Line 2648-2-1, itself, lacks the yielding ability and quality of 1604.

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Table 3. Resistance to halo blight in certain bean lines. Greenhouse test, Corvallis. Planted November 30, 1971; readings February 18, 1972.

Variety or line	Plant resistance*	Pod resistance			Pods infected (total percent)
		No. not infected	No. infected		
			Light	Severe	
190-17	7.2	75	0	0	0
190-10-5	7.6	73	0	2	3
190-10-10	8.0	86	1	2	3
190-17-33	7.3	57	0	0	0
Oregon 58-NZ-2	3.0	16	13	8	43
Gallatin 50	2.8	0	9	9	100
1604 Gen. Mass.	7.7	60	0	0	0
Screened 1604-1 HB	7.8	57	0	0	0
1604-17	7.5	79	1	4	6
HB 1604	7.6	73	0	1	1
1604-3	7.7	58	0	1	1
1604-4	8.3	60	1	2	5
2571	3.3	36	23	13	50
2224-5	3.9	38	27	16	53
2217-23	5.0	38	12	6	39
2217-29	5.9	23	16	4	47
1963-1	3.5	33	18	8	44
1851-4-7	5.0	51	19	9	35
190 x 58-105 N	7.5	75	3	6	11
190 x 58-55 N	8.1	58	3	6	13
2468-2-1-10	8.1	58	0	0	0
2468-2-1	8.1	56	0	1	2
2657	7.4	52	4	4	13
2591	4.3	23	17	12	56

*1 to 9 reading, with 1 very susceptible and 9 very resistant. Difference necessary for significant difference, odds 20:1-0.5; odds 100:1-0.7.

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Lettuce varieties performance studied at Portland, Corvallis

Portland Area

Fifteen lettuce varieties were planted in production fields in the Portland area in spring, 1971, and harvested on June 29, July 9, August 17 and October 21. Four varieties were of special interest, each performing best at a certain time of the year.

Pennlake was superior as an early lettuce for the first two weeks of the harvesting season. Ithaca was almost as early, and adapted to the major portion of the season. This variety was extremely resistant to bolting, produced very firm, uniform heads that gave an excellent net yield. It would be suited for harvest from the beginning of the season through September 15. All other varieties of acceptable head size bolted severely during August, 1971, or produced large puffy heads.

Valrio and Valtemp were the best varieties late in the season because of their mildew resistance. Valrio produced excellent heads, very uniform in size and with good resistance to mildew. This variety showed the best tolerance to frost damage. Both Valrio and Valtemp were smaller than Calmar which also had good resistance to mildew and frost damage but which produced very large, loose heads. The mildew resistance of Valrio and Valtemp is required under the cool, wet conditions which exist in the Portland area in late September and October. All other varieties were completely unsuitable at this time of year.

The other varieties in the trial were Mesa 659, Great Lakes, Minetto, Fulton, FM 9201, Green Bay, Vanguard, Great Lakes 118, Marquette, Calmar and Forty Niner.

--N. S. Mansour
Extension Vegetable Specialist

Corvallis

Small plot observations of 23 varieties were made at the Vegetable Research Farm. The trial was intended as a survey of a wide range of available varieties, for general adaptation. There were 5 seeding dates: April 6, April 23, June 12, July 14 and July 29. Harvest dates covered the period from July 2 to October 21. Notes and small samples for estimating head size were taken for each plot in which usable heads were produced. Generally the heads produced in this trial were smaller than could be expected in good commercial production. The performance of each variety is summarized below, with the average head weight for the samples harvested. Tipburn, where it is mentioned, occurred primarily in plantings 2 and 3.

Minetto - 1.2 pounds. Too small, conical, early, most firm heading, very bitter late in the season.
Calmar - 2.3 pounds. Fair early; mostly puffy or
(Continued next page)

loose and non-heading in plantings 3-5. Slight tipburn.

Great Lakes 118 - 1.9 pounds. Fair in plantings 1 and 2, mostly loose, puffy and unusable in 3-5; fairly bitter; much tipburn.

Valrio - 2.0 pounds. Fair in plantings 1 and 2 but slight tipburn in 2; some bolted or split in 3 and 4; improved in 5 but only 69% headed.

24601 - 2.1 pounds. High percentage heading except in planting 5, but tend to be puffy in all except 1; uniform and smooth appearance.

Ithaca - 1.6 pounds. Early, fairly sure heading, medium size; tender and susceptible to insect and mechanical damage; good table quality; sparse wrapper leaves.

Marquett - 1.2 pounds. High percentage heading except in planting 2; small, fragile; ragged and insufficient wrapper leaves; good table quality; trace tipburn.

Great Lakes 659 - 1.0 pound. Most headed except in planting 4; solid in plantings 1, 2 and 5 but soft or bolting in 3 and 4, with tipburn; rough wrappers.

Mesa - 2.0 pounds. Highly variable in maturity, size and shape; moderate tipburn; headed well all season; bitter in planting 5.

Hot Weather - 1.6 pounds. Fair in plantings 1 and 2, all bolted or split in 3-5; fine, soft, semi-butter type leaves.

Oswego - 1.6 pounds. Good percentage heading except planting 2; solid, good table quality; wrappers fragile; uniform; some cracking in planting 4 when mature; conical.

Empire - 2.0 pounds. Somewhat small; medium sure heading; solid, variable in some plantings; sometimes rough in appearance.

Forty Niner - 1.8 pounds. All non-heading or very puffy except in planting 1 where most headed but were somewhat soft; no prospects.

Vanguard - 2.1 pounds. Mostly non-heading or bolting except in planting 1 where 82% headed but were soft, and 5 where 40% produced solid heads.

Great Lakes R200-95 - 2.2 pounds. 100% solid heads

in plantings 1 and 5, most headed in 2-4, but somewhat puffy in 3; some tipburn; some splitting in 4; slightly conical; promising.

Merit - 1.9 pounds. Soft and puffy in 1-4; fairly solid in planting 5; uniform; bad tipburn.

New York 515 Imp. - 1.7 pounds. Fair in planting 1 and 2, all bolted or non-heading in 3-4, some good in 5; fine leaf, good flavor; semi-buttery type.

Fulton - 1.6 pounds. Good percentage heading in planting 4 and 5, fair in 1-3; solid; good table quality except bitter in 3; medium size, light color, ragged wrappers susceptible to beetle and slug injury.

Valtemp - 1.6 pounds. Solid; good heading percentage in all except planting 5; some tipburn; moderately bitter; some conical shape; promising for retest.

Great Lakes 65 - 1.9 pounds. Fair in plantings 1-3; bad tipburn in 3, no good heads in 4 and few in 5; not especially good in any planting.

Iceberg - 2.2 pounds. Headed some in plantings 1 and 2, practically all non-headed or bolting the rest of the season; soft, semi-buttery types; no value here.

New York #12 - 1.4 pounds. Fair heading in planting 1, poor or completely non-heading or bolting rest of season; soft, semi-buttery type, like 'Iceberg'.

Pennlake - 2.0 pounds. Moderate to good percentage heading all season, fairly solid; some tipburn; good table quality; tender and susceptible to pink rib and decay if overmature.

Generally, 'Pennlake', 'Great Lakes R200-95', 'Valtemp', 'Ithaca', 'Fulton' and 'Oswego' offer possibilities for this area and should be retested. The last three are all somewhat small, somewhat fragile, and may be most useful in home gardens. However, 'Ithaca' appears promising for commercial use in the Portland area, as noted in the preceding article.

More detailed notes and sources of varieties can be obtained from the author.

--J. R. Baggett
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Harper Hybrid gets highest cantaloupe rating in trials

Eleven cantaloupe varieties were planted in replicated trials by Dr. Paul Koepsell and Dave Passon in the Roseburg area. Overall horticultural characteristics were evaluated (taking into account disease resistance performance of these varieties). Receiving the highest overall rating was Harper Hybrid, followed by Gold Star. Both varieties were earlier than Imperial 450 and SR 91, commercial varieties in the area. Both Harper Hybrid and Gold Star were well netted, had round, smooth fruit, good internal color and good flesh flavor with a small seed cavity.

Delicious 51 was the earliest variety in the trial and would have some merit from this standpoint. It has rough, segmented fruit and soft flesh characteristics, making it unsuitable for shipping. Delicious 51, however, might have some use as an early melon for the fruit stand retail trade.

Other varieties evaluated were Supermarket, Imperial 450, Iroquois, SR 91, Golden Gate 45, Harvest Queen, Classic and Honey Rock Resistant.

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