OREGON VEGETABLE Digest

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Pole Bean Lines Resist Yellow Mosaic Virus

Vegetable Research Farm Field Day on July 29

Various phases of current vegetable research may be viewed at the Vegetable Research Farm at Corvallis on Thursday afternoon, July 29. A tour of plots will begin at 1:30 p.m.

Research activities and personnel responsible are as follows:

Snap bean breeding: Blue Lake bush types, pole beans, disease resistance—W. A. Frazier and M. H. Dickson (Dr. Dickson is on sabbatic leave from the New York State Agricultural Experiment Station, Geneva.)

Carrot breeding: W. A. Frazier

Pea, broccoli, and cabbage breeding: J. R. Baggett

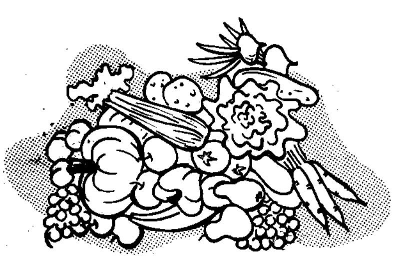
Snap bean population density and spacing: H. J. Mack

Vegetable weed control: G. Crabtree

Vegetable insect control: symphylan, cabbage maggot, motley dwarf virus on carrots—H. H. Crowell and R. E. Berry

Bean mold control: E. K. Vaughan

To reach the Vegetable Research Farm, turn off Highway 34 onto Smith Street, about one-half mile east of Corvallis; proceed past the Botany and Plant Pathology farm and through the cut. Parking areas will be designated near the vegetable crops field laboratory.



In the summer of 1970 we recorded unusually heavy infection of beans with yellow mosaic virus (bean virus 2). The plants were grown in an area on the vegetable crops farm which has been used continuously for testing for resistance to root rot, rust, and yellow mosaic in both pole and bush beans. In this area we plant a row of gladiolus, carrier of the virus, for each three or four rows of beans. Aphids, the insect vector, were unusually abundant in 1970.

Several of the recent pole bean selections, placed in a replicated yield test, showed excellent resistance to yellow mosaic virus (Table 1). The FM1-K variety, known to be susceptible, showed 94.3 percent infection, while most of the new lines showed only one percent or less infection. The impact of the virus on yield was striking; the susceptible variety yielded roughly half the tonnage of some of the better breeding lines.

Although some commercial fields, or parts of fields nearest the source of infection *via* aphids from host plants, showed considerable damage in 1970, the yield losses were not considered as severe as those recorded on the research farm.

These new lines of pole beans have been selected from the segregating progeny of complex crosses involving both bush and pole parents. Most of the lines shown in

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Pole Bean Lines . . .

Table 1. Resistance of pole bean lines to yellow mosaic virus (Corvallis, 1970)

Line	No. plants in test	No. plants susceptible	Percent plants susceptible
FM1-K	576	544	94.3
439-6-5	803	52	6.0
190 x 1128-55	844	7	0.8
190 x 1128-54	824	2	0.3
190 x 1128-1A	662	3	0.5
190 x 1128-3	753	8	1.0
1083 x 190-7	754	8	1.0
1640-5-4	797	12	1.5
190 x 1128-36	806	3	0.4
1083 x 190-5	827	7	1.0
190 x 1128-4	805	0	0.0
190 x 1128-27	724	1	0.1
1083-28	673	5	0.8
190 x 1128-13	733	5	0.7
190 x 1128-23	649	2	0.3

Table 1 and Table 2 have the Oregon 190 bush as a common parent. The 190 bush line and 1128 pole line are resistant to natural field infection with yellow mosaic virus. The 1083 pole line has shown some promise for root rot tolerance and slim pod. Data on root rot tolerance in this test, however, indicate no highly significant differences. The 1640-5-4 pole line is a sister line of 190 bush. The remainder of the original seed lot from which these selections were made was planted in 1970, and a larger number of sister selections of pole and bush are under observation this summer.

Table 2. Pole green pod bean yields and grades, Corvallis (Planted May 14, 1970)

Line	Percent beans in sieve sizes					Yield
	1-3	4	5	6	7 & over	
						tons/A
FM1-K	28.8	25.3	24.8	13.9	7.2	5.8
1640-5-4	24.4	26.9	25.3	16.6	6.8	11.3
493-6-5	26.2	22.4	21.7	17.4	12.3	8.0
1083-28	28.3	26.5	24.5	15.2	5.5	10.4
190 x 1128-1A	27.3	24.8	25.6	15.1	7.2	8.0
190 x 1128-3	27.2	26.1	26.2	15.3	5.2	8.4
190 x 1128-4	24.6	22.8	26.6	17.9	8.1	8.3
190 x 1128-13	31.7	25.7	24.5	13.6	4.5	10.2
190 x 1128-23	24.0	22.2	25.9	18.5	9.4	9.7
190 x 1128-27	27.7	25.3	23.7	14.7	8.6	9.2
190 x 1128-36	23.9	22.7	26.5	19.2	7.7	8.7
190 x 1128-54	25.0	22.5	23.7	17.1	11.7	11.3
190 x 1128-55	26.3	23.4	25.1	17.7	7.5	9.4
1083 x 190-5	41.6	33.2	17.1	5.9	2.2	9.5
1083 x 190-7	42.4	28.2	18.5	7.7	3.2	10.0
Lsd, odds 20:1						1.3
Lsd, odds 100:1						1.7

The pole bean lines shown in the tables are not under replication this year. We are observing newer selections, as well as sub-lines, for pod quality and tolerance to various diseases; all of the lines have so far shown one or more weaknesses in pod characteristics. Several closely approach FM1-K in pod quality, however, and are superior to various disease resistant lines tested in the past.

—W. A. Frazier and J. R. Baggett
Department of Horticulture

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Vegetable Notes . . .

Work by Stephenson, Baker, and Ries of Michigan State University suggested that genetic variability among different lines of beets may be useful in the development of red beet cultivars highly tolerant to pyrazon and other herbicides which are chemically similar. Their results supported the hypothesis that the conversion of pyrazon to N-glucosyl pyrazon in tolerant species such as red beet is the mechanism for detoxification. Inbred lines differed in their rate of pyrazon metabolism and a direct relationship existed between the rate of pyrazon metabolism and tolerance in two lines of beets grown in sand culture. (*J. Amer. Soc. Hort. Sci., 96*:145-147.)

Susceptibility to foliar symptoms of boron deficiency of red beet seedlings was conditioned primarily by a single dominant gene, according to the work of Tehrani and others in New York. However, the presence of modifying genes was indicated by the existence of lines showing an intermediate response and the slight delay in response of the F_1 when compared to the susceptible parent. Results were obtained from inbred lines and commercial cultivars grown in sand culture in growth chambers. (*J. Amer. Soc. Hort. Sci., 96*:226-230, 1971.)

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Carrot Row Spacing Tested

Higher yield and a larger percentage of smaller roots were obtained from a 5-inch row spacing than from 10- and 15-inch row spacings in 1969. In 1970 there were no differences in yields of roots when carrots were planted in 4- and 6-inch rows on "raised beds" compared to 4- and 6-inch rows on "flat beds." There was a tendency for given size roots grown on raised beds to be slightly longer than those on flat beds.

Red Cored Chantenay carrots were seeded in beds with a Stanhay precision seeder on June 11, 1969, in row spacings of 5, 10, and 15 inches. Seeding rates were not varied within rows. Fertilizer at a rate of about 50 pounds N, 150 pounds P_2O_5, and 50 pounds K_2O per acre was broadcast and disked into a silty clay soil before planting. Plots were harvested by hand on October 13 and weights and size grades were obtained.

Data in Table 1 show that yields and percentages of smaller-sized roots were increased as row spacings were reduced from 15 to 5 inches. The percentage of roots 1½ to 2 inches in diameter was about three times as great at 15 inches as at the 5-inch row spacing.

Table 1. Effect of row spacing on yields and sizes of carrots, 1969

Row spacing	Avg. no. roots/ft.	Yield	Percent of root sizes ½-1″	1-1½″	1½-2″	2-2½″
inches		*tons/A*	%	%	%	%
5......	21	41.8	25	62	13	0
10......	23	35.9	12	54	30	4
15......	21	31.3	4	39	44	13

Four 6-inch rows of Red Cored Chantenay were seeded on raised beds and on flat beds on May 3 and May 25, 1970. The fertilizer rate was about the same as in 1969, but a sandy loam soil was used in this test. Harvest was made in early October 1970 and in February 1971. The late harvest was made so that observations could be made on the amount of rotting of roots for later than normal harvest dates.

There appeared to be no differences in yields of roots from raised and flat beds (Table 2). Size distribution of roots was about the same for raised and flat beds, with the May 25 planting date producing slightly larger roots than the earlier planting.

Data in Table 3 show a slight increase in root length of carrots on raised beds as compared to flat beds. More work is needed, however, under varying conditions, to make further comparisons. Although actual counts were not made, there appeared to be less rotting of roots grown on raised beds than on flat beds when harvested in February.

Table 2. Effect of type of bed, planting date, and harvest date on yields and sizes of carrots, 1970

Planting and harvest dates	Type of bed	Avg. no. roots per foot	Yield	Percent of root sizes -1″	1-1½″	1½-2″	2-2½″
			tons/A	%	%	%	%
May 3, October	Flat	22	28.7	13	45	32	10
	Raised	22	28.5	11	41	33	14
May 25, October	Flat	19	29.6	9	38	37	16
	Raised	20	30.8	8	35	42	15
May 3, February	Flat	....	33.5	11	42	36	10
	Raised	....	33.8	12	38	37	11
May 25, February	Flat	....	37.6	8	31	39	17
	Raised	....	43.9	8	28	39	19

Table 3. Effect of type of bed, planting dates, and harvest dates on length of carrot roots, 1970

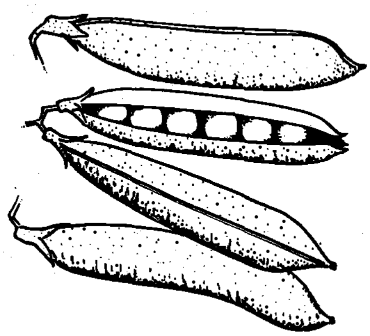
Planting dates	Type of bed	Length of root 1-1½″ H1(11-70)	1-1½″ H2(2-71)	1½-2″ H1(11-70)	1½-2″ H2(2-71)
		inches			
May 3......	Flat	2.8	2.8	3.6	3.7
	Raised	3.1	3.2	3.6	4.0
May 25......	Flat	2.6	2.8	3.4	3.7
	Raised	3.0	2.9	3.9	3.9

Results of earlier trials, reported in *Oregon Vegetable Digest*, Vol. XVII, No. 3, July 1968, indicated that yield increases could be obtained from narrow row spacings of carrots. If narrow rows were used, perhaps raised beds would be beneficial under certain circumstances. Suitable harvesting equipment and equipment for making raised beds would be needed before larger scale testing could be conducted. Size distribution of roots, processing needs, varieties, weed control, and economics would also need to be considered.

—H. J. Mack
Department of Horticulture

Pea Varieties Evaluated for Blonding

Pea variety trials were conducted in 1964 through 1970, in Union County (see *Oregon Vegetable Digest*, Volumes XVII, No. 2, 1968, and XVIII, No. 3, 1969) in an effort to identify varieties that are resistant to blonding. Irrigated peas are grown in Union County for freezing and processing. The growers have been plagued with blond or light-colored peas since this enterprise developed in the late 50's and early 60's. The project was under the direction of the Extension Service and was supported by pea processors, producers, vegetable seed companies, and interested businessmen. An advisory committee of processors and producers reviewed the results and recommended changes each year.



In 1970, five varieties were produced and evaluated. Five replications were made to permit a latin square design. The seed was secured from four pea seed companies. The peas were planted May 15 and harvested in late July as varieties matured to a tenderometer reading in the range of 95 to 105. Bud Bier, field man for Lamb-Weston, selected the harvest dates. The peas were processed at the Lamb-Weston plant, Weston, Oregon, and evaluated by a USDA inspector. The peas were fertilized, irrigated, and weeded in conjunction with the adjacent field of peas.

Table 1. Mean values for five characteristics of five pea varieties

	Sparkle	D. S. Perf.	Esquire	Mohawk	Venus
Blondness rating*	9.6	4.6	7.2	10.0	8.8
Uniformity of color rating*	8.8	2.8	3.8	8.8	7.0
USDA color score	18.6	14.4	16.4	18.8	18.4
Vine weight (lbs./A)	36,100	47,800	43,800	32,600	43,400
Yield (lbs. shelled peas/A)	6,160	2,800	5,700	4,960	4,360

* Ratings: 1 = poorest, 10 = best.

Some pea varieties are more susceptible to blonding than others. Mohawk, Venus, and Sparkle were superior to Esquire. Esquire was superior to Dark Skinned Perfection, the check variety. Mohawk and Venus have been superior in previous trials. Vine weight and yield were not necessarily related.

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