OREGON VEGETABLE Digest

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Little Yield Effect From Spacing in Rows Of Romano Pole Beans

Horticultural Society to Meet November 28-30

Reserve the dates of November 28-30 for the 77th annual meeting of the Oregon State Horticultural Society on the Oregon State University campus.

Program planning for the Vegetable Crops Section is under the direction of a committee headed by Dick Rockhill, Dayton.

General sessions will be held as well as sectional sessions in Vegetable Crops, Small Fruits, Apples and Pears, and Stone Fruits. Meetings of the Vegetable Crops Section are scheduled for Thursday and Friday, November 29-30.

In This Issue

No significant differences in yield were obtained from four spacing treatments of Romano (Italian) pole beans in a test at Corvallis in 1962. Average spacings and yields were: 3-inch spacing between plants (4 plants per foot) -- 8.95 tons per acre; 6-inch spacing between plants (2 plants per foot) -- 9.11 tons per acre; 9-inch spacing between plants (1.3 plants per foot) -- 8.46 tons per acre; and 12-inch spacing between plants (1 plant per foot) -- 8.63 tons per acre. Rows were spaced 5 1/2 feet apart and spacing treatments were replicated five times.

Beans received an application of 500 pounds of 8-24-8 fertilizer band-placed at planting on May 17th. At early bloom a side-dress application of 50 pounds nitrogen per acre was made. Beans were irrigated by overhead sprinklers at approximately 7 to 10 day intervals. Plots were harvested four times at approximately weekly intervals, on August 14, 21, 30, and September 8.

There was a trend for production of highest yields at average plant spacings of 3 and 6 inches as compared to spacings of 9 and 12 inches, although these differences in yield were not statistically significant. It can be seen from data presented in Tables 1 and 2 that the plants spaced 3 and 6 inches apart

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Little Yield Effect . . . (Continued from page 1)

produced higher tonnages at the first pick and lower tonnages at the last pick when compared to plants spaced 9 and 12 inches apart. For the 3-inch spacing of plants, the yield at the first pick was 35% of the total yield while the fourth pick yield was only 8% of the total for this spacing treatment. Plants spaced 12 inches apart produced 17% of the total yield at the first picking date and 25% at the fourth picking. Although differences in yield from the spacing treatment were not great, it is interesting to observe the different pattern in production at the different picking dates as influenced by spacing of plants. This, of course, could be important in situations where there was a shortage of pickers late in the season.

A similar trend in pattern of production was observed in a spacing test on FM-1 Blue Lake pole beans in 1955. These results were presented in Oregon Vegetable Digest, Vol. V, No. 1, pages 8-9, January, 1956.

Table 1. Cumulative Yield of Romano pole beans, Corvallis, 1962

	Pick number			
Spacing between plants	1	2	3	4 (total)
Inches				Tons/A
3	3.16	5.11	8.25	8.95
6	2.19	4.32	7.80	9.11
9	2.05	3.94	6.92	8.46
12	1.49	3.49	6.45	8.63

Table 2. Cumulative Yield of Romano pole beans

	Pick number			
Spacing between plants	1	2	3	4
Inches	%	%	%	%
3	35	57	92	100
6	24	47	86	100
9	24	47	82	100
12	17	40	75	100

--H. J. Mack
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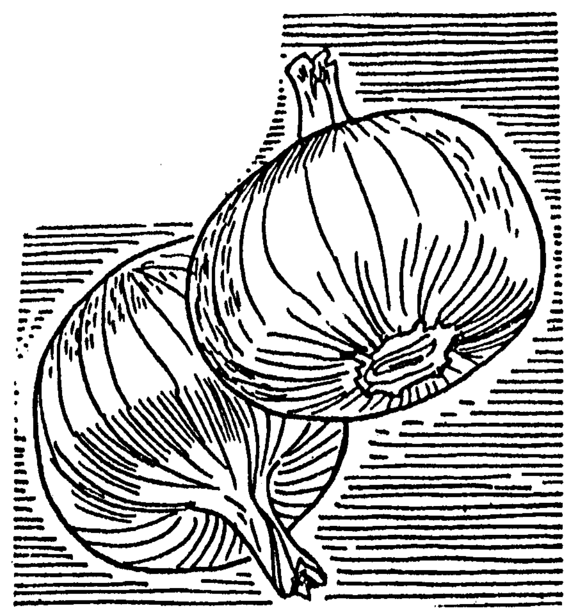
Storage Performance of Onion Lines Evaluated

Since 1951, plantings of hybrid onions have been made at Lake Labish. A highly heterogeneous, open pollinated, population of complex parentage has been planted at Corvallis. Lines of onions isolated at Corvallis will be available for trial at Labish as well as at Ontario. Seed supply will be limited. Some hybrids involving OSU lines will be tested.

The OSU onion derivatives originated from an open pollinated stock combining Oregon Danvers (Kurth), Australian Brown, Otto Bohnert's Yellow Sweet Spanish, and one of the early Yellow Globe combinations of Dr. H. A. Jones, formerly with the U. S. Department of Agriculture.

Two inbred generations of some of the OSU lines have been secured. There is, at the moment, a question of desirability of long-time inbreeding, since a few of the lines appear promising as heavy yielding, long-storing, open pollinated types. Some are Yellow Globe types; others "blend" Sweet Spanish and Yellow Globe characters. Most are distinctly deep globe in shape.



In Table 1, storage ability of some of the lines is shown. OSU lines 1,6,13, which are nearest Yellow Globe in bulb characteristics, kept unusually well compared to Oregon Danvers. Lines 5, 11, and 12, which show some Sweet Spanish characteristics, stored much better than Sweet Spanish. Most of the OSU lines showed very slow sprouting in the field (Table 1), although they finally developed seed stalks and have made a good seed crop. Their yielding ability appears good. The 2997 lines were received through the courtesy of the USDA, and in 1961 they showed considerable tolerance to pink root in Ontario and Corvallis tests. The 2997A (male sterile) has been used to secure hybrid seed with most OSU lines shown in Table 1. Hybrid seed of 2997A X Oregon Danvers has also been secured.

OSU lines, as well as Oregon Danvers, appear to have some pink root tolerance. These data will be made available at a later date.

Among Sweet Spanish types, which are generally late in maturing in western Oregon, the KXL strain has been especially productive.

Oregon Danvers onions are being inbred by D. F. Franklin of the Parma, Idaho Station and by Elmo Davis of the USDA. D. F. Franklin is also working with some of the OSU material of complex parentage. Several seedsmen have excellent programs of onion improvement. It is reasonable to expect continued advances in improvement of onions for various regions. It has long been recognized that one must subject the onion to selection pressures of temperature, daylength, and soil in localized areas in order to secure superb adaptation.

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Storage Performance of Onions . . . (continued from page 3)

The authors wish to acknowledge the cooperation of Wm. Hess, Department of Botany and Plant Pathology, OSU; Neil Hoffman, Superintendent, Malheur Experiment Station, Ontario; many seedsmen in onion variety work; and onion growers Nathan Kurth and Jim Rickard, Lake Labish.

Table 1. Storage Performance of Onion Varieties and Breeding Lines

Variety or breeding line	No. bulbs stored	Sound bulbs Feb. 26	Sound bulbs April 4	Not sprouted in field by May 5 1/
		%	%	%
Oregon Danvers	112	97	47	10
Yellow Sweet Spanish	46	57	11	0
White Sweet Spanish	40	88	0	0
Ia 2997A	121	80	50	3
Ia 2997B	101	59	28	0
OSU 1	115	99	84	83
OSU 5	47	94	47	0
OSU 6	107	98	72	87
OSU 11	53	80	62	75
OSU 12	128	76	50	68
OSU 13	240	97	84	88

1/ After April 10, field planting was made of nonsprouted bulbs for seed.

--W. A. Frazier and A. A. Duncan
Horticulture Department
--E. K. Vaughan
Botany and Plant Pathology Department

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Vegetable Notes . . .

E. V. Walter points out that several factors have been found to be associated with earworm resistance in sweet corn. Visual characteristics which appear to be associated with resistance are long husks, tightness of husks, and color of dry silk (resistant lines have silks that dry a light-yellowish to a very light buff, similar in color to dry husks). All sources of a high degree of resistance so far are from areas subject to a high earworm population.

(Proc. Amer. Soc. Hort. Sci., 80: 485-487, 1962.)

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A machine that combines all operations of fertilizing, seed bed preparation, film laying, and seeding through the plastic mechanically into one operation is described by Blackhurst, Singletary, and Nemec.

(Proc. Amer. Hort. Sci., 80: 556-558, 1962.)

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Genetics and Plant Breeding

(Excerpts from a talk presented at the OSU Food Processors Short Course, February 1961.)

My assignment is genetics and plant breeding. The two are very closely associated, but not synonymous. Genetics is essentially the story of heredity--of the germ plasm heritage of living things. It is the most important basic tool of the plant breeder, but many other disciplines are today involved in the science and the art of plant breeding. Our work on improvement of the snap bean in Oregon involves not only the tools of genetics--the mathematics, the genes, the chromosomes--but the tools of chemistry as used by Dr. Sistrunk in determining quality; the discipline of plant pathology as used by Dr. Vaughan and Dr. McWhorter; the area of physiology as studied by Dr. Mack; of engineering as exemplified by Prof. Rodger's studies of suitability of varieties for mechanical harvesting; and the area of economics involving, for example, the work of Mr. Davis or Mr. Groder which may determine whether or not a new varietal type is economically feasible.

What I have really stated is that no science area stands alone. Wherever one enters the arena of science, he will find eventually that all of science in one way or another will be his concern, if he explores his interest far enough. Unfortunately, no mind is capable of grasping it all, so each of us must be content with using, or contributing to, only a portion of it.

Basic concepts

As a plant breeder I should like to present two basic concepts. They represent the broad foundation upon which all plant improvement rests. First is the concept that the heritage of any living thing is passed from generation to generation through the chemical units comprising the chromosomes and genes. You were one day--or part of a day, at least--a single living cell. So is--and has been--every bean plant and every corn plant. This tiny, microscopic cell has a still smaller, organized nucleus, in which reside the chromosomes. Within the chromosomes are the so-called genes or units of heredity, carefully catalogued by enormously complex chemical systems which, though submicroscopic, carry the total tape recording of what every creature some day will be. These genes determine, for example, whether a bean will grow to be a bush or a pole type, whether bean pods will be long or short, fibrous or tender, tasty or tasteless; or whether you as a human being will be tall or short, a genius or an ordinary fellow, good looking or homely, susceptible or not to certain diseases or syndromes which may or may not shorten your life span. These things are written in the record--in the taped message of what your ancestors handed down to you. In this single celled submicroscopic speck of life there was recorded for you, in the joining together of the genes of your father and mother, a message estimated by Crick as equivalent to 1,000 volumes of books in a library--each volume written in four-letter words! You must live with the genes (the germ plasm) they gave you--whether you like it or not. It is up to you to do the best with what they gave you.

And here is where I wish to state a second great concept in biology: that the ultimate fate and behavior of any living thing--you or the bean plant--depends upon its inheritance and the environment in which it exists. All of life, for every creature, is a story of the interplay of heredity plus environment. Some hereditary features--the color of your eyes,

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Genetics and Plant Breeding . . . (continued from page 5)

for example--can hardly be changed. Others have a subtle relation with environment. If you suffered from malnutrition when young, your body and brain may have been affected. You would not have directly inherited these misfortunes. In western Oregon, the Blue Lake bean usually sets pod well. In Georgia, it will not set pods well. The heredity is the same in both environments; but environment has affected Blue Lake behavior.

You were at one time very largely a chemical called deoxyribonucleic acid. This chemical substance has, in recent years, been identified as the actual major carrier of the genetic heritage. This became clear only seven years ago when biologists finally concluded, through studies of the simplest known organisms--viruses--that this substance or an associated one, RNA, is the actual "core" of life--the chemical constituting the gene as we have pictured it. This chemicogenetic discovery is to the biologist what the splitting of the atom is to the physicist. Is it possible that within a few more years or decades the geneticist--or perhaps the bio-chemist or bio-physicist--will decipher how the code is translated by these molecules of DNA, and then that it will be possible, in a test tube, to create living systems? This is the hint of the boldest and most confident of today's biologists. I somehow feel that this day may be a long way ahead--that we do not fully recognize the enormous complexity of the micro-physico-chemical system which actually separates living from nonliving matter. Yet the experienced scientist today is very reluctant to predict what may or may not be done in this or other realms in the decades ahead.

Plant breeding

I could not resist the temptation to touch on this forefront of genetics. I hope, in the process, however, that I have given you just a tiny, fractional background of the modern genetic knowledge currently available to the breeder. The more he knows about the material with which he works, the more intelligently and efficiently he can pursue his goals of improving plants and animals. The greater his knowledge, the easier he can manipulate the genetic heritage; and that is what he actually does. The plant breeder controls the direction of inheritance--he attempts to dictate to the DNA how it will be organized to play back from the tape an ability to yield more, to taste better, or perhaps to look or even smell better. This is part of the science of plant breeding today; but let's explore its practice and its art more fully. I will use our snap bean breeding program as an example.

(To be concluded in the next issue of Vegetable Digest.)

--W. A. Frazier
Horticulture Department

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Vegetable Note . . .

A rapid and convenient technique for evaluating cracking in light-colored legume seeds, including lima, snap, kidney, and pea beans, is outlined by French, Thompson, and Kingsolver of the United States Department of Agriculture. An indoxyl acetate technique for staining cracked seed coats is rapid, stains only cracked seeds. In tests, it had no deleterious effects on normal growth of seedlings from uncracked pea beans.

(Proc. Amer. Soc. Hort. Sci., 80: 377-386, 1962.)

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