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# Table Beet Yields Affected by Spacing

In an experiment at Corvallis in 1965, the highest yields of table beets were obtained at a plant population of 9 to 10 roots per linear foot at 22-inch and 11-inch row spacings. Yields were lower at a within-row spacing of 16 roots per foot, for there was a higher percentage of smaller diameter roots.

Row spacings of 22 and 11 inches and two rates of within-row seeding were included on Detroit Dark Red (Morse Strain) table beets at the OSU Vegetable Research Farm. Approximately 1,000 pounds 8-24-8 fertilizer per acre was broadcast and disked in prior to planting. Additional nitrogen, about 40 pounds per acre, was sidedressed later in the season. Beets were seeded with a Planet Jr. planter on May 8. Within-row seeding rates were accomplished through use of plate holes 24 and 30 at the 22-inch row spacing and plate holes 24 and 34 at the 11-inch row spacing.

Average yields in tons per acre and percentages of roots in various sizes are shown in Table 1. At a within-row spacing of 9 to 10 plants per foot, yields were about the same at the 11- and 22-inch row spacings. The percent of roots 2 inches in diameter and smaller was 12 at the 22-inch row spacing and 34 at the 11-inch row spacing. At a within-row spacing of 16 roots per foot, the yield at the 22-inch row spacing was about five tons higher

(Continued next page)

## Vegetable Crops Field Day Planned for July 27

A tour of vegetable research plots at the OSU Vegetable Research Farm will be conducted on Wednesday, July 27, beginning at 2 p.m. Major emphasis of the field day will be on bush and pole bean breeding and cultural studies, although there will be an opportunity to see work on other crops--sweet corn, broccoli, beets, carrots, peas, onions, tomatoes, and lima beans.

To reach the Vegetable Research Farm, cross the Van Buren Street bridge going east from Corvallis, then turn left on Smith Lane about one-half mile from the bridge; proceed past the Botany and Plant Pathology Farm and through the "cut." Parking areas will be designated.

## *In This Issue . . .*

## Table Beet Yields . . . (Continued from page 1)

than at the 11-inch spacing. However, the percent of roots 2 inches and smaller was 79 at the 11-inch row spacing and 41 at the 22-inch row spacing.

Table 1. Effects of Spacing on Yield and Size of Table Beets

| Row spacing | No. Roots | Yield | Percent roots of sizes | | | | |
|---|---|---|---|---|---|---|---|
| | | | <1 | 1-2 | 2-3 | 3-4 | >4 |
| Inches | Per ft. | T/A | Inches | | | | |
| 22 | 16 | 20.9 | 3 | 38 | 51 | 8 | 0 |
| 22 | 9 | 28.7 | 1 | 11 | 42 | 41 | 5 |
| 11 | 16 | 15.6 | 15 | 64 | 19 | 2 | 0 |
| 11 | 10 | 28.3 | 2 | 32 | 53 | 13 | 0 |

Although this preliminary experiment for the one year was limited in number of spacing treatments, it is apparent that between- and within-row spacings can affect yields as well as exert a great influence on size of table beets. Payment to growers and various needs of processors are related to the size, grades, and yields of the beets. Further work on plant density of table beets is planned.

--H. J. Mack
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## *Vegetable Note . . .*

J. J. Natti of the New York State Agricultural Experiment Station, Geneva, reports that cropping sequences have a significant effect on the severity of root rot and the yields of red kidney beans. He suggested that maximum yields of beans in soils infested with the common root rot pathogens may be obtained under a cropping sequence of cereals followed by beans. A previous crop of cabbage caused a reduction in yield of beans. The continuous cropping of the same land to beans did not increase the severity of bean root rots; on land that had lain fallow prior to planting of beans, root rot was severe and yields were reduced. (New York Farm Research, Vol. XXXI, No. 3: 14, Oct.-Dec. 1965.)

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# Cavity Spot of Carrots and Parsnips Investigated

As the time between seeding and harvest of carrots and parsnips increases, so do root disorders called cavity spot and root scab. Nutrient culture and field experiments reported by D. N. Maynard, et al. (University of Massachusetts, Proc. ASHS, 1961 and 1963) show that cavity spot of carrots is "associated with an increased accumulation of potassium and decreased accumulation of calcium" in the petioles.

The occurrence of cavity spot in one field of parsnip roots harvested in the Willamette Valley during January and February this year prompted analyses of soil and root tissue. Comparisons were made between normal and affected parsnip roots from two separate fields on the same farm.

Samples were taken in each case from five random locations in each field and each of the five samples was analyzed separately. Results are shown in Table 1.

Table 1. Soil and Root Tissue Analyses as Related to Cavity Spot of Parsnips

| | Soil | Root epidermis | Root phloem |
|---|---|---|---|
| pH | | | |
| Cavity spot | 6.8 | --- | --- |
| Normal | 6.2 | --- | --- |
| Nitrogen | | | |
| Cavity spot (% dry wt.) | --- | 1.09 | 1.23 |
| Normal (% dry wt.) | --- | 1.55 | 1.62 |
| Phosphorus | | | |
| Cavity spot | 20.0 (ppm) | .258 (% dry wt.) | .095 (% dry wt.) |
| Normal | 66.0 " | .271 " | .106 " |
| Potassium | | | |
| Cavity spot | 1.04 (me/100 g.) | 3.71 (% dry wt.) | 2.40 (% dry wt.) |
| Normal | 0.69 " | 3.26 " | 2.28 " |
| Calcium | | | |
| Cavity spot | 6.7 (me/100 g.) | .339 (% dry wt.) | .146 (% dry wt.) |
| Normal | 8.4 " | .425 " | .155 " |
| K/Ca ratio | | | |
| Cavity spot | --- | 10:1 | 16:1 |
| Normal | --- | 7.6:1 | 14:1 |
| Magnesium | | | |
| Cavity spot | 1.5 (me/100 g.) | .221 (% dry wt.) | .084 (% dry wt.) |
| Normal | 1.8 " | .269 " | .105 " |
| Boron | | | |
| Cavity spot (ppm) | 2.30 | 23.8 | 17.6 |
| Normal (ppm) | 1.13 | 25.1 | 15.6 |

(Continued page 4)

## Cavity Spot Investigated . . . (Continued from page 3)

Table 1. Soil and Root Tissue Analyses as Related to Cavity Spot of Parsnips (Continued)

| | Soil | Root epidermis | Root phloem |
|---|---|---|---|
| Manganese | | | |
| Cavity spot (ppm) | --- | 16.4 | 14.0 |
| Normal (ppm) | --- | 28.8 | 21.0 |
| Zinc | | | |
| Cavity spot (ppm) | 1.60 | 20.4 | 19.5 |
| Normal (ppm) | 2.60 | 22.2 | 14.4 |

Soil samples were taken at four depths from locations where parsnip roots were most seriously affected (Table 2).

Table 2. The pH, Ca, and K Levels of Soil from One Field in Which Parsnips Were Affected by Cavity Spot

| Depth Inches | pH | K | Ca |
|---|---|---|---|
| | | me/100 grams | |
| 3 | 6.5 | 0.92 | 6.3 |
| 6 | 6.5 | 0.85 | 6.1 |
| 12 | 6.6 | 0.99 | 6.1 |
| 18 | 6.5 | 0.97 | 6.1 |

Analyses of tissue from longitudinal sections of parsnip roots showed K and Ca levels to be higher in the epidermis than in the phloem. Samples from radial sections at different levels were not taken, but it seemed that lesions were more numerous and severe on the lower half of the storage roots.

Based upon these observations and the successes reported from Massachusetts, we have recommended a reduction in potassium fertilizers and an increase in lime and calcium nitrate fertilizer on fields in the Willamette Valley where cavity spot of parsnips and carrots has been a problem. It also would seem advisable to incorporate lime into fields where these crops will be planted and when harvest will be delayed until late winter.

--Andrew A. Duncan
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# Thistle Butterfly Appears Again in Oregon

The thistle, or Painted Lady, butterfly has again made one of its famous migrations into the Pacific Northwest. Early in May, and for about three weeks thereafter, butterflies were reported flying north through western Oregon and Washington, sometimes in numbers heavy enough to be a hazard to driving. Numerous questions have come into the Department of Entomology for identification of the butterfly and for information on the significance of the migration.

The thistle butterfly, Vanessa cardui (Linn.), is claimed to be the most widely distributed butterfly in the world and is found in all temperate regions and in some tropical areas. It occurs throughout North America and is by far the most abundant species in the West. In southern California this butterfly appears periodically in great migratory flights; such migrations have been noted in 1895, 1902, 1913, 1914, and 1924 (according to Essig in "Insects of Western North America"). Food of the larvae in the main breeding areas consists largely of noneconomic plants, but, when the insects are abundant, they are known to attack such crops as beans, globe artichokes, mint, hops, sunflowers, and prunes.

An article on the Lepidoptera (J. W. Tilden, The Journal of Research, 1962) has summed up most of the published information on the movements of this insect. The picture appears to be something like this: The first (initiating) brood apparently originates to the south, in northern Mexico or southwestern Arizona. Large flights do not occur except in years when there has been sufficient rainfall on the deserts for a large growth of vegetation on which the butterfly population can build up. At this time the larvae feed mostly on members of the Borage family--Cryptantha and tarweeds and fiddleneck (Amsinckia); thistles and other composites seem to be of little importance. When the adult butterflies emerge under conditions of high population, they tend to fly into the wind, thus starting a movement (or "migration") in a northwesterly direction. Four or five broods may be produced in this way, each one working farther north, until, in certain favorable years, they cross the border into Oregon and even Washington and British Columbia. Many of the lesser "migrations" noted in southern California do not get farther than the San Francisco area before the force of the movement is spent.

The question has been raised as to whether the thistle butterfly is found north of the Imperial Valley of California in any but outbreak years. Apparently they do exist in low populations in parts of northern California, but they have trouble getting through the winters (in hibernation as an adult) in Oregon or farther north. Certainly this insect is of no economic importance in the Willamette Valley except in years of great butterfly movement from the south--like this year.

Oregon has been invaded by two migrations of Vanessa cardui in recent years. In 1949 larvae were seen in many areas of the state, feeding first on thistle and later on beans, mint, and hops. Laboratory tests showed that a 1% parathion dust (such as was used at one time for aphid control on beans) was rapidly effective against the spiny, dark-colored caterpillars. DDT and methoxychlor dusts were also effective, but to a lesser extent. About two-thirds of the caterpillars collected in the field that year were found to be infested with larvae of a parasitic fly. The thistle butterfly again reached Oregon in large numbers in 1958. Small-scale field tests showed that newer insecticides such as malathion, Dibrom (naled), and Sevin (carbaryl) were also effective against these insects in the caterpillar stage.

(Continued page 6)

# Motley Dwarf Virus Infects Carrots

In 1964, a planting of carrots near Corvallis contained many abnormal plants. Plants were stunted and leaves had a yellow and green mottle. Frequently, tips of the leaves became red. This condition was found to be common in carrot plantings in other parts of the Willamette Valley. At that time, it was suspected that these plants were infected with carrot motley dwarf virus. Carrot plants infected with motley dwarf virus have been seen since then in Scotland by Duncan and in New Zealand by Swenson. The infected plants resembled in all respects the diseased plants found here in Oregon.

The yellow willow aphid is the only known vector of carrot motley dwarf virus. Like many aphid species, it alternates between a woody plant (where eggs are laid in the fall and where two or three generations are produced when the eggs hatch in the spring) and herbaceous plants (in the summer). The summer host plants of the yellow willow aphid are all umbelliferous plants, including carrot and dill. The winter host plants are certain kinds of willows. However, in the Willamette Valley, the yellow willow aphid may also develop during some winters on carrots which grow from roots left in the field.

Studies in England show that the effect of motley dwarf virus is related to the time of aphid migrations into carrot fields in the spring and early summer, and to the number of aphids. Carrot yields were only six tons per acre in fields where numerous aphids arrived early, compared to 24-25 tons per acre where aphids were late in arriving and few in number.

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## Thistle Butterfly Appears . . . (Continued from page 5)

Caterpillars resulting from the hatching of eggs laid by the current migration of Painted Lady butterflies have been seen feeding on (and webbing the leaves of) Canadian thistle and peppermint in various parts of the Willamette Valley at the time of this writing (May 27). Where thistles are in or adjacent to cultivated crops, these larvae are a threat. With several types of insecticide to choose from (see the Oregon Insect Control Handbook for registration of materials by crops) and with plenty of warning by the presence of the larvae in the thistles, little loss should result from the 1966 migration of Vanessa cardui.

--H. H. Crowell
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Entomology Department

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## *Vegetable Note . . .*

In the new quarterly journal of the American Society for Horticultural Science, HortScience, Maynard, Barker, and Lackman of Massachusetts reported a marked variation in tomato lines tested with respect to ammonium tolerance. Excess ammonium resulted in stem lesions. The wide variation in the population tested suggested the possibility of a genetic approach to the problem. (HortSci., 1: 17-18, 1966.)