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Progress Report...Onion Neck Rot Control

Neck rot control of onions was studied in areas near Vale, Nyssa, and Weiser during 1957. Onions were obtained from the farms of Max Barlow, north of Vale; Warren Farmer, southwest of Nyssa; and Charles Joseph, west of Weiser. Plans for the experiment were similar to those of the previous year (reported in Vegetable Digest, Volume VI, Number 3).

1957 was a "good" growing season; all onions matured well and no rain occurred during harvest time. No significant differences were found in keeping qualities of onions from the three areas.

Artificial Inoculation

Half of each lot was inoculated with spores of neck rot fungus. In 1956 all inoculations were made by dipping onions in a suspension of spores after tops had been removed. This method is effective, but too severe. Methods used this past year in addition to the above, included dipping the entire plant immediately after lifting and before curing, and spraying onions with a small amount (11 gallons per acre) of spore suspension directly after lifting.

All three methods resulted in significant amounts of neck rot. In future tests the spray method will be used with increased

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Watermelon Yields Increased With Polyethylene Mulch

Watermelon production may be increased through the use of a polyethylene mulch. In 1957 a replicated planting of melons made at the Umatilla Station showed a yield increase of 7.4 tons per acre when a plastic mulch was used.

Black polyethylene plastic, four feet wide and 1.5 mil (0.0015") thick, was laid down directly over the irrigation furrows and held in place by putting soil over the edges of the plastic film. To insure water penetration, the plastic was slit every four or five feet along the bottom of the furrow with a hoe.

Blue Ribbon Klondike melons were planted in hills five feet apart and thinned to two plants per hill. The melons

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volume of suspension. It is much easier and more convenient, and more closely approximates a rain during harvest season; therefore, it is considered a fairer and more logical method.

Drying:

In all experiments, 92.13% of onions dried for 24 hours at 115°F. were healthy after 10 weeks storage, compared with 66.9% of those not dried (figure 1). Weight losses during drying were approximately the same at 105, 115, and 125°F. (table 1).

Table 1

Length of drying period	Weight lost in drying at: 105°F.	115°F.	125°F.
	Percent	Percent	Percent
Hours			
24	1.96	1.58	1.77
48	3.28	2.50	4.03
72	4.81	4.38	4.85

At 105°F. the percent of healthy onions after 10 weeks storage increased when longer periods in the drier were used, and there was no injury. When dried at 115°F. for either 24 or 48 hours very little rot developed in storage. There was a significant increase in rots in onions dried at this temperature for 72 hours, however, although the injury was not apparent when onions were removed from the drier and placed in storage. When dried at 125°F. for 24 hours there was no apparent injury and very little rot developed in storage, but longer periods of drying at that temperature were obviously injurious. After both 48 and 72 hours the outer scales were "cooked" and few onions remained healthy after 10 weeks in storage (figure 2).

Excess Nitrogen and Water:

Application of 100 units of nitrogen per acre in addition to the fertilizer normally used, and one additional irrigation at the end of growing season resulted in significant increases in neck rot development during storage. Apparently there were direct and indirect effects. All onions in the main experiment were of medium size so the differences shown in table 2 cannot be attributed to the indirect effect of fertilizer and water in increasing size of either

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Onion Neck Rot... (continued from page 2)

neck or bulb. It should be noted, however, that neck rot was more severe in the jumbos than in small onions (table 3). There seems to be no doubt that larger onions are more susceptible to neck rot and that small onions of the Sweet Spanish variety keep better than extra large ones.

Table 2

Influence of Excess Nitrogen and Water on Development of Neck Rot During Storage

	Healthy onions after 10 weeks storage (a)			
	Joseph	Farmer	Barlow	Average
	Percent	Percent	Percent	Percent
Normal N and H_2O	80.44	80.31	86.05	82.26
Excess N and H_2O	76.88	71.03	80.35	76.09

(a) Includes inoculated and uninoculated onions

Table 3

Influence of Size on Development of Neck Rot During Storage

	Healthy onions after 10 weeks storage (a)			
	Joseph	Farmer	Barlow	Average
	Percent	Percent	Percent	Percent
Less than 2" diameter	99.15	99.57	98.25	98.99
4" or greater diameter	84.12	84.96	94.56	87.91

(a) Uninoculated onions only

Storage Containers:

Less neck rot developed in onions stored in slatted crates than in ones stored in burlap bags (table 4). This was true regardless of the origin of the onions, the fertilizer and irrigation practices, or the degree of natural curing or drying. Differences naturally were greatest in inoculated onions but were consistent for all tests made in 1956 and 1957. Crates permitting better ventilation than burlap bags have proven much better storage containers and are more easily and rapidly handled. Because results so consistently favored crates, the use of burlap bags as storage containers will be discontinued in 1958. Greater emphasis will be placed on growing practices, field curing, and drying.

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Onion Neck Rot... (continued from page 3)

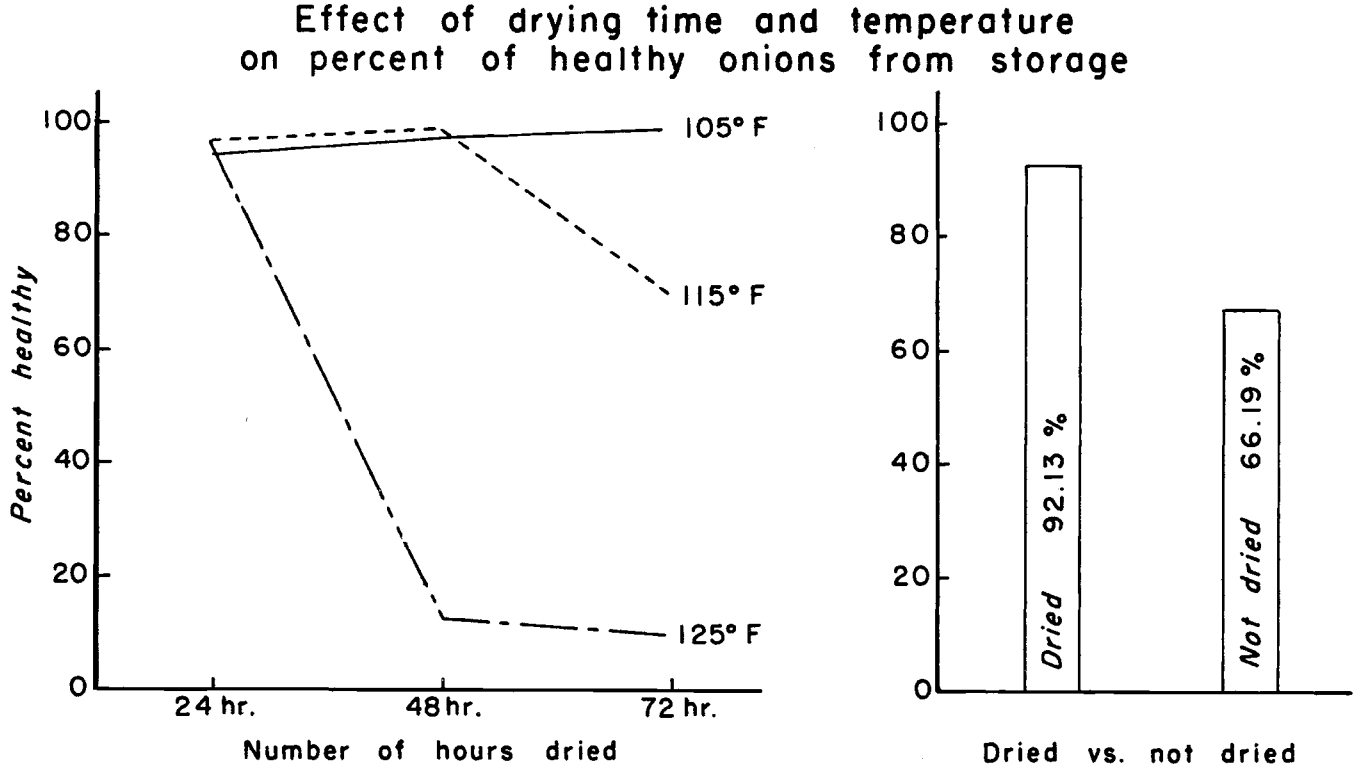
Table 4

Influence of Type of Storage Container on Development of Neck Rot During Storage

Stored in:	Healthy onions after 10 weeks storage		
	Not inoculated	Inoculated	All onions
	Percent	Percent	Percent
Crates	97.88	67.36	82.62
Bags	95.27	56.15	75.71

Future Plans:

More harvesting and handling operations will probably be done by machines in the future. Additional studies will be made in 1958, therefore, to determine possible influences of these practices on development of neck rot and other storage rots.



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Control Slugs in Pole Bean Yards

Studies during the past two years indicate slugs can be important pests of pole beans in the Willamette Valley (Oregon Vegetable Digest, July 1956). Damage may occur in various ways: (1) feeding on stems and underground parts of bean seedlings, resulting in plant weakening or the entry of disease organisms; (2) feeding on foliage of seedlings and larger plants; and (3) injury to pods during periods of cool, damp weather.

After vines have been disked down in early fall and following the first heavy rains, great numbers of eggs are laid in the crop residue and under clods. These eggs may hatch the same fall or overwinter and hatch into hungry baby slugs the following March or April. During early spring another spurt of egg laying takes place and hatching of this crop occurs within a few weeks. These slugs, combined with the overwintering ones, may constitute a damaging population by the time beans are planted. A cool, damp spring may see real damage done to the bean stand.

Growers can survey their fields by the bait pile method to see if slug control measures are needed. Little piles of the metaldehyde bait (equivalent to 10 or 15 pellets) can be placed in various parts of the field and marked with a stake. An examination of the piles the next day will reveal dead and dying slugs, usually within a radius of a foot of the pile. An average of 5 to 10 slugs per pile indicates there are probably enough to do real damage if the season is right. Often only part of a large yard will have a heavy population and special control measures can be restricted to the threatened areas.

Reports from Holland show calcium cyanamide to be an effective slug poison. Cyanamide is often plowed under with cover crops to help break down the green manure and improve the soil for bean growing.

In a field south of Eugene, which had a tremendous slug population (as high as 80 slugs per bait pile in some areas), cyanamide had been used the previous year at the rate of about 200 pounds per acre. A specific trial was run in April 1957, in which cyanamide (Aero Cyanamid) was applied to the barley cover crop at the rate of about 300 pounds per acre in two 100-foot strips across the field. Instead of plowing immediately, the cyanamide was allowed to remain on the surface for several days.

Bait pile slug counts showed that two days after treating, numbers dropped from an average of 43 to 8 per pile, a reduction of over 80%. This condition still held nine days later, indicating that slugs had been killed, not just repelled by the decomposing cyanamide.

Both ground and cover crop were very wet during this period. Thus, it seems that by allowing cyanamide to lie on the wet ground a few days before plowing, which does not weaken its fertilizing activities, considerable slug control can be obtained in the spring without added expense.

Dutch workers also have concluded that cyanamide had the added feature of being effective under cool weather conditions.

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Control Slugs... (continued from page 5)

What about effectiveness of metaldehyde dusts compared to regular commercial bait pellets? A test was run on the same field near Eugene in October 1957. Replicated 50' by 50' plots were treated at three different rates with metaldehyde dusts using a 3-foot fertilizer spreader, and at two rates with baits (MetagXX). Bait pile counts were made twice with the following results:

Material	Rate of actual toxicants/acre	Reduction of slugs (interval after treatment) 9 days	22 days	Approximate cost of materials/acre
	Pounds	Percent	Percent	Dollars
1. Metaldehyde dust	5.3 (meta.)	94	83	14.12
2. Metaldehyde dust	9.5 (meta.)	99	93	25.32
3. Metaldehyde dust	12.6 (meta.)	100	94	33.56
4. Bait pellets (10 lbs/A.)	0.3 (meta.) 0.2 (arsenic)	89	80	2.30
5. Bait pellets (20 lbs/A.)	0.6 (meta.) 0.4 (arsenic)	97	90	4.60

All these treatments were successful in reducing the slug population. Because of the higher cost of metaldehyde dusts, however, bait seemed preferable for fall treatments of bean yards. Probably two applications at the 10-pound rate, spaced two or three weeks apart, would be more effective than one treatment of 20 pounds. Control just after the first fall rains is especially important as it reduces the population before too many eggs are laid.

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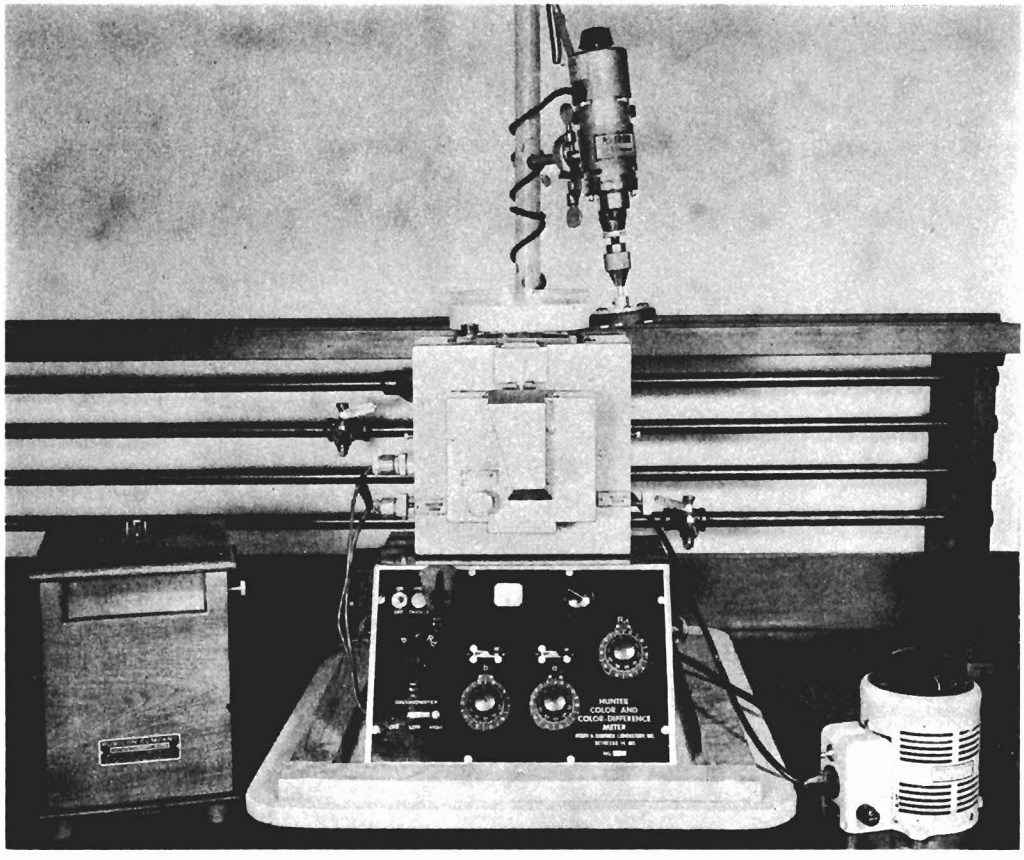
Blue Lake Bean Color

Variability in the pod color of Blue Lake pole beans has been under discussion in recent years. Since the advent of the new high-yielding and stringless varieties this problem appears to be increasingly serious to many people. Continued high quality of processed Blue Lake beans is important to the bean industry of Oregon. While many research studies have been carried out on various phases of bean quality, no attempt has been made to integrate field variables and varietal characteristics with color variations, one of the most common problems.

In 1955, Sidwell at O.S.C. found that nitrogen levels had some influence on the color of pole green beans. These differences were apparent in the Hunter Color Meter readings as well as in A.M.S. color scores. This was particularly evident in a color score increase when the beans were stored a few days before canning. Potassium significantly increased color scores of size 4 and 5 beans that were canned after storage. Phosphorus, on the other hand, increased Hunter Meter "Rd" readings, indicating a lighter color, but was not shown to affect A.M.S. Scores. Phosphorus also speeded up seed development and hastened maturity.



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Bean Color... (continued from page 7)

Green bean storage at various temperatures after canning had no effect on the Hunter Color Meter values or on the overall color according to Sigele (O.S.C., 1956). Temperature had no effect on carotene or pheophytin concentration, but storage at 100° F. caused greater retention of xanthophylls than 34° F. The larger size beans of the Associated 92 variety contained higher concentrations of pigments than did smaller sizes. Sigele concluded that in general the color of the canned beans was not significantly affected by storage temperatures, processing treatments, or storage times.

When designing the field phase of this study it was necessary to find some means of controlling the amount of sun reaching certain plants at a given time. Sheets of black plastic were used when complete darkness was desired. The plastic was applied in the field by draping it over the raceme and securing the ends during the bean pod development.

In the tests reported here, a random sample was taken of the treatments listed in the table at 2-3 different harvest dates. Duplicate 2-pound samples were harvested, placed in plastic bags, and taken directly to the laboratory for analysis.

The values in the table are means of the samples from two or three harvests. The wave lengths were chosen to represent the maximum absorption of chlorophyll (640) and carotene (440). The higher optical density values represent greater concentrations in these two pigment groups.

While the results are preliminary, there are significant facts involved making them worth considering now. It appears that green bean color is greatly affected by exposure to the sun during development, not only with respect to completely shaded pods, but also to the sides of pods which may be exposed to full sunlight. Regardless of how the beans were shaded, results within a variety were comparable.

Differences between irrigations and no irrigation may be a shading effect since the non-irrigated beans had limited foliage compared to those which were irrigated.

Differences were also noted between harvest dates and sieve sizes, but these data are not presented here.

It is also noted in the table that there may be a differential reaction to sun exposure. It is interesting that pods of the varieties which were darkest in full sunlight tended to be relatively light when shaded. This raises a question of possible difficulties in selecting dark colored bean lines which will be uniform in processed product color. In the selection work at Oregon State College, however, this has not appeared to be a highly limiting factor.

The dry matter content will compensate for part of this difference if the results are calculated on a dry weight basis, yet differences will still remain. We can expect this color difference to be reflected in the processed product because pigments largely remain

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Bean Color... (continued from page 8)

within the original cell structure after processing. While the color of a canned product will more or less blend with time, there is a question as to whether this is an appreciable blending or loss of color.

Results are preliminary but they do point to some of the factors needing further study relative to pole green bean quality.

Spectrophotometer Readings and Dry Matter Content of the Fresh Beans

Treatments		Optical densities at two wave lengths (640)	(440)	Dry Matter
FM-1 Variety				Percent
Full sunlight		.298	.148	12.090
Natural shade of plant		.237	.108	10.184
Black plastic shade		.237	.112	10.650
Sun exposed side of bean		.282	.142	11.353
Opposite side from sun		.246	.105	10.790
Irrigated		.325	.147	9.009
Non-irrigated		.370	.163	10.263
Varieties				
FM-1	shade	.238	.131	10.610
	sun	.256	.141	11.743
103	shade	.235	.101	10.164
	sun	.283	.133	12.880
104	shade	.220	.103	10.797
	sun	.311	.148	12.895
906	shade	.218	.107	10.648
	sun	.279	.134	12.087

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Watermelon Yields Increased... (continued from page 1)

were seeded by hand with a corn planter on the slope of the irrigation furrows. Melons were side dressed with 70 pounds of nitrogen per acre prior to planting and all plots were furrow irrigated.

Melons were harvested on four dates--August 16 and 27, and September 7 and 23. The accompanying table shows differences in yields per acre, melons per acre, and average melon size. Significant yield increases were due to the production of larger numbers of melons rather than any increase in melon size.

Most yield increases occurred on the first two harvest dates, indicating that mulch may also be valuable for effects on earliness.

Watermelon Yields--Mulched and Non-Mulched Plots

Hermiston, Oregon, 1957

	Non-mulched	Polyethylene mulch
Yield, tons per acre	15.0	22.4
Yield, melons per acre	13,454	20,615
Average weight per melon, pounds	13.3	13.0

Plastic provided effective weed control, eliminating most weeds from the covered area.

There was considerable yield variation within a treatment which may be partially attributed to poor seed germination and subsequent replanting. Poor germination was not restricted to one treatment, but was present in both mulched and non-mulched plantings.

Plants mulched with polyethylene plastic produced 7.4 tons per acre more than non-mulched plants. This increase in yield with melons valued at $20 per ton gave an additional gross income per acre of $148.

Assuming a cost of 4¢ per square foot, the original cost of the plastic amounts to $87.12 per acre. Plastic may be used more than one year by saving it at the end of each growing season, thus prorating its cost.

Assuming the entire cost of the polyethylene the first year, the net profit is $60.80. If the cost of the plastic is prorated over a 3-year period the net profit per year is $119. There is a saving in labor costs as a result of the weed and moisture control exhibited by the plastic. Such savings are less obvious than yield increases and were not considered in these experiments.

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--Tom Davidson
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Entomologists Discuss Insect Problems

Various phases of insect control were discussed at the Pacific Northwest Vegetable Insect Conference held in January and some were of interest to the Oregon grower.

Onion Maggots

Dieldrin, heptachlor, and endrin continue to give satisfactory onion maggot control when used as seed treatments in British Columbia. Dieldrin as a seed treatment (1 to 2 oz. toxicant per pound of seed) has not given complete protection for the entire season in Oregon, Washington, and Idaho. Accordingly, supplementary dustings with 10% DDT against the adults are advised for 1958. Endrin granules as a furrow treatment seem promising for Oregon and Idaho, but did not protect onions as well in 1957 as in 1956 in western Washington. Among the new materials tried, diazinon showed promise in all three states in 1957.

Carrot Rust Fly

Difficulties have been reported in controlling the carrot rust fly in peat soil at Lake Samammish, Washington, with aldrin, dieldrin, or heptachlor soil treatments.

Some insect damage was found in carrots grown in aldrin treated soil in Lane County in 1957, but the identity of the pest has not been established. Since the injury was not typical of the carrot rust fly, some investigation will be carried on in 1958.

Nitidulid Beetles

These small, black beetles are pollen feeders and will blast bean blossoms when their numbers exceed six beetles per blossom. Experimental trials with 4% Diazinon and 5% malathion dusts (30 and 40 pounds per acre respectively) reduced the population below this economic level for 4 or 5 days. An air application of 10% perthane dust at 50 pounds per acre also reduced the beetle population. These tests, along with other observations, showed that most insecticides used on beans could effectively reduce nitidulid populations, if the original population was not too high and migration into the yards was not heavy.

Bean Aphids

In experimental trials, 4% Diazinon and 5% malathion dusts (30 and 40 pounds per acre respectively) gave excellent control of the black bean aphid on pole beans. These materials function as contact insecticides and thoroughness of coverage is necessary if good control is to be expected.

Insects on Mint

In 1957, heavy infestations of the alfalfa looper invaded mint fields in western Oregon. Fortunately, these pests were later controlled by virus diseases. Experimental trials with DDT and parathion were not particularly effective. There is now some evidence to show

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Insect Problems... (continued from page 11)

that use of parathion may result in excessive residues in mint oil. Mint growers are advised not to use parathion as a foliar application until further data can be collected.

Wireworms, Tuber Flea Beetles, and Western Spotted Cucumber Beetle Larvae

These soil pests are still adequately controlled by total soil treatments of aldrin, dieldrin, or heptachlor. Studies at Corvallis show that these materials at the rate of 10 pounds of toxicant per acre have given excellent crop protection for a 9-year period. At lighter dosages (2 or 5 pounds of toxicant per acre) they have been equally effective for a 5-year period.

Symphylids

After four seasons, it has been established that parathion (5 pounds of toxicant per acre) will not always adequately protect crops from symphylid damage. For this reason, recent emphasis has been given to use of soil fumigants and improved methods for their application. Large plots were established in Multnomah, Linn, and Benton Counties in 1957 to determine initial effectiveness of certain fumigants and how well they might reduce symphylid populations below the economic level over a period of time. Initial evaluations of these trials will be made during the spring of 1958.

The Oregon Insect Control Handbook

On the basis of the conference, and Oregon research in 1957, certain changes in vegetable pest control will be made in 1958. These will be stated in the newly revised Oregon Insect Control Handbook which is expected to be off the press early in April. This handbook will carry new recommendations and the latest information on residue tolerances.

--H. E. Morrison
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Vegetable Note

Many important vegetable crops are of American origin. Corn was widely grown by Indians in both North and South America at the time of Columbus. Wild forms of corn are not known and its exact origin is a matter of speculation. Lima beans originated in tropical America and have been grown for food since prehistoric times. Beans were being used by American Indians when the Europeans arrived. Peppers came from tropical America, while tomatoes and potatoes originated in the highlands of western South America.

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