OREGON VEGETABLE Digest

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Report on Vegetable Varieties for 1965

Halo-Blight Tests on Bean Varieties

The occurrence of halo blight, caused by the bacterium Pseudomonas phaseolicola (Burk.) Dows., on bush snap beans in Oregon in 1964 has greatly magnified the importance of the relative susceptibility of bean varieties and breeding lines. Because several distinct types of beans are now grown or have possibilities for production in the area, the relative potential losses which might occur in the various types are of considerable interest to growers and processors. Likewise, the potential of breeding material for the development of varieties resistant to the disease is of immediate importance to plant breeders involved in the development of improved bean varieties.

Two tests were conducted in the fall of 1964. The first, involving 340 varieties and lines, was planted near Woodburn on August 21, 1964. A single plot of about

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In This Issue...

Every two years we have been listing vegetable varieties adapted to various areas of Oregon in the January issue of Vegetable Digest. Both old and new varieties are listed, with brief comments on distinct new ones. There are innumerable varieties of most vegetables and, in some cases, there are many strains of a given variety.

Unless there is a compelling reason for a major change, try new varieties on a small scale. Continuous testing of promising new varieties on a reasonably small scale will often pay big dividends.

Growers must be aware of the exacting requirements of the market for varieties. Most processing firms require exacting varietal types. In the market garden trade, use care in switching to distinctly new types.

Varied responses of varieties, even in adjacent localities, are due to differences in reaction of the plants to environmental factors such as temperature, rainfall, day-length, soil, insects, and diseases. It is well to remember that the total behavior of a plant can be accounted for by the environment interacting with its inherited make-up.

Strain tests of a given variety are often worthwhile--especially with a crop like cabbage. If a very good strain is located, try to test stock a year in advance and purchase such stock from the seedsman. This is

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especially valuable for some of the market garden crops. In general, seedsmen who handle large quantities of seed of a given variety sold for processing purposes are able to keep stocks in reasonably good shape through close attention to roguing and continuous development of foundation stocks.

There are several sources of information on vegetable varieties, and it may be well at times to check with more than one source. It is difficult for any one individual to keep up with all new developments in every one of the vegetable crops. At OSU we generally are able to keep up-to-date only on important new developments in the major vegetable crops. With others, we must suggest trials only on the basis of past experience or on information secured from elsewhere. The following sources of information are available: experienced growers, fieldmen, county agents, seedsmen's representatives, seedsmen's catalogues and descriptive lists, Extension specialist, Andy Duncan, and vegetable breeders at OSU.

Asparagus: Mary Washington, California 500.

Beans, green bush: Tendercrop, mottle-seeded, now well established, especially for freezing. Gallatin 50, an off-white seeded version of Tendercrop, is of distinct promise for this type of bush bean. Executive and Tenderette are also of Tendercrop type. OSU 949 and 2065 will likely be released this spring. They have been derived from Blue Lake. Seeds for pilot trial acreages have been made available. Pods of these lines more closely approach Blue Lake than those of any other bush bean.

Rogers 206 should be tested as soon as it is available.

274 of Asgrow is somewhat late and heavy foliaged, but worthy of trial.

Beans, green pole: For processing--FM-1K, Prime Pack (considered essentially the original FM-1 bean), FM-1P, Asgrow 231; for eastern Oregon areas subject to curly top virus damage, Columbia, developed by the late B. F. Dana--this bean is essentially of Blue Lake quality. Other favorites of Oregon gardeners--Oregon Giant; Kentucky Wonder; Romano, an "old" bean gaining prominence as a distinct new processed product; new Blue Lake pole lines from OSU being used in pilot acreages: 284, 991, 2244.

Beans, wax bush: Puregold, Earligold; several OSU wax bush beans of complex parentage are available for processor small plot work. For eastern Oregon curly top areas we suggest contacting Dr. Douglas Burke, Irrigation Experiment Station, Prosser, Washington.

Beans, lima pole: Christmas, Oregon (a white "runner" bean of scarlet runner type).

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Beans, lima bush: Large pod: Fordhook 242 and Concentrated Fordhook. Small pod: Clark's Bush, Early Thorogreen, Thaxter (new, mildew-resistant), and Henderson.

Broccoli: Waltham 29, Northwest Waltham, and Purple Head (purple florets). Spartan Early is smaller than the Walthams but well suited for home use. Italian Green Sprouting is inferior to the other varieties listed above, but may be all that is available in some cases.

Beets: Detroit Dark Red, mildew-resistant type, for processing; also for home gardens, Green Top Bunching, Seneca Detroit.

Brussels sprouts: Jade Cross (early F_1 hybrid), uniform in maturity and plant form; attractive to aphids; sprouts closely spaced and pressed together along stem; some tendency for sprouts at base of stem to become infected with soft rot if harvest is delayed. Fancy Most and Catskill are suited for home and market use.

Cabbage: Danish Ballhead, Golden Acre, Green Acre, Copenhagen Market, Marion Market, Pioneer. Strains of these types resistant to fusarium yellows should be used where the soil-borne pathogen is present. Club root resistance will likely be incorporated in cabbages in the next few years. For a savoy type, Chieftain Savoy; for small heads, Babyhead.

Carrot: For processing--Red Cored Chantenay, Royal Chantenay, Nantes. For the gardener, Red Cored Chantenay will hold up longer in the fall without as much cracking and rotting as Nantes. Market garden types--Imperator, Gold Spike, Gold Pak, Chanticleer, Morse Bunching. Hybrid carrots hold promise for the future, but are not yet available beyond small trial lots. W-5, a new synthetic from Wisconsin, has excellent color and is worthy of trial.

Cauliflower: Snowball X, Snowball Y, Early Snowball, Snowdrift. For winter or spring types, a range of varieties--December to April.

Celery: Utah (there are many good strains of this green, long petiole type).

Cantaloupe: Spear, Pike, Oregon Delicious, Hales Best, and Hearts of Gold are somewhat late in western Oregon. They perform best when transplanted to the field, or when plastic or paper mulches are used. In some warm areas of eastern Oregon the later-maturing Crenshaw can be grown. Fusarium-resistant varieties--Iroquois, Harvest Queen, Delicious 51, Resistant Honey Rock, Gold Star--are also late maturing. A new OSU golden-rind, slip-type early honey dew is available for small trial plantings.

Cucumber: For pickling--MR17 (mosaic-resistant), SMR-15 (scab-mosaic-resistant), SMR-58, Spartan 27, Spartan Dawn, and other new disease-resistant varieties should be tried. For slicing, F_1 hybrids are usually very productive--Burpee Hybrid, Sensation Hybrid, Surecrop Hybrid. These hybrids generally also do well in greenhouse production.

Corn, sweet: Golden Cross Bantam remains the major processing corn of high quality for the area. Jubilee, though slightly less tender, is an excellent producer and of good general quality. For earlier maturity in home and market gardens--North Star, Golden Beauty, Seneca Golden, FM-Cross, Sugar King. Tokay Sugar is an exceptional quality garden variety, though white in color and small in ear size.

Eggplant: Black Magic (early F_1 hybrid), New Hampshire, Black Beauty, Burpee Hybrid.

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1965 Vegetable Varieties . . . (Continued from page 3)

Lettuce, head: 456, Phoenix, Pennlake.

Lettuce, leaf: Oak Leaf, Salad Bowl.

Lettuce, butterhead: Bibb, Summer Bibb, Buttercrunch.

Onion: Danvers Yellow Globe (western Oregon); hybrid Surprise; Sweet Spanish (eastern Oregon). In a few years, pink-root-resistant hybrids should be available; mildew resistance may be several years away. Interest in small white pearl (pickling) onions warrants a review of white, short-day types that are spherical in shape and have a very thin outer scale. Barletta types such as White Pearl, White Creole, and FM-L-281 are promising when seeded early and thickly.

Peas: Canners--Perfection types and Alaska (small early). Freezers--Freezer 69, Frosty, Dark Green Perfection, Midfreezer, Jade. Market and garden--Alderman (tall), Little Marvel (dwarf), Thomas Laxton (medium tall), Progress 9, Icer 95. Enation mosaic-resistant Perfected Freezer 60 may be available for freezing and garden.

Pepper: Yolo Wonder, mosaic-resistant, somewhat late; Early Calwonder, Pennwonder, Idabelle. For small fruit and very early--Vinedale.

Pumpkin: New England Pie, Small Sugar, Jack O'Lantern, Connecticut Field, Dickinson.

Summer squash: Zucchini, Caserta, Yellow Straightneck, Yellow Crookneck; White Scallop is not so well adapted in Oregon. Burpee Hybrid, Storr's Green, Seneca Zucchini, and Zucchini Hybrid are exceptionally productive green varieties which are easy to pick. Blackini also has open foliage and is high in quality but less productive. Seneca Butterbar is an exceptional quality yellow straightneck type.

Winter squash: Hubbard (many types well adapted), Golden Delicious, Banana, Uconn (bush, small-fruited Table Queen): Table Queen, Sweet Meat, Buttercup, Marblehead, Butternut, Silver Bell. Butternut and Buttercup are outstanding for home use; both are easily matured in western Oregon, are of convenient size and are high in quality. They are not adapted to long storage.

Rhubarb: Valentine, McDonald, Riverside Giant. A few OSU hybrids are available for limited trial.

Tomato: Early determinate, nonstaking types--Victor, Bounty, Gem, Pennheart, and new OSU releases, Willamette and Medford. Medium early determinate--Wasatch, Pritchard, Early Pak 7; good hybrids of medium maturity--indeterminate, stake well: Moreton hybrid, Big Boy Hybrid, Big Early Hybrid, Burpee Hybrid; early indeterminate: Valiant, Faribo, Hybrid E; indeterminate, nonhybrid, medium early, stake well: Queens, Stokesdale, Red Jacket (potato leaf). In the next few years many new varieties can be expected. Campbell 135 is rather crack-resistant but somewhat late here. Ace is large-fruited and of good quality, but somewhat late. Immuna Prior Beta is small-fruited with unusual ability to set fruit at low temperatures. The recent OSU release, Large German Cherry, is worthy of trial.

Watermelon: Klondike (many strains); New Hampshire Midget (early Ice Box, only fair quality, very small); Charleston Gray (fusarium-resistant, good shipper, too late for western Oregon).

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Halo-Blight Tests on Beans . . . (Continued from page 1)

15 plants was grown of each variety, except items 1 through 27 in Table 1 which were replicated three times. Inoculation was made on September 11, 1964, by thoroughly spraying at 45 pounds pressure, the primary leaves with a heavy suspension of juice from infected pods and leaves. The source of inoculum was a mixed variety planting. A second, similar inoculation was made on September 21, 1964, when the first trifoliolate leaves were well-developed. A number of sprinkler irrigations were applied, but the weather was mostly dry, especially during the first weeks of the test period.

No study was made to determine the race of the causal organism involved, but the reaction of Red Mexican 3, which is resistant to Race 1, susceptible to Race 2 (according to communication from Dr. J. C. Walker, University of Wisconsin), would indicate that Race 1 at least predominated in the source used here. Since some infection occurred on Red Mexican 3, it is possible that more than one race was present.

Scores were taken for primary leaf infection on September 25, 1964; for primary infection on the second set of inoculated leaves and some secondary infection on September 28, 1964; and for the over-all condition of the plants on October 27, 1964. At the time of the last observation, considerable secondary infection, toxin-produced yellowing, and general stunting had occurred on the more susceptible materials. The test was terminated shortly thereafter by frost.

An additional test, with similar inoculation methods, was made of a portion of the varieties grown in cans in the greenhouse. In this case, the plants were placed in a mist chamber for a day, following inoculation on November 10, 1964. Scores on severity of inoculated leaf infection and toxin reaction are included in the table.

A 0-5 scoring system for infection was used on both tests, with 0 for no visible symptoms; T for trace; 1 and 2 for few to moderate number of scattered lesions with no visible effect on plant growth; 3 for moderately severe infection--usually with heavy lesions, noticeable toxin-yellowing, and some stunting; 4 and 5 for severe infection with extreme stunting, toxin-yellowing, and secondary spread.

Results

Table 1 lists varieties, grouped and labeled according to general type of variety or breeding line, with susceptibility scores. Of the many breeding lines included with the varieties in the tests, only a limited number with interesting levels of halo blight resistance are shown in the table. Figure 1 shows examples of very severe infection (Tendercrop), compared with one of the most resistant varieties (Red Mexican 3), in the greenhouse test. Kinghorn, one of the most severely affected--with strong epinasty of the primary leaves and complete cessation of growth, is shown in Figure 2. An explanation of type symbols used in Table 1 and a discussion of results in each group follows:

GB - green bush - (Standard bush snap beans, except for Dwarf Hort. and Red Kidney.) This group was entirely in the highly susceptible class, with extreme toxin effects for the four which were included in the greenhouse test.

WB - wax bush - Wax beans were similar to GB, but Puregold may be less susceptible than most in these two groups.

GP - Green pole - Romano rated moderately high in infection, with conspicuous toxin effects.

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Halo-Blight Tests on Beans . . . (Continued from page 5)

BL - Blue Lake - Pole varieties and lines were somewhat tolerant in the field compared to the preceding groups, but showed severe toxin effect in the greenhouse.

BB - Bush - Bush lines of Blue Lake breeding varied as a group but included several much more resistant varieties than the Blue Lake poles. OSU 949 was perhaps the best; the toxin effect, though rated 3.0 in intensity for this variety, was confined to strong halos around the few lesions formed, and was not systemic.

FD - The field or dry beans tested here were mostly quite resistant, as has been previously known by bean breeders and plant pathologists.

RR - Root-rot-resistant lines tested included many with fair-to-good resistance. The best are listed here.

YM - Bean yellow mosaic-resistant lines--same comments as for RR.

AC - A line obtained from Cornell University, reputed to have halo blight resistance, and showing good resistance in these tests.

CR - A line selected for resistance to root rot and rust.

PC - *Phaseolus coccineus* lines tested were moderately susceptible. Line 2020, shown in the table, was the most tolerant. Many breeding lines from crosses of *P. coccineus* x *P. vulgaris* material were considerably better.

It should be recognized in considering these tests that infection symptoms observed were mostly primary, or perhaps toxin effects caused by primary infection, and that relative development of secondary infection through a growing season might not be entirely related to these test results. Also, the resistant-breeding materials noted here should be tested with known races before their value can be fully ascertained.

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Vegetable Note . . .

Isenberg and Ang studied effects of maleic hydrazide field sprays on storage quality of onion bulbs in New York. They found that at the completion of bulbing, onions enter into a rest period which is characterized internally by solid white tissue in the leaf initials and small inconspicuous root primordia in the base plate. Nontreated onions exhibited growth by a slow elongation on the innermost leaf initials accompanied by a change in tissue color of the blade portion from pale yellow to green, depending upon temperature and light conditions. However, onions treated with MH did not exhibit these tissue color changes but remained in the rest period until the end of the experiment. (Proc. Amer. Soc. Hort. Sci., 84: 378-385, 1964.)

Halo-Blight on Beans . . . (Continued from page 6)

Table 1. Susceptibility of Bean Varieties and Lines to Halo Blight in Field and Greenhouse Tests[a]

Variety or line	Type[b]	Field test: Primary leaves 9-25-64	Field test: Trifol. leaves 9-28-64	Field test: General score 10-7-64	Greenhouse test: Primary leaf	Greenhouse test: Toxin effect
1. Tenderette	GB	3.6	3.6	5.0		
2. Tendercrop	GB	2.3	3.0	4.3	5.0	5.0[c]
3. Harter	GB	1.6	3.3	4.0		
4. X-Ida 3399	GB	2.0	2.6	4.0		
5. X-Ida 3435	GB	2.6	3.6	4.0		
6. Idalight	GB	3.0	3.6	4.3		
7. X-Ida 3446-2	GB	1.6	3.6	4.0		
8. Gallatin 50	GB	2.6	3.0	4.3	4.5	5.0[c]
9. Dwarf Hort.	GB	2.3	3.6	4.6	3.0	5.0[c]
10. Red Kidney	GB	2.0	3.0	3.6	5.0	5.0[c]
11. Puregold	WB	1.5	2.3	3.6	2.0	5.0[c]
12. Kinghorn	WB	3.6	4.0	4.3	5.0	5.0[c]
13. Romano	GP	2.3	3.3	3.3	3.0	5.0[c]
14. OSU 991	BL	1.1	2.3	1.6	3.0	5.0
15. OSU 284	BL	2.3	2.0	1.3		
16. FM-1	BL	1.6	3.3	2.3	3.0	5.0
17. OSU 2189	BB	1.6	1.6	1.6	2.0	2.0
18. OSU 2061-2	BB	2.3	1.6	2.0	5.0	5.0
19. OSU 2195	BB	2.0	2.3	2.0	1.0	2.0
20. OSU 2051	BB	1.1	1.6	2.3	1.5	2.0
21. OSU 949	BB	2.0	0.8	1.3	0.5	3.0
22. OSU 2065	BB	1.6	1.3	1.6	1.5	3.0
23. 4236 W	BB	1.6	2.0	2.3		
24. G.N. UI 31	FD	1.0	2.3	2.0	1.0	0.0
25. G.N. UI 16	FD	0.8	1.6	1.3	T	0.0
26. Red Mex. UI-3	FD	1.0	2.0	1.3	T	T
27. Red Mex. UI-34	FD	0.5	1.6	2.0	1.5	1.0
28. N4-1-4	RR	1.0	T	T	1.0	4.0
29. N4-5	RR	1.0	T	1.0	1.0	1.0
30. 3160-14-6	RR	2.0	T	1.0	1.0	2.0
31. 111-37	RR	T	T	1.0	T	1.0
32. N69-3-4	RR	1.0	1.0	1.0	1.0	2.0
33. 34-19	YM	2.0	1.0	1.0	1.0	1.0
34. 117-24	YM	1.0	1.0	1.0	2.0	2.0
35. 118-75	YM	T	1.0	1.0	1.5	4.0
36. 118-28	YM	2.0	1.0	1.0	1.0	2.0
37. 63-28-6-1	YM	1.0	1.0	1.0	T	T
38. A-4553	AC	1.0	2.0	1.0	T	T
39. 7854	CR	1.0	1.0	1.0	1.5	2.0
40. 2020	PC	2.0	1.0	2.0	3.0	3.0

[a] Items 1-27 were replicated three times in the field test; for these, the scores are averages of the replications with trace readings assigned a value of 0.5. Items 28-40 were nonreplicated. See text for explanation of scoring system.

[b] See text. Red Kidney and Dwarf Hort. are included under Green Bush because of general plant characteristics.

[c] Toxin effect extreme, producing severe epinasty and stunting as in Figure 2.

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Halo-Blight on Beans . . . (Continued from page 7)

Figure 1. Red Mexican 3, one of the most resistant varieties, and susceptible Tendercrop, inoculated with halo blight in the greenhouse.

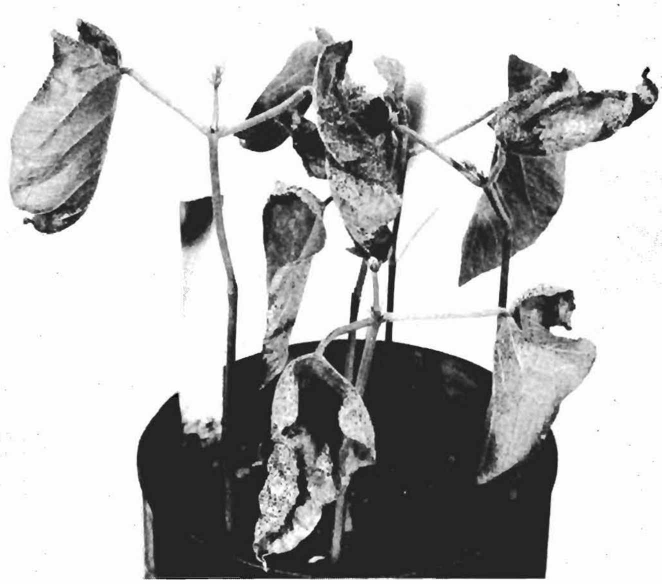

Figure 2. Kinghorn Wax inoculated with halo blight, showing extreme severity of infection and toxin effect.

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Cultural Studies on Blonding of Peas

Exclusion of light from the developing pods is the principal cause of blond peas. This has been amply demonstrated in field and greenhouse tests at Oregon State University and elsewhere. Different varieties responded in the same way when the pods were artificially shaded.[1]

Replicated large-scale field trials were carried out in the summer of 1964 in the Grand Ronde Valley of Union County. Plantings of Dark Skin Perfection were made in three widely separated locations on different dates to test management practices thought to affect the occurrence of light-colored peas. Treatments were as follows:

Irrigation

Light--irrigated only when available moisture at the 12-inch depth was less than 50%; heavy--irrigated sufficiently to maintain the available moisture above 50% at the 12-inch depth.

Seed source

Foundation seed--from carefully rogued seed fields; held-over seed--from peas grown for freezing but by-passed because of over-maturity and later harvested for seed.

Seeding rate

Three seeds per foot (light); six seeds per foot (normal); and nine seeds per foot (heavy).

Fertilization

N	P_2O_5	S
0	0	0
11	0	25
50	0	0
50	0	25
50	60	25

Minor elements

The following were applied as foliar sprays at flowering: Iron, zinc, manganese, and a combination. Each plot was 20 x 40 feet, replicated six times. Three replicates received light irrigation and three, heavy irrigation.

One planting was lost because of an irrigation equipment failure. One was cut, swathed, and vined using conventional field equipment. The other was sampled by pulling the plants from

[1] Vittum, M. T., and A. A. Duncan. 1964. Blonding of peas. Oregon Vegetable Digest. Vol. 8, No. 4.

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Studies on Blonding of Peas . . . (Continued from page 9)

a strip completely through the center of each plot. The plants were run through a smaller "plot" or "sample" viner. Peas were collected, cooled, washed, sampled, blanched, and scored for color. Blond and yellow peas in each sample were counted; "blonds" were those having both seed coats and cotyledons showing no green color, and "yellows" were those having variations of light green or mottled seed coats over yellow or mottled cotyledons. The "over-all" score of the sample was a visual rating of the relative intensity of green color.

The preponderance of zero values in some cases made the data difficult to analyze, so "blonds" and "yellows" were added together. The "over-all" score of intensity of greenness was considered separately.

Variance analyses of light irrigation, heavy irrigation, pooled irrigation, and the data collected from all other treatments, including planting dates, indicated that we had not, by any of the management practices imposed, succeeded in altering the number of "blonds" or "yellows" or in changing the over-all greenness at either location.

Uncontrolled seasonal factors were more influential in control of growth of peas and in the occurrence of blond peas than were the management practices.

The problem is one, therefore, of growing varieties that, regardless of season, permit light sufficient to produce chlorophyll to reach all the developing pods and seeds.

The number of pods per plant, peas per pod, and the length of the pea vines were not affected by any of the treatments.

Seed germination

Some pods and seeds of the peas grown in greenhouse studies of blond peas at Oregon State University were allowed to grow to maturity and were harvested for seed.

Some of the pods had been completely enclosed in aluminum foil from anthesis to harvest, others were partially shaded, and still other individual pods of adjoining pairs remained in full sunlight. This provided seed of three colors: "blond" (seed coat and cotyledons having no chlorophyll), "yellow" (seed coat and/or cotyledons having small amounts of chlorophyll in mottled patterns), and "green" (seed coat and cotyledons a normal green color).

The seeds were air-dried at room temperature, each color divided into three lots and planted in a greenhouse at uniform depth in a light soil mixture that had been steamed. No fungicide was applied to the seeds.

The blond peas germinated first and most uniformly, followed by yellow and green in a random pattern. All plants were a normal green color at emergence, appeared normal in growth habit and equal in vigor after emergence.

The speed and uniformity of germination of the blond and yellow lots suggest: (1) the absence of some inhibiting factor present in the normal green seed or (2) the presence of a stimulating substance in the blond seeds.

However, it seems unwise to draw too many conclusions or to make general statements based upon these very limited observations. They only suggest interesting areas for further study such as chemical composition, which will be covered in the next edition.

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Studies on Blonding of Peas . . . (Continued from page 10)

Response of raw excised peas to light

On the supposition that perhaps protochlorophyll present in the seed coats and cotyledons of blond peas would rapidly turn green on exposure to light, a simple experiment was set up. Single layers of blond peas were placed in covered petri dishes previously rinsed with distilled water to increase the relative humidity and prevent withering.

The peas in the covered petri dishes were then exposed to daylight on a window sill having northern exposure and to overhead fluorescent lights. No change of color toward green could be detected in any of the peas over a period of several days. The reduction of protochlorophyll to chlorophyll by the addition of two hydrogen atoms is thought to be a comparatively simple reaction that takes place without the aid of enzymes. However, it does not occur in shelled peas any more than in the excised parts of the aboveground portions of any other plant, which should not be too surprising.

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Vegetable Notes . . .

Reduction in cracking of tomato fruits, a problem of great importance to western Oregon tomato growers, may be possible through application of findings of Dickinson and McCollum in Illinois (Proc. Amer. Soc. Hort. Sci., 84: 485-490, 1964.) Calcium chloride applied to the fruit during the growing season reduced the severity of cracks in susceptible Garden State when fruits were immersed in water under vacuum. The reduction in cracking may have been due to an increased Ca content of the fruits. However, calcium chloride in water reduced the amount of cracking when fruits were immersed under vacuum.

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Kitchen and associates in Texas (Proc. Amer. Soc. Hort. Sci., 84: 441-443, 1964), studied varietal differences in content of calcium oxalate, which is of interest for its possible physiological effects in humans. A range of 5.42 to 9.81% was found for total oxalates in a total of 49 lines or hybrids included in the tests. Some F_1 hybrids were lower in oxalate content than either parent, and it appears that selection of parent lines could minimize the content in commercial spinach. Savoy types contained less oxalate than smooth types.

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