

OREGON VEGETABLE

FEB 11 1971



Digest

Volume XX Oregon State University, January 1971 Number 1

Vegetable Varieties Recommended for 1971

Suggestions Requested For Improving Digest

We are beginning our twentieth year of publication of *Oregon Vegetable Digest*. In our first issue, Director F. E. Price stated, "All departments that deal with vegetable problems will contribute to its pages. New and significant findings, here and elsewhere, will be summarized by specialists in the various fields. It is hoped that others interested in the welfare of the industry—growers, fieldmen, processors, county extension agents, and others—will take an active part and interest in the publication. Comments and suggestions may be sent to this office."

We welcome your comments and suggestions for improving future issues. Please send them to Department of Horticulture, Oregon State University, Corvallis, Oregon 97331.

In This Issue . . .

| | |
|--------------------------------------------------------|---|
| Vegetable Varieties Recommended | 1 |
| Suggestions Requested for Improving Digest | 1 |
| Harvesters Promising for High Density Bush Beans | 4 |
| Sloughing and Texture of Snap Beans Studied | 5 |

Every two years the Department of Horticulture prepares a list of vegetable varieties adapted to various areas of Oregon. Old and new varieties are included, with comments on some of the new ones. The list should not be considered exhaustive; there are numerous varieties of most of our common vegetable crops, and in many instances there are several strains of a given variety.

Caution is suggested in changing to new varieties without clear, compelling reasons. It is usually best to plant small trial plots or acreage at first and to repeat the tests for three years or more. Varieties will vary in behavior from year to year and from location to location. Many environmental factors such as soil, diseases, insects, temperature (night and day), solar radiation (intensity and length of day), rainfall, irrigation, various chemicals, and impacts of machinery interact with varying heredity to give a range of responses among varieties and strains.

When a strain of a given variety appears especially promising, it may be well to purchase seed a year or two in advance, indicating to the seedsmen the particular stock desired.

It is difficult for any one person to keep up with new variety developments in every crop. Therefore, it may be well to seek information from several sources. At Oregon State University new, promising variety developments in major crops usually are noted and tests run; with other crops, suggestions are based only on experience elsewhere. Sources of information may be experienced growers, county agents, fieldmen, seedsmen's representatives, catalogues and descriptive lists, extension specialists, and vegetable breeders at OSU.

Asparagus. Mary Washington and California 500.

Beans, green bush. Tendercrop, mottle-seeded, is now well established, especially for freezing. Gallatin 50

(Continued next page)

Vegetable Varieties . . .

is an off-white seeded Tendercrop type. Executive and Tenderette are also of Tendercrop type. The Oregon 58 bush bean was released recently and is near Blue Lake in pod quality. Tempo has shown some promise; care should be exercised to harvest this variety at prime quality stage; it is not a large, fleshy type. 274 of Asgrow is somewhat late and heavy foliated, with only fair concentration of set; it is a fleshy type. Asgrow 290 is slim podded, vigorous, late, of good quality. FM-14 is a flat-pod type approaching Romano Pole in pod characteristics.

Beans, green pole. For processing: FM-1K, Prime Pack (considered essentially the original FM-1 bean), FM-1L, and 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 and Kentucky Wonder. Romano is a flat-pod bean with distinctive flavor.

Beans, wax bush. Puregold and Earliwax. A few OSU wax beans of complex parentage are available for use by processors in small-plot work. For eastern Oregon curly top areas, we suggest contacting Matt Silbernel, Irrigation Experiment Station, Prosser, Washington, and Dr. L. L. Dean, Bean Research Laboratory, Twin Falls, Idaho.

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

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

Beets. Detroit Dark Red (mildew-resistant type, best for processing). Green Top Bunching, Seneca Detroit, Early Wonder, and others.

Broccoli. Waltham 29, Northwest Waltham, and Purple Head (purple florets). Spartan Early is smaller than the Walthams but is suited for home use. Italian Green Sprouting is inferior to the varieties listed above, but it may be all that is available in some cases. Harvester is of current interest for mechanical harvesting. Green Comet is an excellent, uniform F₁ hybrid.

Brussels sprouts. Jade Cross (early F₁ hybrid) is uniform in maturity and plant form; attractive to aphids.

The sprouts are closely spaced and pressed together along the stem, and there is 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. Early and midseason: Golden Acre, Early Jersey Wakefield, Green Acre, Marion Market, Copenhagen Market, Bonanza, Market Topper, Market Prize, Stonehead, Ventura, Little Rock, Reeds Hybrid No. 1, Head Start, and Pace Setter. Late: Danish Ballhead and Oregon Ballhead. Small: Babyhead. Savoy: Chieftan and Savoy King. Use strains resistant to fusarium yellows if this disease has been a problem. Many good new F₁ hybrids are being introduced; the above list is not complete.

Cantaloupe. Spear, Oregon Delicious, Hales Best, and Hearts of Gold are somewhat late in western Oregon. Fusarium-resistant varieties: Iroquois, Harvest Queen, Delicious 51, and Resistant Honey Rock. Gold Star, Harper Hybrid, Supermarket, Saticoy Hybrid, and Burpee Hybrid are F₁ hybrids which have done well in western Oregon. All varieties perform best when grown on a plastic or paper mulch. Crenshaw only in the warmer areas.

Carrot. For processing: Red Cored Chantenay, Royal Chantenay, and 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: Emperor, Gold Spike, Gold Pak, Chanticleer, and Morse Bunching. Hybrid carrots hold promise for the future, but seed supplies have been short. Spartan Sweet, Spartan Bonus, and Hi Pak have shown promise.

Cauliflower. Snowball X, Snowball Y, Early Snowball, and Snowdrift. For winter or spring types, there are a range of varieties from December to April. Early Purple Head is a good garden variety.

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

Corn, sweet. Jubilee, the most important commercial processing hybrid, will usually outyield Golden Cross, but both have good quality. Also for home and market: Early—North Star and Golden Beauty; mid-season to late—Seneca Golden, Sugar King, FM-Cross,

Oregon Vegetable Digest is published four times a year by the Agricultural Experiment Station, Oregon State University, Corvallis, G. Burton Wood, Director. Address correspondence to the author concerned or to the Department of Horticulture.

Material may be reprinted providing no endorsement of a commercial product is stated or implied. Please credit Oregon State University. To simplify technical terminology, trade names of products or equipment sometimes will be used. No endorsement of products named is intended nor is criticism implied of products not mentioned.

Vegetable Varieties . . .

and Sugar Daddy. Tokay Sugar (early) and Silver Queen (late) are high-quality white varieties well liked by home gardeners.

Cucumber. For pickling: MR17 (mosaic resistant), SMR-15 (scab mosaic resistant), SMR-58, and other new disease-resistant varieties. Several F_1 hybrid pickling cucumbers with concentrated crown set are available and are adapted to mechanical harvest. For slicing: Burpee Hybrid, Sensation Hybrid, Surecrop Hybrid, Marketmore, and Gemini. These F_1 hybrids are usually very productive; they also do well in greenhouse production. Gemini and Marketmore are scab resistant. Poinsett and Marketer are open-pollinated varieties. M & M Hybrid has looked especially good in greenhouses.

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

Lettuce, head. Imperial 456, Phoenix, Pennlake, and various Great Lakes strains, such as GL 659 and Premier. Oswego, Mesa, Fulton, and Monetto should be tried.

Lettuce, leaf. Oak Leaf, Salad Bowl, Bronze Leaf (Prizehead) is exceptional. Ruby is attractive but does not necessarily have good quality.

Lettuce, butterhead. Bibb, Summer Bibb, and Buttercrunch.

Onion. Danvers Yellow Globe (western Oregon), hybrid Surprise, and Sweet Spanish (eastern Oregon). 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, Early Frosty. Dark Green Perfection, Midfreezer, and Jade. Market and garden: Alderman (tall), Little Marvel (dwarf), Thomas Laxton (medium tall), Progress 9, and Icer 95. Enation mosaic-resistant Perfected Freezer 60 and Mohawk may be available for freezing and garden. A virus-resistant OSU line is available for trial in home gardens.

Pepper. Large bell: Yolo Wonder (mosaic resistant, somewhat late), Early Calwonder, Penwonder, Keystone Resistant Giant, Idabelle, and Michigan Wonder. New varieties to be tried are: Jade, Midway, Bellingringer, and Bellboy. For small fruit and very early: Vinedale, Early Bountiful, Morgold (orange), and Vinette.

Pumpkin. New England Pie, Small Sugar, Jack O'Lantern, Connecticut Field, and Dickinson; Big Max for exhibition.

Rhubarb. Valentine, MacDonald, and Riverside Giant. A few OSU hybrids are available for limited trial.

Summer squash. Zucchini, Caserta, Yellow Straightneck, Yellow Crookneck, and White Scallop or F_1 hybrids of these varietal types. Burpee Hybrid, Storr's Green, Seneca Zucchini, and Zucchini Hybrid are exceptionally productive green varieties which are easy to pick. Blackini has open foliage and is high in quality but less productive. Seneca Butterbar and Goldbar are yellow straightneck types of exceptional quality. There are many other new F_1 hybrids of both the yellow and green types which are good. Avoid Dark Green Zucchini and Black Zucchini, which have heavy foliage.

Winter squash. Hubbard (many types well adapted), Golden Delicious, Banana, Table Queen, Sweet Meat, Buttercup, Butternut, and Silver Bell. Butternut and Buttercup are outstanding for home use and are easily matured in western Oregon; they are of convenient size and high in quality, but they are not adapted to long storage. Sweet Meat has good quality and is long keeping. Silver Bell keeps well and is very dry.

Tomato. Early determinate, nonstaking types: Victor, Bounty, Fireball, New Yorker, and the OSU releases, Willamette and Medford. Medium early determinate: Wasatch, Pritchard. Good hybrids of medium maturity, indeterminate, stake well: Moreton Hybrid, Big Boy Hybrid, Big Early Hybrid, Burpee Hybrid, Burpee VF, Spring Giant, and Cardinal Hybrid. Indeterminate, nonhybrid, medium early, stake well: Stokesdale and Red Jacket (potato leaf). Many new varieties are being released. Ace is large-fruited and of good quality, but somewhat late. Immuna Prior Beta is small-fruited and has unusual ability to set fruit at low temperatures. The recent OSU release, Large German Cherry, is worthy of trial. Golden Boy has a large, mild, yellow fruit. California VF 145-21-4 and other strains are medium late but of promise for verticillium and fusarium resistance. For a pear type, Napoli, medium maturity.

Watermelon. Klondike (many strains), New Hampshire Midget (early ice box type, only fair quality, very small), Charleston Gray (fusarium resistant, good slipper, relatively late maturing), and Crimson Sweet (fusarium resistant). Newer icebox melons should be tried. Sugar Baby is a medium small dark green melon which is fairly early. Seedless varieties, such as Hybrid 313, should be tried.

—W. A. FRAZIER, J. R. BAGGETT,
N. S. MANSOUR, and H. J. MACK
Department of Horticulture

Harvesters Promising for High Density Bush Beans

Harvesting of snap beans in high density plantings (5 x 5-inch spacings) was demonstrated to be mechanically feasible by two experimental prototype harvesters that were tested at the OSU Vegetable Research Farm during 1969 and 1970. However, further testing, modifications, and improvements are contemplated by the manufacturers.

The tests were conducted in cooperation with engineers of Mather & Platt, Ltd., Manchester, England, and Chisholm-Ryder Company, Niagara Falls, New York, largely through the coordination of Dr. A. A. Duncan, former Vegetable Crops Specialist at OSU. OSU agricultural engineers also cooperated.

Several varieties of snap beans that varied in growth habit were planted in 40-inch "beds" (5 x 5-inch spacings) in 1969 and in 40- and 80-inch beds in 1970. Spacing between beds was 18 to 24 inches. Hand harvested yields in high density plantings were affected by varieties, planting dates, and harvest dates; the yields ranged from 8 to 12 tons per acre, with about 50% of the pods sieve size 4 and smaller.

The Mather & Platt multi-row prototype harvester (Figure 1) was a pull-type harvester (picking reel and fans) run by hydraulic motors. The 48-inch-wide picking reel was set at a 45 degree angle to the "rows." After picking and cleaning, the beans were elevated by an air stream to a bin above the tractor. Limited observations in 1969 showed that the highest picking efficiency was 85 to 88% as compared to hand harvest. This machine was not tested in Oregon during 1970, but it is understood that further tests were conducted in England.

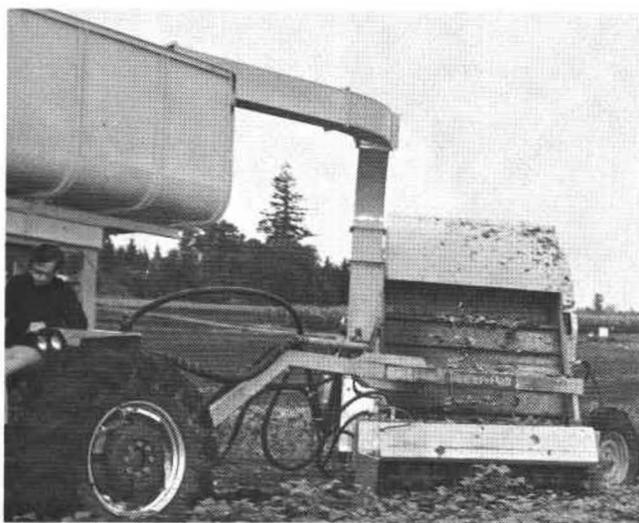


Figure 1. Prototype multi-row harvester of Mather & Platt (1969).

The Chisholm-Ryder self-propelled prototype harvester (Figure 2) was tested in high density plantings in 1970. The picking reel is perpendicular to rows or travels at a 90 degree angle to the rows, although in a 5 x 5-inch spacing there is really no row orientation. The picking reel could handle a planting about 72 inches wide. The harvester appeared to be very efficient in harvesting pods from plants. In one replicated test on Gallatin 50 snap beans, the percentage of pods remaining on the plant and those dropped on the ground was less than 8%.



Figure 2. Chisholm-Ryder prototype high density harvester (1970).

Future developments in high density bean plantings will be influenced by study and analysis of experimental harvester tests, feasibility of larger acreages of high density plantings and appropriate cultural practices, potential yield increases, and economics of development of production of the crop as well as the machines for planting and harvesting.

—H. J. MACK
Department of Horticulture

Sloughing and Texture of Snap Beans Studied

The occurrence of sloughing in either canned or frozen cooked snap beans is an undesirable condition which can materially reduce USDA grade for character. Fortunately, snap beans grown for processing in the Pacific Northwest are relatively low in fiber, stringless, and quite dependable in tenderness. One of the undesirable products of high tenderness in snap beans, however, is sloughing of the skin.

Sloughing means a loosening and partial loss of the epidermal layers of the pod unit after being canned or frozen and cooked. The visual effect ranges from an unsightly shriveled appearance to various degrees of fraying and peeling of skin into the cooking water or brine.

Pod split is a tendency of cut pods to split and expose seeds. It is often associated with sloughing in tender-walled varieties of beans. The problem, as in the case of sloughing, is aggravated by agitation of the bean units during serving, particularly in institutional feeding.

Factors affecting sloughing and pod split

1. **Variety.** The genetic make-up of the snap bean affects quality and distribution of pectic materials, the principal intercellular cementing substances, in the pod. Thus, varieties vary in their predisposition to sloughing and softness under normal processing conditions. Pole Romano Italian bean is highly susceptible to sloughing. Some new bush snap bean varieties available to industry, such as new Oregon 58, have excellent Blue Lake qualities of fleshiness, tenderness, and flavor; however, sloughing, split pods, or softness may be present on cooking.

2. **Cultural conditions.** It has been shown that high soil moisture availability during growth increases pod tenderness and susceptibility to slough. Moisture stress during the growing season conversely reduces sloughing but creates other quality problems such as increased fiber, tough pod walls, and roughness.

3. **Sieve size.** In general, the larger sieve sizes show less slough tendency; however, sieve size effect may be quite nominal in those varieties which retain good fleshiness and tenderness into the large sieve bean.

4. **Blanch.** The processor of frozen vegetables is likely to consider the blanch operation (a particular hot water process) important only to remove cell gases and inactivate enzymes responsible for flavor and color deterioration after freezing. Research findings indicate that the blanch also can be responsible for initiating enzyme

reactions which alter pectic substances and promote changes in pH, texture, color, and vitamin content. The fresh snap bean pod, which initially contains pectic substances largely in form of methylated pectins (long polymerized molecules composed of sugar-like units, neutral in charge and hot water-soluble), is heated during the water blanch operation through an intermediate temperature range (150-180° F) where enzymes are activated to produce nonvolatile organic acids. Pectic acid, formed by enzymatic transformation of the neutral pectin molecules, is one of the principal acids formed. This enzyme action stops when pods are exposed to higher temperatures of 195 to 210° F, so the amount of pectic acid formed depends on the rate at which pods pass through the intermediate temperature range. Pectic acid and its Ca, Mg salts are relatively insoluble forms of pectic substances. In this state, the pectic material is kept in its intercellular position and good adhesion between cell tissues is retained.

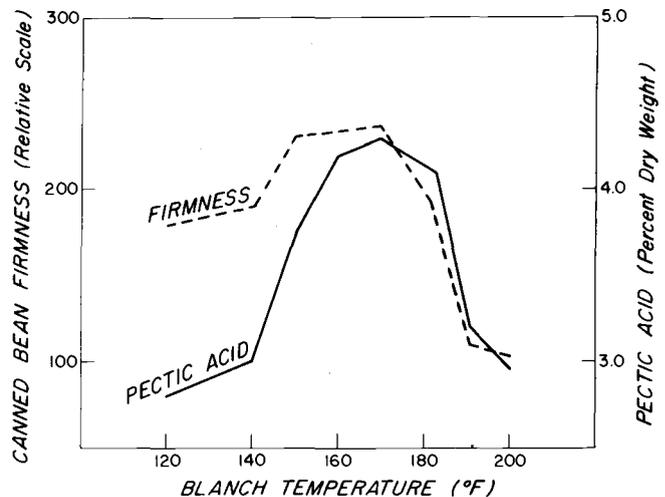


Figure 1. Canned bean firmness and pectic acid content.

This pectic acid formation has been closely linked with firming of the snap bean pod. When blanch temperature is varied and time is held constant, pectic acid content and relative firmness increase together to a maximum around 170° as temperature is raised, then both drop rather sharply with the use of temperatures above 180° F (Figure 1).

This article was taken from a talk given at American Frozen Food Institute Technical Workshop, Portland, Oregon, September 17, 1970.

Snap Beans . . .

Experimental Studies at OSU

✓ If we were to monitor the firmness of our snap beans after blanching, we might expect that the use of very high blanch temperatures would result in soft beans. The prime reason the canner of snap beans uses an intermediate blanch temperature (around 175° F) is to enhance firmness and simultaneously minimize sloughing. The canner may, if necessary, extend the firming effect initiated by the intermediate blanch temperature by holding the pods for a period of time between blanch and sterilizing process. Figure 2 shows the effect on canned snap bean texture and sloughing when the blanched bean was held in a canning brine at constant temperature for periods up to two hours after the blanch.

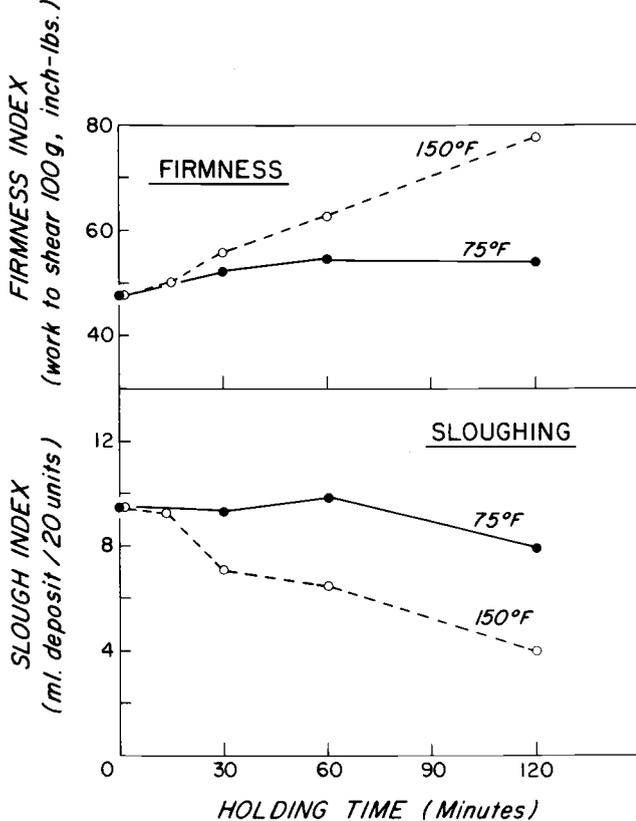


Figure 2. Canned snap bean texture after post-blanch hold.

✓ The freezer cannot follow the same course of action open to the canner to reduce a slough or pod split problem. The freezing process requires that the enzyme systems be completely inactivated to stabilize quality in frozen storage. High temperatures (205° F and above) at minimal times are recommended to achieve inactivation and retain the bright green color desired in the beans.

The possibility of preventing a slough problem in frozen snap beans by utilizing a preblanch at intermediate temperatures followed directly by a final high temperature inactivation blanch has been investigated. The relative success of a preblanch step in a dual blanch system to suppress sloughing was assessed at 160° and 170° F blanch temperatures with time varied (Figure 3). The 170° F temperature was the more efficient of the two temperatures in altering texture, and the effect was proportional to time of blanch.

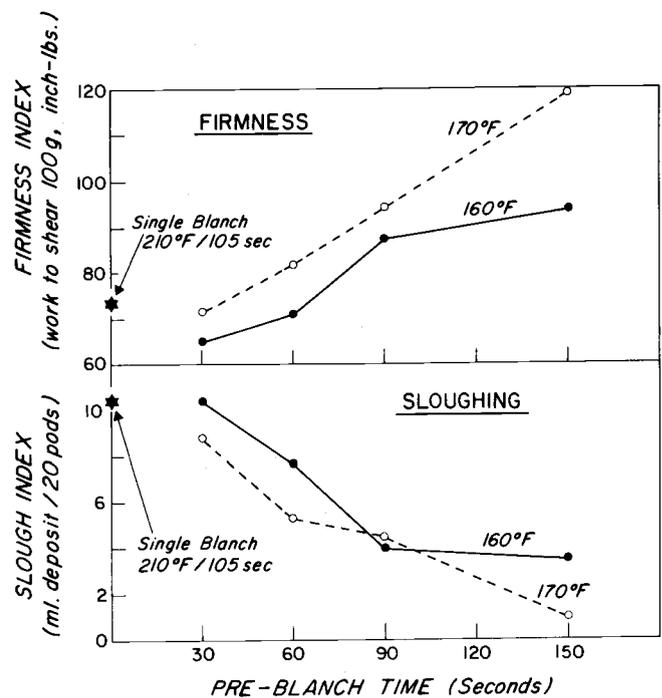


Figure 3. Pre-blanch effect on frozen snap bean texture.

✓ The overall value of such a dual blanch system must be judged on evidence of both textural and color effects on the beans. The pH, normally around 6.5, in the fresh bean, tends to drop during pectic acid production in blanch-induced firming. This, in addition to extra heat exposure, would tend to lead to more loss of the bright green color desired in frozen beans. The magnitude of the color loss resulting directly from the pre-blanch treatment in a dual blanch system was objectively measured in terms of the a_1/b_1 Gardner Color meter index and by visual score in a study on the frozen

Snap Beans . . .

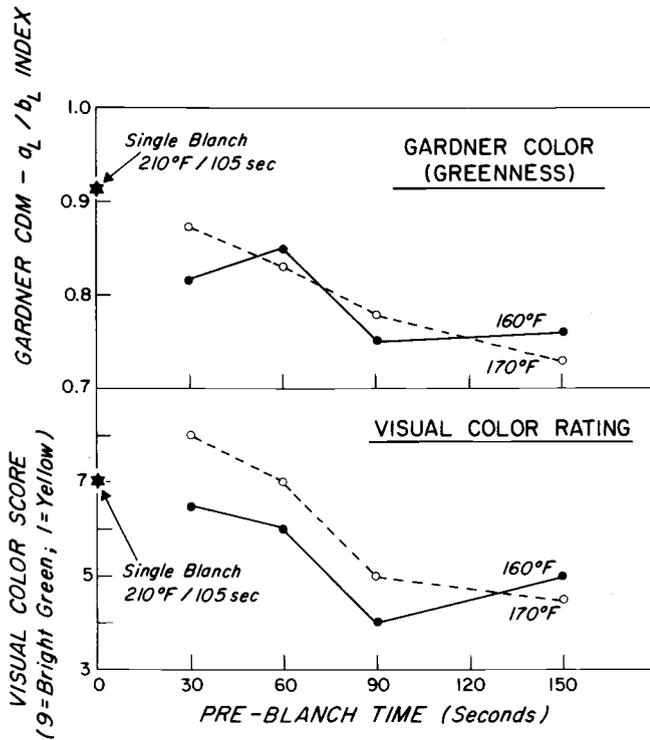


Figure 4. Pre-blanch effect on frozen snap bean color.

Oregon 58 bush bean (Figure 4). The instrumental results indicated that greenness declined steadily as pre-blanch time increased, although the color loss was detected visually only after the preblanch time exceeded one minute. This work suggests that a dual blanch utilizing a short preblanch at 170° F may hold some promise as a processing technique for freezing certain snap bean varieties. Sloughing and soft texture would be avoided, with a minimum damage in color.

Two other possible solutions to the slough problem in frozen snap beans have not yet been studied.

1. Use of pH control of preblanch water within a close range of the normal pH 6.5 of fresh snap beans by use of appropriate buffering agents.

2. Introduction of soluble calcium into the blanch water as an adjunct to the firming effect of the pre-blanch treatment. Some reports indicate that addition of calcium salts to the brine in processing tests on canned snap beans has not produced consistent firming in the canned product. Calcium salt addition even at relatively low levels also may introduce off-flavors in canned snap beans.

—GEORGE W. VARSEVELD
Department of Food Science and Technology



Oregon Horticultural Society Meetings *January 28-30*

A vegetable session will be part of the Oregon Horticultural Society meetings in Portland Memorial Coliseum, January 28, 9:45 until noon. There will be panel discussions on "A look at the bush bean situation" and "Sweet corn harvesters and harvesting." Also included will be progress reports on a nutritional survey in cole crops and use of plastic tape in seeding cucumbers.

Labor, marketing, and legislation affecting horticultural producers will be featured in general sessions of the Horticultural Congress January 28-30. An equipment show will be an outstanding highlight in conjunction with the meetings.

Dr. Robert W. MacVicar, president of Oregon State University, will be the speaker at the annual banquet.