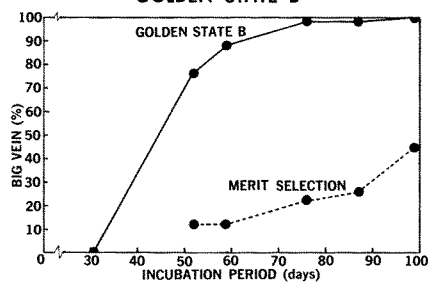


BIG VEIN TOLERANCE OF MERIT SELECTION
COMPARED WITH A SUSCEPTIBLE VARIETY,
GOLDEN STATE B



20 of 20 plants of a susceptible variety had big vein within 67 days of inoculation, whereas Merit had 20 of 20 plants with big vein in 91 days. This indicates that BVV resistance of Merit can be overcome and is one reason why Merit might have as severe big vein as susceptible varieties in some fields. However, when the progeny of the most resistant plants from this screening were tested the following year, they had only 45% big vein in 99 days compared to nearly 100% big vein in the susceptible checks at 76 days. Apparently a rigorous screening and selection program can greatly improve the big-vein resistance of Merit. This possibility is being tested now using a susceptible commercially grown variety.

A Merit plant, selected for resistance, was crossed with Great Lakes A-36 to incorporate big-vein resistance with the Great Lakes horticultural characteristics. The F₂ and F₃ progeny were screened by severe inoculations in the greenhouse and the most resistant plants selected. These will be screened again in the greenhouse for resistance and also planted into the field to determine their horticultural characteristics. The development of big-vein-resistant varieties appears especially promising at the present time.

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The Salinas Valley Vegetable Growers and Shippers provided financial assistance on this project; D. E. Purcifull, J. K. Uyemoto, L. E. Dunning and W. M. Colt provided technical assistance; and breeding for resistance was done in cooperation with J. E. Welch, Department of Vegetable Crops, University of California, Davis. A. S. Greathead, Farm Advisor, Monterey Co., cooperated with chemical control studies. Field evaluation of BBV resistance was by Frank Zink, Vegetable Crops Specialist, Monterey Co.

Recently Developed Vegetables Aid Mechanization and Climate

G. C. HANNA • A. GENTILE • P. G. SMITH • L. F. LIPPI

A CONSTANT SEARCH is carried on by scientists of the Department of Vegetable Crops at Davis and Riverside for plant breeding materials—among both wild species and cultivated varieties—that will contribute resistance to specific plant diseases of concern to the vegetable industry. After crosses are made between the resistant types and commonly cultivated varieties, a prolonged process of backcrossing and selection has to be followed. The progenies have to be checked and rechecked to be sure that the resistance is not lost. Ultimately the breeding lines are brought back to horticulturally desirable types. Then they have to be tested for their adaptability to the various climatic areas of the state—usually with the help of county farm advisors. The processing and shipping ability of the crop has to be determined, as well as edible quality. Only after all of these evaluations is the decision made to release a new variety to the seed industry for seed increase and distribution to growers. This report reviews some of the varieties developed in the past few years that have found a place in the state's production, as well as some new varieties just released.

Tomatoes

Imperial, released in 1959, is a market-type tomato with resistance to Fusarium wilt. It was developed in the Nyland district of the Imperial Valley and is adapted primarily as a fall shipping tomato for that area. The plants are determinate, light green in color and produce a good cover. The fruits are a flattened globe shape, of good size and with a tendency to have an open style.

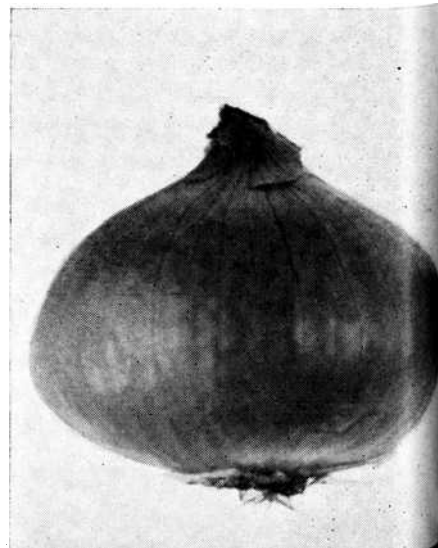
VF36, released in 1959, is resistant to Fusarium and Verticillium and produces a tomato suitable for canning. It is two weeks earlier than Pearson and is one of the earliest resistant strains suitable for

processing. Yield trials indicate that it is equal to other resistant varieties. Canning tests reveal that it is equal or superior in quality to other leading varieties. The vine size is smaller and more open than Pearson. Fruit size has been consistently as large and the fruits as firm as Pearson.

(The prefix VF has become standard to denote resistance to Verticillium and Fusarium wilts.)

VF14, released in 1961, is also resistant to Fusarium and Verticillium and is suitable for canning. It is a week later than VF36 and is, therefore, a second early resistant variety. It has set fruit abundantly during the high temperatures that prevail in the Sacramento-San Joaquin valleys of California. This ability to set at high temperatures and the time of maturity make it a good companion variety to be planted with VF36.

VF14 also carries the uniform ripening gene. Fruit is oblate in shape with some tendency for navel formation at the blossom end on fruit of the first clusters. Soluble solids and firmness of fruit are similar to VF36 but the pH is somewhat higher. The vine size is about the same



e Varieties

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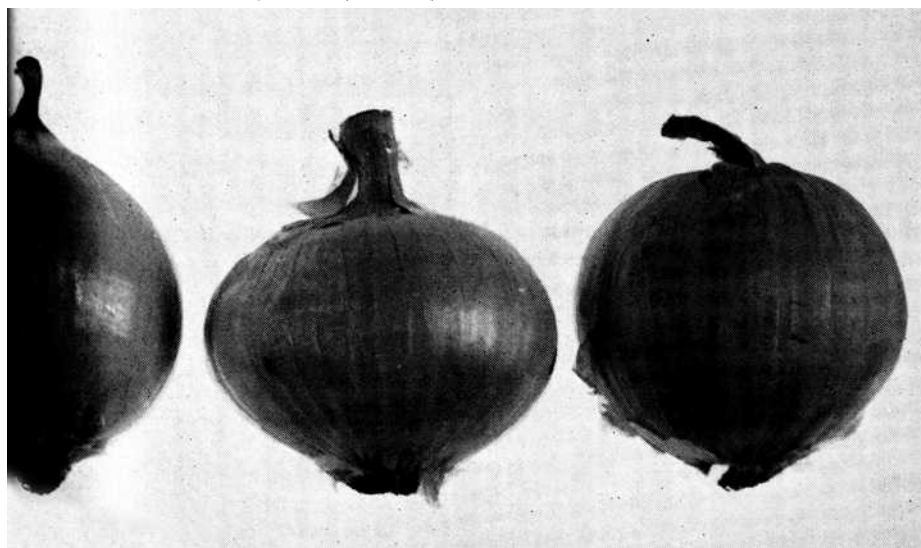
DAVIS • O. D. MC COY

as VF36 but more compact and with better leaf protection of the fruit from the sun.

VF145

VF145, released in 1961, is an early-canning variety of tomato, suitable for mechanical harvesting, that is also resistant to Fusarium and Verticillium wilt. It has a relatively small, compact vine with a fairly concentrated fruit set. The ripe fruit of this variety will remain on the vine in a sound condition longer than those of most varieties, thereby making it possible to obtain a high percentage of the total crop at one harvest. Tests at Davis and Meloland showed that it would set fruit at higher temperatures than other varieties. For this reason it is more adaptable for successive plantings to obtain a continuous harvesting period. The pH range compares favorably with canning varieties; however, the percentage of soluble solids is somewhat lower than most other canning varieties. It will probably only be an interim variety. However, it serves a useful purpose in helping to mechanize the canning tomato industry in California.

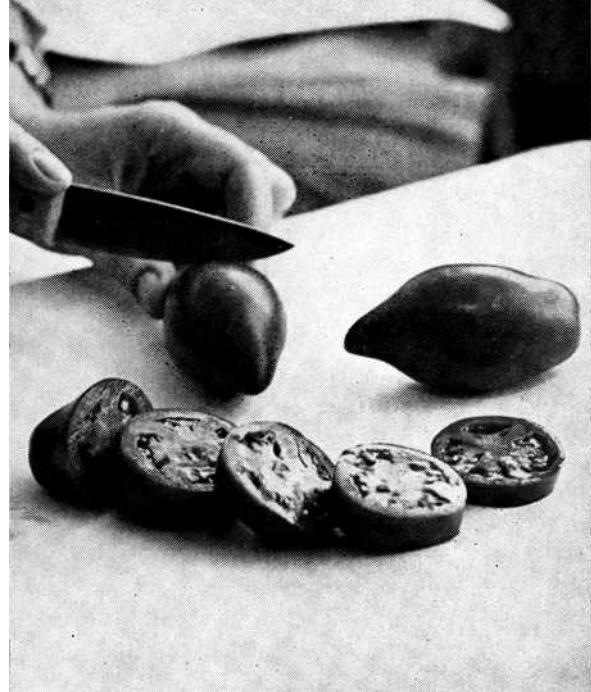
Variety was selected primarily for early maturity.



VFN8, released in 1964, is a Verticillium, Fusarium, and nematode resistant variety suitable for canning. It is resistant to five species of nematodes, namely: *Meloidogyne incognita*, *M. javanica*, *M. arenaria*, and *M. thamesi*. It is not resistant to the *M. hapla* species. This variety was developed by crossing a nematode-resistant line with VF14. The breeding line VFN14 was developed from the progeny of this combination, and was crossed with VF36. VFN8 was selected from the resulting progeny. In 1963, this variety was grown under a wide range of climatic conditions in California and the Culiacan area of Mexico where it performed quite satisfactorily. It appears to have the wide range of adaptability of VF14 and VF36. Vine characteristics are similar to VF14. The fruits are deep, oblate and carry the uniform ripening gene. It matures with VF14 and is therefore a second, early variety. Tests at the U.C. pilot plant showed that fruit from three regional trials had processing characteristics similar to VF14.

VF13L

VF13L, released in 1964, is an early canning variety of tomato resistant to Verticillium and Fusarium with elongated fruit suitable for mechanical harvesting. It has a smaller vine and more concentrated fruit set than VF145. The ripe fruit of this variety will remain on the vine in a sound condition longer than VF145, making it possible to obtain a higher percentage of the total crop at one harvest. VF13L is similar to VF145 in pH and soluble solids. Limited tests in mechanically harvesting this variety show materially less damage to its elongated fruits than occurs in varieties with round fruit. The reduced fruit damage permits faster harvesting operations, less soil, mold, and fruit fly contamination and



VF13L, the new elongated canning tomato designed to aid mechanical harvest.

faster processing in the cannery. These factors should materially aid in the acceptance of mechanical harvesting of tomatoes.

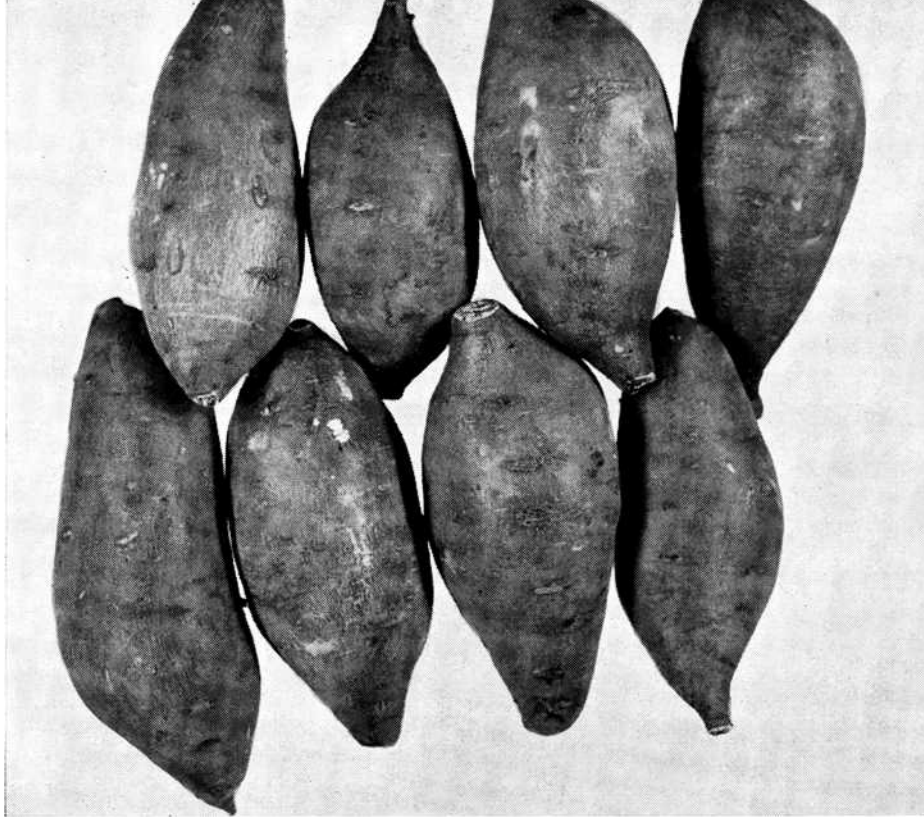
Sweet potato

Calred, released in 1961, is a sweet potato suitable for the early fresh market. It is resistant to *Meloidogyne incognita* nematodes and has considerable resistance to *Streptomyces ipomoea* (soil pox). It is susceptible to *Fusarium oxysporum* (stem rot). The potatoes are fusiform in shape. The epidermis is dark red in color, the surface being slightly russet which aids in reducing injury at harvest. The flesh is deep orange. The baking quality of this variety is equal to the Puerto Rico strains. This variety has been grown for several seasons in the San Joaquin Valley. Yields have been consistently good. It appears to be especially suitable on soils where soil pox is a problem.

Peppers

Mexican Chili M4, released in 1962, is a tobacco mosaic-resistant, high color Mexican Chili intended for dehydration use. This was obtained from a cross between a mosaic-resistant Bell-type breeding stock and a field selection of Mexican Chili, backcrossed three times to Mexican Chili, and selected for three more generations. Extractable color is 30-32 Lovibond or 4700-5100 $\mu\text{g/g}$ carotenoid pigment concentration on a dry powder basis. Plants are a uniform medium height, with a good crown set of medium to large fruit of typical shape.

Santa Fe Gem, released in 1962, is a



Calred, an early fresh market sweet potato variety, was selected for resistance to nematodes and soil pox.

has been grown in isolation as an open-pollinated line. Additional selections for earliness, size, shape and small neck were made in 1954, 1956, 1958, and 1960.

M-100 is almost a globe in shape, slightly pointed at the base. The color is white with a slight buff cast on the outer dry scales at maturity. The scales are moderately tight. Top growth is somewhat different from standard Sweet Spanish. The leaves are comparatively small and the neck is very small. The maturity date at the Imperial Valley Field Station, Meloland, is approximately April 15. M-100 may not present any advantage when used as a variety for commercial production. However, it is believed to possess some potential as a parental line in early white hybrids.

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yellow wax pepper derived from a cross of Fresno Chili × Floral Gem. The fruits are pendant and similar to Fresno Chili in shape, size, and pungency. The fruit walls are thicker and smoother than those of Floral Gem and less subject to damage from handling. The plants are intermediate in habit between the two parent types and are homozygous-resistant to the tobacco mosaic virus. This variety has grown well in the desert and coastal

regions of southern California, in the Bay Region, and at Davis.

Onion

M-100, released in 1961, originated from a single bulb selection in 1952 from a commercial field of Early White Sweet Spanish, grown in the Imperial Valley. M-100 was selected primarily for early maturity. The original bulb was self-pollinated in 1953. Since that time it

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