Miscellaneous Publication 115

Vegetable Crops for Commercial Production in the El Paso Valley Area

Sweet corn variety trials at the Ysleta station

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TEXAS AGRICULTURAL EXPERIMENT STATION

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SUMMARY

Vegetables have produced satisfactory yields in tests at the El Paso Valley Experiment Station at Ysleta. Profitable returns from commercial vegetable crops are dependent on market prices as well as on acre yields. Prices generally are governed by the national supply and demand, and are usually higher during periods of lowest production.

Many vegetables can be grown successfully in the El Paso Valley. The nine crops which are discussed in this publication appear to have the greatest possibilities for shipping to distant markets.

ASPARAGUS

Crowns are grown from seed planted in a nursery, and transplanted in the field the second spring. Transplants should grow two seasons before cutting begins. Set crowns below the soil level in 5 to 7-foot rows. Intercropping may be practiced the first 2 years.

SWEET CORN

Gulfcoast, Aristogold No. 1, Silver Cross Evergreen and Aristogold Bantam Evergreen are large thick-ear types. Illinois Hybrid No. 10, Golden Security, Calumet, Oto, Peoria and Golden Hybrid No. 57 are long slender-ear types. The corn earworm can be controlled by thorough applications of 10 percent DDT in mineral oil applied in the silks at 48-hour intervals.

CANTALOUPE

Imperial 45 and Hale's Best Jumbo are the recommended varieties. Sandy loam soil is best, but if known to be infested with nematodes, it should be fumigated with D-D, methyl bromide or ethylene dibromide 2 weeks prior to planting. A 1½ percent lindane dust usually will provide adequate control of cucumber beetles, aphids and spider mites.

LETTUCE

Imperial 847 and Imperial 44 are varieties generally planted for crops to be harvested in October and November. Varieties planted to be harvested in the spring usually include Great Lakes and Premier Great Lakes. Lettuce requires considerable phosphate but high nitrogen levels may result in soft heads or seedstalk formation.

ONIONS

White and yellow granos and San Joaquin are the main varieties. Sweet Spanish strains usually produce fair to good yields but are late. Planting should be made from September 10 to December 1. Medium to high fertility of soil produces the highest yields, but extremely high fertilizer applications are not profitable. Medium to high moisture levels should be maintained during bulbing, up until 2 weeks prior to harvest. Thrips may be controlled with applications of 20 pounds per acre of dusts containing 5 percent chlordane, 20 percent toxaphene, or 5 percent DDT-3 percent BHC.

TOMATOES

Improved Pearson and Stokesdale produced highest yields at the El Paso Valley Experiment Station. Medium-texture soils of medium fertility but high in phosphates produce the greatest yields. Plant on wide beds to prevent the soil underneath the plants from becoming wet during irrigation. Western yellow blight is the most serious disease and there is no satisfactory control for it. Isolation from beets, wild mustards and legumes and the leaving of 2 to 4 plants per hill greatly increases yields. Tomato fruitworm may cause considerable injury if not controlled. Dusts containing 5 percent DDT or 5 percent DDD with sulfur will provide adequate control of both fruitworm and red spider when properly applied.

PEPPERS

There are three classes of peppers: (1) chile—Anaheim, Hungarian Wax, N. M. College No. 9 and N. M. College No. 6 are the leading varieties; (2) bell—the varieties Asgrow Wonder, California Wonder and Calwonder show the most promise; (3) pimiento—Leading varieties are Perfection and Truhart Perfection. The requirements and care of peppers are essentially the same as those of tomatoes. Phytophthora blight, chile wilt and western yellow blight may become serious, but the close spacing of plants usually will provide sufficient stand even after the removal of infected plants.

SWEET POTATOES

Allgold and Gold Rush are two new varieties with deep salmon-pink flesh of excellent quality and high-yielding capacity. Other suitable varieties are Maryland Golden, Nancy Hall, Porto Rico and Red Velvet. They should be planted on light soils, and only small amounts of nitrogen and moderate amounts of phosphate applied.

WATERMELONS

Plant only on light soils and irrigate lightly. Open an irrigation furrow near the hills at time of planting and work toward the center between the rows with each successive cultivation. Nitrogenous fertilizer applications should be light. Best adapted varieties are Klondike R7 and Peacock for Western markets and Black Diamond, Dixie Queen and Kleckley's Sweet for Eastern and Northern markets. A 1½ percent lindane dust is effective against cucumber beetles, aphids and squash bugs.

Vegetable Crops for Commercial Production in the El Paso Valley Area

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THE CLIMATE OF THE EL PASO VALLEY is very favorable for the production of most vegetable crops. Even though vegetables have always been grown in home gardens in the area, commercial production has been limited to relatively few acres. High yields and good prices, stimulated by a wartime economy, have resulted in 80 percent or more of the farm land of the Valley being planted to cotton since 1940. Vegetables have not been grown more extensively principally because prices often have been too low for profitable returns in comparison with cotton, because of the general perishability of vegetables and because of the inadequacy of packing and marketing facilities. A reduction in the cotton acreage will result in increased plantings of other cash and soil-building crops.

Table I shows that some vegetables offer excellent income possibilities. Prices paid for perishable produce depend on its supply and the demand for it. The success of production in any area lies in its ability to compete profitably in the national market. Produce either is put on the market in competition with that of other areas, or it can come into the trade channels at a time when national production is relatively low.

Vegetable tests at the El Paso Valley Experiment Station at Ysleta have been under way since 1947. This publication summarizes information from these tests as well as general experience with vegetables in the area. Insect and disease control is summarized briefly for each crop discussed; for more complete information see Texas Agricultural Extension Service Circular 323, "Guide for Controlling Insects and Diseases on Vegetable Crops in Texas, 1953." Additional references on insects, diseases, fertilizers and varieties are given on page 10 of this publication.

Figure 1 shows the dates of El Paso Valley production in comparison with national shipments and possibilities of nine vegetable crops recommended for the El Paso area. The shipping dates and relative amounts of produce were taken from the "Weekly Summary of Fruit and Vegetable Carlot Shipments" for 1950-52, prepared by the Market News Branch of the Agricultural Market-

Table 1. Average production and value of 10 vegetable crops in the El Paso area in comparison with cotton and alfalfa[1]

Crop	Acres[2]	Unit	Price per unit (dollars)	Yield per acre	Value per acre (dollars)
Asparagus	52	lb.	0.13	2632	313
Cantaloupes	647	crate	2.58	118	305
Corn, sweet	24	lb.	0.06	2782	150
Lettuce	196	crate	2.36	276	571
Onions	510	bu.	1.74	340	565
Peppers, bell	11	lb.	0.05	8871	429
Pepers, chile-dry	387	lb.	0.29	1062	306
Peppers, chile-green	147	lb.	0.06	3110	176
Tomatoes	284	lb.	0.03	10531	263
Sweet Potatoes	173	bu.	2.19	173	384
Watermelons	97	lb.	0.02	10604	226
Average	2528				324
Cotton, long staple	15509	bale	298.17[3]	.79	281[3]
Cotton, short staple	102169	bale	163.16[3]	1.36	264[3]
Alfalfa hay	26512	ton	26.47	4.00	111

[1] Ten-year averages (1943-53) of yields under the Elephant Butte Project. These data were compiled from the records of the Bureau of Reclamation, United States Department of Agriculture.
[2] These data do not include acres that were not harvested due to production or market failures.
[3] Including seed.

Table 2. Summary of fertilizer recommendations for the El Paso area

Crop	Pounds of available plant food per acre: N	P_2O_5	Time and method of application: Drill or near row	Side-dressing
Asparagus	100	100-150		Immediately after cutting
Sweet corn	90-100	0		When plants are 12-18 inches high
Cantaloupe	90-110	50-80	1/2 N and all P_2O_5 at planting	1/2 N when vining begins
Lettuce	40-60	60-90	1/2 N and all P_2O_5 at planting	1/2 N 6 weeks after planting
Onions	50-100	60-100	1/2 at planting	1/2 in early spring
Peppers	40	60	1/2 at planting	1/2 at first bloom
Sweet potatoes	20	40	7-14 days prior to setting	
Tomatoes	20-40	60	1/2 at planting	1/2 at first bloom
Watermelons	20-40	60	1/2 N and all P_2O_5 at planting	1/2 N at first bloom

CONTENTS

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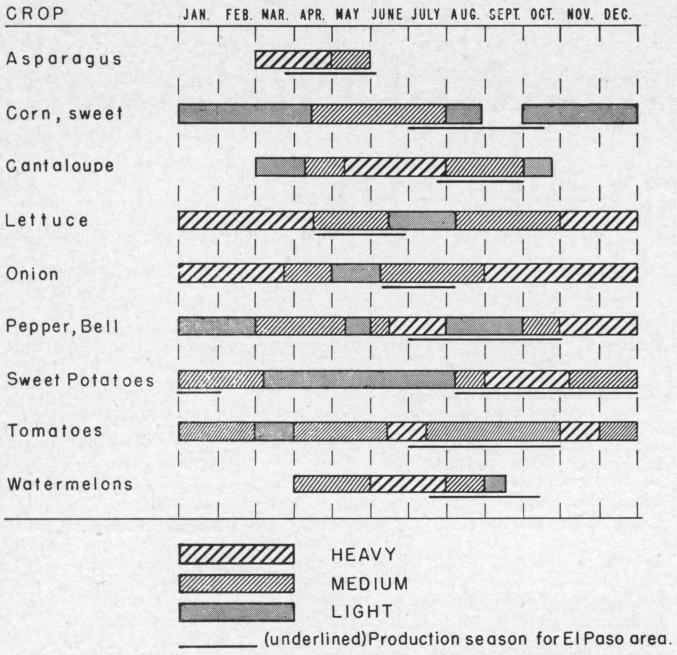

Figure 1. National shipping schedule for nine vegetable crops. From the "Weekly Summary of Vegetable Carlot Shipments" for 1950-52, issued by the Market News Branch, Agricultural Marketing Service, USDA.

ing Service, USDA, Washington, D. C. These reports include only interstate shipments, and therefore do not include crops marketed locally, nor most of those which enter the processing industries.

ASPARAGUS

Asparagus can be grown on practically all well-drained El Paso Valley soils. The soil should be leveled and free of perennial weeds and grasses, since the crop occupies the land for several years and there is no opportunity for further preparation after the crowns are planted.

The rust-resistant Washington strains are the only varieties recommended. The plants, or crowns, may be purchased from plant growers or started from seed in a nursery planting, using one pound of seed for each acre to be set. Germination of seed is usually slow but may be hastened by soaking 3 to 5 days. The seed should be planted on low beds, spaced 18 or 36 inches apart, in April or early May. The seedlings are harvested in the fall and stored, or may be left in the soil until transplanted to the main field in early April.

Only 1-year crowns of good size, containing large buds should be planted because many of the small, weak ones will not survive. Transplanting is done by hand, dropping the roots with the buds up into furrows 4 inches deep in heavy soils and 8 inches deep in sandy soils. Plants should be spaced 18 inches apart in 5 to 7-foot rows. The roots should be covered 2 to 3 inches at planting time to prevent smothering of the buds before reaching the surface. This leaves the row in a "water furrow" which is gradually filled through the first season by cultivation.

Low beds may be formed over the crowns the second season to facilitate cultivation and irrigation. Wide beds 8 to 10 inches high should be pulled over the crowns about the middle of February during the third and succeeding season. Tests show that the yield and quality of asparagus from medium to high beds are superior to that from low beds. The crowns grow on an inclined plane which places them closer to the surface each succeeding year; therefore, beds of old fields should be higher than those of more recent plantings.

The harvests of spears may be obtained for 3 to 4 weeks the first season of cutting (third growing season of the crowns) and 8 to 10 weeks in older plantings. If the cutting season is extended beyond June 15, yields may be reduced the following year. The spears usually are removed from the beds 2 to 6 inches beneath the surface when there are 4 to 8 inches of growth above ground. Asparagus knives, or "gougers," which have a flared cutting tip generally are used in harvesting. Large operators in recent years have used machines which remove a top slice of the bed and pass it over a screen so that the soil drops back in place. Many spears too short for bunching also are removed with the longer ones, but these may be used for canning or freezing. During warm days it may be necessary to harvest every morning, while during the early and cool part of the season cutting may be made on alternate days or only twice a week.

Immediately following the cutting period each spring, the beds should be leveled within a few inches of the crowns. Disc harrows and drags usually are used to lower the beds, but implements should not touch the crowns because injury may result. Growing conditions should be the best possible, since food is stored in the crowns and roots during the summer and fall for the production of spears the following spring.

Figure 2. Double cropping with asparagus and okra. First-year asparagus in the furrows and okra on the ridges.

Annual minimum application of 100 pounds of nitrogen and 100 to 150 pounds of phosphoric acid should be made to infertile and sandy soils. On fertile soils of medium to heavy texture, manures and fertilizer may be needed. Side-dressing applications should be made after growth begins in the spring on young, nonproducing fields, and broadcast applications over the beds and in the top surface immediately after harvest on plantings in production.

Harvesting should not begin until the third spring, or after the transplants have had two seasons' growth. This has led to intercropping in many sections to get some return from the land until the asparagus comes into production. Intercropping can be a satisfactory practice the first 2 years, provided the rows are far enough apart to permit ample space for the intercrop and the asparagus. Six feet between the asparagus rows would be the minimum if this system is to be followed.

SWEET CORN

Excellent yields of high-quality sweet corn can be produced in the El Paso Valley by selecting adapted varieties and practicing thorough earworm-control measures. Almost any soil will produce high yields with good cultural practices except highly alkaline soils.

Plantings may be made between April 1 and July 15 for harvesting between July 1 and October 15. Hills spaced 12 inches apart in 36 to 42-inch rows, with two to four plants per hill produced highest yields in tests. For soils of average fertility, a side-dressing of 90 to 100 pounds of nitrogen when corn is 12 to 18 inches tall should be adequate. For maximum yields, moisture should be maintained at a medium to high level, especially during the pollination period.

Varieties which have produced good yields at the station are Gulfcoast, Aristogold No. 1, Silver Cross Evergreen and Aristogold Bantam Evergreen for the thick-ear types; and Illinois Hybrid No. 10, Golden Security, Calumet, Oto and Golden Hybrid No. 57 for slender-ear types. All these varieties have yellow kernels, except Silver Cross Evergreen which has yellow mixed with white. Peoria, while not yielding quite as well as the other varieties named, is a good white kernel variety. The highest tonnage per acre is produced by thick-ear varieties while the slender-ear varieties produce the highest number of ears.

The principal insect attacking sweet corn is the corn earworm. Thorough and regular applications of DDT in mineral oil, as described in Texas Extension Circular 323, have given 90 percent control. Applications should begin when 10 percent of the ears show silks and should be repeated at 2-day intervals until all silks are brown. Recent tests show that fair control may be obtained from a 10 percent DDT dust applied with special machinery, or from individual ear treatment with a stencil-type paint brush. Lindane, sulfur or other miticides should be used with DDT dusts in at least the last application to prevent a red spider infestation.

CANTALOUPES

High temperature and sunshine favor high sugar content and good flavor in cantaloupes. These factors make the Southwest the important cantaloupe-producing region of the United States.

Imperial No. 45 (also called P.M.R. No. 45) and Hale's Best Jumbo have been the highest producers of medium-size melons in tests conducted in the El Paso area. The double bed or cantaloupe bed of 72 to 84-inch width generally is used, and the seed are drilled in rows on each side of these beds. Plants are thinned 1 to 3 per hill which usually are spaced about 40 inches apart. A mixed fertilizer of nitrogen and phosphate is recommended for cantaloupes. Application of 40 to 60 pounds of nitrogen and 50 to 80 pounds of phosphoric acid before planting and 50 pounds of nitrogen when plants begin to run is sufficient for most soils. Plantings may be made between April 1 and July 1.

Cantaloupes thrive best in a sandy loam soil; however, heavy soils generally produce the highest yields in the El Paso Valley because of the severity of nematodes in the more sandy soil. Soils known to be heavily infested with nematodes should be fumigated with methyl bromide, ethylene dibromide or D-D before planting cantaloupes.

Other pests attacking cantaloupe are principally cucumber beetles, aphids and red spider mites. Lindane, methoxychlor, parathion, dieldrin, rotnone and other insecticides provide adequate control when properly applied. Insecticides containing sulfur should not be applied on cantaloupes. Anthracnose sometimes attacks the foliage late in the season or after a rain. Copper sprays and dusts are recommended if applied early but are relatively ineffective after disease has spread through the field.

LETTUCE

The lettuce plant is a relatively poor forager and has a small root system. The crop can be raised on a wide range of soil types; however, the heavier soils are best adapted to crops that mature during periods of comparatively high temperatures for they tend to be cooler and retain moisture longer than the medium and light soil types. Light soils may be used for lettuce crops that mature during cool periods if adequate moisture and nutrient supplies are available.

The El Paso Valley produces two crops of lettuce each year. The fall crop is planted from July 20 to September 10 and is harvested October 15

to December 1. The second crop may be planted from November 20 to April 1 and harvested from April 15 to June 15. High temperatures frequently cause tip-burn in the June crop, and may prevent the germination of seed planted in July and August. Most growers plant Imperial 847 or Imperial 44 for the fall crop and Great Lake or Premier Great Lakes for the spring crop.

The preparation of land for the planting of lettuce and other small-seeded vegetables, is more exacting than for such crops as corn and cotton.

Lettuce lends itself well to close spacing; two rows may be planted on each 42-inch bed. Two to 3 pounds of seed are required per acre, and plants should be thinned to 14 to 16 inches apart in the row. As soon as they are large enough (usually 3 to 6 weeks after germination), plants should be blocked, leaving 2 to 4 plants per hill. Ten to 20 days later they should be thinned to one plant per hill.

Soil moisture should be retained at a medium to high level for maximum yield and quality of heads. The rate of moisture uptake increases as the lettuce heads begin to form and continues to increase until maturity. Three to five irrigations usually will be necessary; the first to germinate the seed, the second at time of thinning or immediately thereafter, and one to three irrigations at 15 to 30-day intervals after thinning, depending on the stage of growth and climatic conditions. Under good irrigation and cultivation practices, a total of 12 to 20 inches of water should be ample for either fall or spring crops. Cultivation after planting, other than to control weeds, is wasted effort.

Lettuce invariably responds to phosphate applications at planting time. Early growth and yield have been increased and maturity hastened somewhat by early phosphate applications. The development of the lettuce plant during its early stages apparently is important to the final outcome of the crop. Band applications providing 60 to 90 pounds of phosphoric acid per acre should be made at planting. On relatively fertile soil, nitrogen should be applied with caution. Not more than 20 to 30 pounds of actual nitrogen per acre should be applied when temperatures are in the higher growing ranges and not more than 40 to 60 pounds at any time. Nitrogen applications may contribute to excessive seedstalk formation or large, soft heads if combined with high temperatures, especially on soils of favorable organic matter content and physical condition. On heavy soils depleted of organic matter, 10 tons of barnyard manure per acre may produce greater yields than chemical fertilizers.

ONIONS

Onions should be planted in the El Paso area from September 10 to December 1, or early enough for the growth of one true leaf before severe cold. Planting too early may result in excessive growth before cold weather sets in, and numerous seedstalks may appear in the bulb crop. Bulbs which have bolted (formed seedstalks) are considered culls. Onions planted in December usually are slow in germinating and often do not reach sufficient size for good yields.

Seed of Texas Early Grano and San Joaquin planted early in September produced the best yields in experiments at the station. These varieties are somewhat resistant to bolting and may be planted earlier than most other varieties. If they are planted early in September, harvesting may begin the first week of June. White Grano may be planted after September 20, but earlier plantings usually result in excessive bolting. Bolting usually is more severe following mild winters. Riverside Sweet Spanish, Utah Sweet Spanish and Yellow Sweet Spanish Colorado No. 6 are later maturing varieties and fall plantings usually are harvested from July 10 to 15. The Bermuda types do not yield well in the El Paso area.

Careful land preparation is important in onion culture or stands will be poor and yields low. Seed usually are planted in two 3 to 6-inch bands spaced 14 to 20 inches apart on each 38 to 42-inch bed. Seeding should be at a rate of 3 to 6 pounds per acre, and planted one-half inch deep in heavy soils and three-fourths inch in sandy soils. Extremely tight soils should not be planted to onions unless 15 to 20 tons of barnyard manure per acre have been broadcast and turned under prior to listing and planting. The root system of the onion is rather meager in spread, in depth or penetration and in branching. Few roots reach a depth of more than 10 inches, however, a few may penetrate as much as 20 inches, depending on soil type. The lateral spread is 6 to 12 inches, with the main root zone within a 6-inch radius. The more compact the soil the less the spread and penetration of the root system.

Rates of fertilizer application vary among growers. Onions require fertile soil for maximum yields but excessive applications of commercial fertilizers are questionable. The onion is grown for its bulbous vegetative portion and not the fruiting portion; therefore, it requires an available source of nitrogen during most of its active growing period. Animal manures with supplemental side-dressings of chemical fertilizers in late spring are excellent. While fertilizer requirements differ from one farm to another, depending on the type of soil and the previous cropping history, at least two applications should be made each year, one at the time of planting and again in the early spring. On light soils, an additional nitrogenous side-dressing 4 to 6 weeks prior to harvest has proved profitable for most growers. Heavy applications of highly nitrogenous fertilizers during the autumn are likely to promote soft growth that will be injured by cold. Fertilizer applications should provide 50 to 100 pounds of nitrogen and 60 to 100 pounds of phosphoric acid. Soils which have been fertilized, or

on which alfalfa was grown during the previous season, may need no more than half the amounts recommended above.

The root system of the onion is not capable of obtaining sufficient moisture from areas farther than 8 inches from the bulb. Therefore, adequate irrigation to provide moisture in this root zone is required at all times if satisfactory yields of high quality bulbs are to be produced. The appearance of the plants cannot be used as an index for determining when to irrigate because growth will be retarded before symptoms are visible. The water requirements of onions in the seedling stage are not high, but after bulbing begins in the spring, weekly irrigations produce the highest yields. Irrigation applications should cease 2 weeks before harvest to permit the bulbs to mature, otherwise their keeping quality is affected adversely. Harvesting may begin when 40 percent or more of the tops have fallen over. Bulbs may sunburn if not harvested soon after the tops have died.

Cultivations should be light and frequent enough to control weeds only. Since onions are poor competitors for nutrients and moisture, it is necessary to control weeds at all times. Experiments show that omission of the last hoeing when needed, resulted in 50 to 75 percent reduction in yields of No. 1 bulbs. Herbicides have been used for controlling weeds in many areas, with varying degrees of success. The age and species of the weeds, the temperature when applied and method of application are important factors in chemical weed control. Calcium cyanamide, PCP (pentachlorophenol) and the amine salt of 2,4-D have given good results as pre-emergence treatments. Weak spray solutions of sulfuric acid and phosphoric acid, and potassium cyanate dust have been used successfully as post-emergence treatments.

The main pest attacking onions in the El Paso Valley is the onion thrip. These insects are very small but often build up tremendous populations early in the spring if not controlled. They feed on the leaves and in the leaf sheaths by rasping the surface and sucking the juices. Thorough applications of 5 percent chlordane, 5 percent DDT, 20 percent toxaphene or 5 percent DDT-3 percent BHC dusts have given good control when applied at the rate of 20 pounds per acre. If thrips are not controlled, onion yields will be decreased, and the insects will migrate to other nearby crops.

TOMATOES

The tomato is among the least exacting of the vegetable crops as to soil type and soil reaction. The essential requirements of a soil are that it be well drained but capable of retaining adequate moisture. Very sandy and heavy clay soils are the least desirable. An extensive and vigorous root system and its thorough occupancy of a large volume of soil make it possible for tomatoes to be grown successfully on a variety of soils. Improved Pearson and Stokdale have produced highest yields.

Barnyard manure is good tomato fertilizer because it adds nutrients and conditions the soil for better root penetration. If manure is applied, it should be supplemented with 4 pounds of phosphoric acid per ton. If only commercial fertilizers are used on heavy soils, applications should be made of 60 pounds of phosphoric acid and 20 pounds of nitrogen. Forty pounds of nitrogen should be sufficient on light soils of moderate fertility; half applied before setting or planting, and half in bands 6 to 8 inches from the plant and 4 inches below the soil surface about the time the first blooms appear.

Tomato plants may be started in one of three methods: (1) Seed may be planted in rows spaced 4 inches apart in a hotbed about February 1. The seedlings should be transplanted to pots or plant bands, or 3 to 4-inch spacings in a coldframe when the first true leaves appear. When plants are 4 to 6 inches tall, and all danger of frost is over, plants should be transplanted to the field. (2) Plants may be permitted to grow in the hotbed until transplanted to the field. In this case seeding may be delayed until February 20 to March 15. To produce sturdy plants, the seedlings should be thinned to about 15 per foot. (3) Seed may be planted directly in the field. Since transplanting on a commercial basis is expensive and often results in poor stands, field seeding has become the most common practice, except where earliness is desired. After all danger of frost is past, plant a few seed in each hill, and leave a ridge alongside for wind protection. When planting in late March or early April, hotcaps should be used for frost protection. Hotcaps also offer protection against wind, blowing sand and insect injury. Plants should be thinned after the first pair of true leaves have fully opened.

Plants should be spaced 18 to 24 inches in medium-high beds 6 feet apart. Where field seeding is followed, seed may be planted on each side of the cantaloupe bed with a 2-row planter, and thinned to hills 24 to 30 inches apart. The vines should be trained to occupy the beds so that the furrows may be left open for passage of irrigation water and harvesters. When tomatoes touch wet soil, serious losses from rot usually result. Tomatoes turning red are most likely to be affected. When first planted or set, irrigation applications should be frequent and light. Subsequent irrigations should be moderate and made at 2 to 4 week intervals. After harvesting the first cluster of fruit, if one irrigation is given which thoroughly wets the first 3 to 4 feet of soil, further irrigations usually will not be necessary.

Western yellow blight or curly top is the most troublesome disease of tomatoes in the Southwest, and there is no known satisfactory control. The disease is transmitted by the beet leafhopper

which feeds principally upon beets, mustard and legumes. Incidence of the disease can be reduced by the removal of host plants in the vicinity of the tomato field. Leaving two to four plants per hill has increased the stand in infected fields by as much as 50 percent. Leafhoppers usually can be controlled with a 5 percent DDT dust. On tomatoes, however, leafhopper control has not been completely satisfactory. The insects do not prefer tomatoes and will not continue to feed on them. Only one puncture by a leafhopper carrying the curly top virus may be sufficient to infect the plant. Even though the insect may be killed, the plant already will have been infected. Periodic applications of 5 percent DDT dust have been helpful in holding infection to a minimum.

Soils known to be heavily infected with verticillium wilt should not be planted to tomatoes. Heavy nematode infestation in the soil will greatly reduce yields of tomatoes. Soil fumigation 2 to 3 weeks prior to planting usually will provide adequate control of the nematode for 1 year.

The tomato fruit worm, also known as the corn earworm and cotton bollworm, is the most serious pest. Other common insects causing some injury are hornworm, red spider, stinkbug and potato beetles. Dusts containing 5 percent DDT or 5 percent DDD have given good control of fruitworm with three properly timed and thoroughly applied treatments. DDD is more effective against the hornworms than DDT. These dusts should contain at least 50 percent sulfur to control the spider mites.

PEPPERS

Three general types of peppers are produced —chile or hot peppers, sweet or bell peppers and pimiento peppers. Most of the acreage planted to peppers in the El Paso Valley is planted to chile. Plants may be produced in hotbeds and transplanted to the field. They also may be seeded directly in the field. An acre of peppers requires approximately 4 ounces of seed if planted in a hotbed or 2 pounds if seeded directly in the field. Germination requires 8 to 12 days. For early production, hotcaps may be used, as discussed under the section on tomatoes.

Recommended varieties of peppers are: chile —Anaheim, Hungarian Wax, N. M. College No. 9 and N. M. College No. 6; bell pepper — Asgrow Wonder, Calwonder and California Wonder; pimientos—Perfection and Truhart Perfection.

The climatic and fertilizer requirements of peppers are about the same as for tomatoes. Large applications of highly nitrogenous fertilizers, while increasing vegetative growth, may seriously delay fruiting and maturity. For average fertile soils, applications should be made of 40 pounds of nitrogen and 60 pounds of phosphoric acid, half before or at time of planting, and half when blooming begins.

Diseases of peppers are numerous but seldom become serious in arid climates. Phytophtora blight may cause some loss during humid or rainy weather. Chile wilt and western yellow blight usually cause some loss of plants. Close spacing usually will provide sufficient plants for satisfactory yields even if many plants are lost through diseases. Infections of virus diseases are generally transmitted by sucking insects, such as leafhoppers. These insects usually are abundant in fields of alfalfa or planting of beets, spinach and other vegetable crops. Blossom-end rot is a physiological disorder which is easily started by extremes in soil moisture. Excessive nitrogen causes plants to become more susceptible to this diesase.

SWEET POTATOES

During the past several years, only a few acres have been planted in sweet potatoes in the El Paso area, but the crop promises good profits. Nancy Hall and Maryland Golden (or Maryland Sweet) have been the leading varieties for commercial production, but are below standard in appearance and quality. In variety trials at the Ysleta station, Allgold has produced the greatest yields and highest quality potatoes over a period of 3 years. Bred and selected by the Oklahoma Agricultural Experiment Station, Allgold has excellent eating quality and appearance but does not store as well as Nancy Hall or Porto Rico. In color and shape, it resembles Maryland Golden but does not have the numerous "veins" found underneath the surface of Maryland Golden. Gold Rush, Porto Rico and Red Velvet are good varieties but are inferior to Allgold in yield and quality.

Sandy soils are ideal for sweet potato production, but the water requirement of these soils is relatively high. Heavy soils are not recommended for commercial production, because roots produced in them are badly shaped and unattractive. Heavy applications of nitrogenous fertilizers often result in excessive vine growth, accompanied by low yields of marketable roots. On moderately fertile soil, 20 pounds of nitrogen and 40 pounds of phosphoric acid applied in the bed prior to setting should be sufficient.

Plants or slips are obtained from sweet potatoes by the following procedure. Select medium-size roots of good shape and color and free of rots and scurf. Treat by dipping in a solution of Phygon, Borax, Dithane D14, Semasan Bel or Corrosive Sublimate to kill disease-producing organisms that are present on the surface. Place in a disease-free hotbed about March 1 and cover with 3 to 4 inches of clean sand. Approximately 9 square feet will be required for each bushel of seed, and not less than 5 bushels should be bedded for each acre to be planted. In about 6 weeks, sprouts 8 inches long should be ready. Pull these sprouts and transplant to medium high beds which

are thoroughly wet, spacing the plants 18 to 24 inches apart. Sprouts should be set as soon as drawn. Setting may be by hand with the use of a dibble, or with a transplant machine. By keeping the hotbed moist, several crops of sprouts may be pulled from the same planting.

Cultivations should be shallow and frequent enough to control weeds only. Weeding or cultivating usually is not necessary after the vines cover the ground. Irrigations should be light and frequent enough to maintain a medium supply of moisture. High moisture levels will result in excessive vine growth accompanied by long "stringy" roots. If the soil becomes extremely dry, the sweet potatoes may crack when growth is resumed following irrigation.

Harvesting of early plantings may begin in late August when prices usually are high. But this means a sacrifice in yield. For maximum tonnage, harvest may be delayed until the first light frost occurs. A heavy frost may injure the roots and lower their eating and keeping qualities. Sweet potatoes may be plowed out with a turning plow, a middle buster or a potato digger. Roots should not be bruised when digging, as this results in unattractive black spots on the surface and makes them more susceptible to decay. After harvest, roots should be "cured" at a temperature of 85° F. for 10 days and then stored at 50 to 55°. Sweet potatoes improve in quality during storage because part of their starch content turns to sugar.

WATERMELONS

Fusarium wilt-resistant Klondike-R7 and Peacock are the principal varieties grown in the El Paso Valley, and generally are preferred at Western markets. Other varieties which may be grown are Black Diamond (Florida Giant), wilt-resistant Dixie Queen and Kleckley's Sweet. Planting should be delayed until after the soil warms up in the spring, usually May 10 to 15. Earlier plantings often result in dwarfed plants and low yields. They should be planted in hills spaced 8 feet apart in 10-foot rows, and thinned to 2 plants per hill after the first true leaves appear.

A small irrigation furrow should be opened adjacent to the hills for watering and the furrow worked toward the center between the rows with each successive cultivation. It should be about 4 feet from the row by the time the vines have covered two-thirds of the bed. Watermelons have an extensive root system, and irrigations need not be heavy nor frequent; but the soil should be thoroughly watered to a depth of 2 to 4 feet prior to planting. Irrigations after melons begin to mature usually are not necessary and may even cause the melons to split.

Only loamy soils should be planted to watermelons since heavy soils seem to induce melon splitting. On soils of moderate to good fertility, 40 to 60 pounds of phosphoric acid should be applied at or before planting in bands beneath or near the rows. Four to 6 weeks after planting, it may be desirable to side-dress with 20 to 30 pounds of nitrogen. If there is doubt as to the fertility of the soil, half of the nitrogen should be applied with the phosphate at planting and half at the first bloom stage.

The most serious pests on watermelons (and cucurbits in general) are cucumber beetles, melon aphids, squash bugs and nematodes. Lindane dust (1½ percent gamma isomer of benzene hexachloride) is effective in controlling all of these except nematodes. Cucumber beetles usually appear when the plants are in the seedling stage but seldom cause serious injury after the plants begin to vine. Aphids (plant lice) seldom appear until after runners begin to form. Plants should be examined on the undersides of the leaves every few days for aphids. When injury appears, as evidenced by curled or wilted leaves, blow dust carefully so as to hit the undersides of the leaves as well as the tops. Squash bugs may appear any time during the season. They cause dwarfing and wilting of plants as they suck the juices from the leaves and stems. Squash bugs are controlled by dusting thoroughly, as for aphids. Nematodes inhabit the soil and can be controlled satisfactorily with methyl bromide, D-D or ethylene dibromide, but the chemical should be applied at least 2 weeks prior to planting.

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