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Production of Summer Squash On Phosphatic Clays Of Florida [1]

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INTRODUCTION

Summer squash is produced commercially in Florida and can be a valuable commodity, especially in the winter and early spring months. Squash is a fast-growing crop and produces income sooner than most vegetables. Based on cultural studies and economic analyses, summer squash might have potential as a vegetable commodity (especially in a double-cropping system) for the phosphatic clays. This guide outlines information for squash culture on phosphatic clay soils.

CULTIVARS

Summer squash generally include the yellow straightneck and crookneck types and the zucchini squashes. Before growing summer squash, check with the market to see which type will be most desirable. Yellow crookneck types are widely grown in southern Florida. For specific recommended cultivars, consult Circ. 530-C listed in the back of this publication. In studies at the Mined Lands Center, "Multipik" straightneck has performed well.

SOIL PREPARATION

Soil tillage is difficult in the clay, but is a key step in optimum vegetable production. Vegetables at the Mined Lands Center have benefitted from a cover crop of alfalfa prior to planting vegetables. The cover crop aids in dewatering the clay, adds organic matter to the clay, and provides nitrogen to the vegetable crop. Prior to planting the vegetable crop the soil should be plowed to bury any plant refuse and to start decomposition of the cover crop.

After plowing, the soil will require additional tillage or mellowing to fracture the clay clods and provide an adequate seed bed. If time permits, the soil can be prepared well ahead of planting time and left to mellow by action of rain and alternate wetting and drying of the clay. Work at the Mined Lands Center has shown that rough beds raised with bedding disks and left for several months mellowed well by planting time. To speed up the mellowing process, sprinkler irrigation is needed to provide timely water applications. Several wetting and drying cycles can produce beds ready to plant in 2 to 3 weeks.

If beds are prepared for immediate planting, then several passes with a rototiller or roterra will be

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needed to fracture the clods. One system that produces acceptable beds is to use two to three passes of a large bedding disk followed by two passes of a rototiller with tine speed set at 280 rpm.

Squash seed is large enough so that it can be planted in soil that is not as finely prepared as that needed for small-seed crops. In addition, squash can be seeded by mixing the seed with "plug-mix" (peat-vermiculite) and applied to the bed in hills with a plug-mix planter. Irrigation after seeding will help seal in the soil around the seed.

POLYETHYLENE MULCH

It is recommended that squash be produced on plastic-mulched beds. Beds six to eight inches high will facilitate water movement away from the crop during heavy rain. Plastic mulch helps keep the fruits from becoming soiled with clay which would necessitate careful washing. Mulch has other benefits such as reducing fertilizer losses, reducing weed problems (black mulch), and speeding up crop growth from warming of the soil.

FERTILIZER

Research at the Mined Lands Center has shown that the clay is very high in many nutrients, especially phosphorus, potassium, calcium and magnesium. Responses to fertilizer additions of these nutrients are not expected. Crops seeded or transplanted in cool soils might, however, respond to small amounts of fertilizer applied as a starter in a band.

The clay has a high pH value (7.5 to 8.0) which might affect micronutrient availability. However, the only micronutrient found to be in occasional deficient supply has been manganese. Since very little work with micronutrients has been conducted on the clays, it is suggested that 5 lbs manganese, 3 lbs copper, 3 lbs zinc, and 1.5 lbs boron be applied per acre for squash. Micronutrients would be most efficiently applied by banding in the bed. Where deficiencies persist, foliar sprays of the deficient nutrient might be needed.

Nitrogen is the nutrient needed in largest quantities on the clays. Studies at the Mined Lands Center have shown that squash nitrogen requirements are about 100 lbs per acre. When following alfalfa, a reduction in this rate might be possible. The nitrogen fertilizer should be incorporated in the bed during bedding operations. Where the beds have been rain mellowed, the nitrogen can be knifed into the bed to avoid disturbing the mellowed soil by tilling.

PLANTING

Squash can be direct-seeded or transplanted. Transplanting can produce slightly earlier yields and might be favored in winter months. Transplanting can be done mechanically through plastic mulch or done by hand.

Direct seeding can be done with vacuum seeders that place raw seed through the mulch. An alternate method is to use the "plug-mix" method.

Beds should be formed on 5-ft centers and be about 36 inches across the top to accommodate twin-rows of squash. Rows on the bed should be about 18 to 20 inches apart with 12 to 15 inches between plants in the rows. About 2 lbs of seed will be needed for one acre.

IRRIGATION

Irrigation requirements on the clays are much less than for the sandy soils. Successful crops have been produced at the Mined Lands Center with only irrigation for stand establishment.

Drip irrigation is a very excellent method for applying water (and fertilizer) to squash crops growing on plastic mulch. With drip irrigation, only the bed area is wetted in contrast to overhead sprinklers which wet the alleys as well. The wetting of the alleys makes it impossible to get equipment into the fields for spraying or harvesting.

Drip irrigation can be used to apply some or all of the nitrogen needs of the crop. Dividing the nitrogen fertilizer amounts into weekly additions of 8 to 10 lbs of nitrogen per acre is a good approach.

WEEDS

Weeds can be a problem in squash production, especially in the alleyways and spray roads. Mechanical cultivation is difficult in the clay,

especially in wet conditions. Herbicides are few and often must be supplemented by manual cultivation. For recommended chemicals, see the publication list at the end of this publication or consult the IFAS Weed Control Guide available in hard copy or via computer through the Extension Service.

INSECTS

Insects must be managed for successful squash crops. Major insect pests include pickle worm, vine borer, melon worm, leaf miners, aphids, cucumber beetles, squash bugs, and cutworms. Squash crops should be scouted regularly to determine levels of insects and to plan control measures. Recommendations for chemical control can be found in the Insect Control Guide.

DISEASES

Several serious diseases can damage squash crops including downy mildew, powdery mildew, and viruses. Diseases need to be carefully identified before the best control practices can be determined. Viruses are transmitted by aphids from weeds or from other virus-laden crops. Control of viruses by insect control is generally not feasible.

Diseases can be minimized by rotation, elimination of weed hosts, fungicide- treated seed, resistant cultivars, and fungicide sprays. Recommendations for fungicides can be found in the Disease Control Guide available in hard copy or via computer from the Extension Service.

POLLINATION

Fruit set on squash depends on adequate insect pollen vectors. The most efficient pollinating insect is the honey bee. At the onset of flowering, at least one active hive should be placed in the field for every 3 acres of squash. Place hives along the edge of the field in shaded areas.

When using bees, carefully select and apply insecticides so that bees will not be killed. Insecticides should be applied in the afternoon when squash blooms are closed and bees are not present.

HARVESTING

Summer squash is harvested at an immature stage of growth and is very perishable. Squash is harvested by hand when fruits are 4 to 6 inches in length, are shiny, and have soft, fleshy seeds. Squash are placed in picking containers and transferred to the packing shed or packed in the field. In either system, the squashes are washed to remove dirt. The washwater should contain about 75 parts per million of free chlorine to destroy decay-causing organisms.

Following washing, squashes are packed in waxed cartons or wire-bound crates. Packing squashes according to USDA grade standards provides a standard for buying and selling squash in the market.

Squash should be thoroughly cooled to maximize shelf-life of the fruit. For maximum shelf-life, fruits should be cooled to 40°F by hydrocooling or force-air cooling. Do not cool below 40°F since summer squash is susceptible to chilling injury.

ADDITIONAL LITERATURE

Hochmuth, G. J. 1988. Commercial vegetable fertilization guide. Univ. Fla. Coop. Ext. Circ. 225-C.

Hochmuth, G. J. 1988. Polyethylene mulching for early vegetable production in north Florida. Univ. Fla. Coop. Ext. Circ. 805.

Hochmuth, G. J., and Rick L. Mitchell. 1987. Double-cropping vegetables on polyethylene-mulched beds. Univ. Fla. Coop. Ext. Veg. Crops Ext. Report VEC 87-11.

Kovach, S. P. 1984. Injection of fertilizers into drip irrigation systems for vegetables. Univ. Fla. Coop. Ext. Circ. 606.

Maynard, D. N. 1987. Commercial vegetable cultivars for Florida. Univ. Fla. Coop. Ext.

Olson, S. M., and M. Sherman. 1988. Squash production in Florida. Univ. Fla. Coop. Ext. Circ. 103.

Stall, W. M. 1987. Weed control in Florida vegetables - Cucurbit crops. Univ. Fla. Coop. Ext. Misc. Pub. VEC-CU 1.87.