considered when deciding how many prunes to take for maximum market value.

Removal of 3 prunes produced the greatest total number of 13.61 kg cartons (Table 2) and increased the grade size so that this level of pruning produced the highest market value for both an average and a good season (Table 3). Removal of six prunes reduced total fruit production over no pruning but had higher market value because of the increased percentage of fruit in larger sizes (Table 1 and 2).

A question might be raised concerning the effects of supply control on the profitability of pruning. A market order that excluded 7 x 7's from being marketed would appear to give pruning an advantage. Less small fruit are produced from pruned plants, so a smaller percentage of the total yield would be discarded.

With both poor and good prices, taking three prunes was still the strategy that maximized market value. Even though taking no prunes was decidedly better than taking nine prunes without supply control, there was very little difference between the two strategies if the 7 x 7's were culled.

Literature Cited

1. Burgis, D. S. and Pat Crill. 1972. Pruning test comparison of tomato varieties Florida MH-1 and Walter. *Proc. Fla. State Hort. Soc.* 85:171-175.
2. Kelbert, David G. A. 1964. A comparison of "string-trellised" versus conventional tying methods for supporting staked tomato. *Proc. Fla. State Hort. Soc.* 77:120-122.
3. Personal communication to D. S. Burgis (unpublished) from West Coast growers and packing house operators during 1974 spring season.
4. Peters, J. S. 1973. A season of forlorn hopes. Annual Rept. of Fla. Tomato Committee, page 20.

THE ERADICATION OF TWO POTENTIALLY DANGEROUS RUSTS, PHYSOPELLA PALLESCENS AND P. ZEAE, FROM FLORIDA

C. P. SEYMOUR and J. W. MILLER

FDACS, Division of Plant Industry
Gainesville

Abstract. **A post-entry inspection by the Plant Quarantine Division, ARS, USDA of a research planting of teosinte,** Euchlaena perennis, **and** Tripsacum **spp. at Fairchild Tropical Garden Research Center, Miami, Florida in April 1970 revealed the presence of a foreign rust,** Physopella pallescens. **Subsequent surveys by personnel of the Plant Quarantine Division and the Division of Plant Industry, Florida Department of Agriculture and Consumer Services, revealed another rust,** Physopella zeae, **on** E. perrennis **in the same planting. Additional surveys of other known Tripsacum plantings indicated that the 2 rusts were restricted to the Fairchild plots. An emergency quarantine was implemented by state and federal agencies. Measures were then taken to eradicate this potential threat to Florida's 18-million-dollar corn industry as well as possibly to the sugarcane industry. As of October 1974, no rust has been observed and it appears that these 2 introduced rusts have been eradicated. However, strict surveillance is being maintained.**

In 1964, several species and various hybrids of *Tripsacum* along with *Euchlaena* spp. were introduced into the United States at the Waltham Field Station, University of Massachusetts. These plants were increased there and selected species were sent to Fairchild Tropical Garden Research Center, Miami, Florida, where a field planting was established. Genetic studies of these corn relatives were made in an attempt to find resistant genes to the Helminthosporium fungus, the cause of corn leaf blight. The planting in Fairchild Garden covered approximately 2 acres and had more than 600 clones of *Tripsacum* and *Euchlaena.* Sources for the 1964 introduction included Mexico, Venezuela, Colombia, Peru, Bolivia, and Brazil. Forty additional species of *Tripsacum* were imported from Mexico to Fairchild Garden in 1969 by Dr. L. F. Randolph, College of Agriculture, Cornell University.

All of these introductions were approved by the Plant Quarantine Division, ARS, USDA under Quarantine #37 which covers nursery stock. Either fumigation with methyl bromide or dipping with a pesticide or a combination of pesticides for surface

Contribution No. 386, Bureau of Plant Pathology.

disinfestation of plants for diseases, mites, and insects was necessary before release to the importer.

Plants introduced under this quarantine may be required to be fumigated or surface disinfested following examination. In a shipment of Tripsacum plants from Mexico in October 1969 a few leaf blades showed rust pustules. The rust-infected blades were removed and the plants were then dipped in captan and released to Dr. Randolph for movement to a glasshouse at Fairchild Garden by the Plant Quarantine Station in Miami. Plant Quarantine Division Plant Pathologist Frank Matthews was sent to Fairchild Garden in December 1969 to examine *Tripsacum* and *Euchlaena* clones that had been introduced into the United States from Mexico in 1964 and 1969. Rust was prevalent on susceptible clones throughout the planting. Matthews examined the rust and concluded that it resembled *Physopella pallescens* (Arthur) Cumm., a rust not known to exist in this country. Samples were forwarded to Mrs. Flora Pollack, Mycologist, National Fungus Collection, Beltsville, Maryland who confirmed Mr. Matthew's diagnosis. Additional rust-infected specimens were requested by Mrs. Pollack, who determined that some of the introduced clones were also infected with *Physopella zeae* (Mains) Cumm. and Ramachar, a second rust not known to exist in the United States.

A joint state and federal emergency quarantine was invoked by the Division of Plant Industry, Florida Department of Agriculture and Consumer Services and the Plant Protection Division, USDA on 2 April 1970 to prevent the spread of these 2 new rusts. The quarantine prevented the movement of all plants including potted nursery plants adjacent to the Tripsacum plots and dried herbarium material from the 8-acre Fairchild Tropical Garden Research Center. A thorough cooperative rust survey was initiated on 27 April 1970 which included Fairchild Garden Research Center and all known Tripsacum plantings in Florida. The plantings outside of the Research Center consisted of the 2 native species, *T. floridanum* Porter and *T. dactyloides* L. Neither of the 2 new rusts was found outside the Fairchild Tropical Garden Research Center. Additional control measures were taken to prevent the spread of these 2 rusts as follows: all tops were cut from Tripsacum and Euclaena clones and burned. The stumps of these clones and all nursery soil were then heavily sprayed with zineb to kill surface rust spores; the adjacent potted nursery plants and soil were also sprayed with the same fungicide. Rhizomes were taken from selected clones, dipped in zineb, potted, and placed in a plastic greenhouse. This spraying procedure was repeated at 2-week intervals until final fumigation of plots with methyl bromide at the rate of 1 lb/100 sq ft was completed. The herbarium material was also fumigated with methyl bromide.

Pathogenicity studies were initiated in a glasshouse at the USDA Plant Introduction Station in South Miami with the rust *Physopella pallescens* on the following hosts: *Tripsacum floridanum* and *T. dactyloides*, the 2 native species; *T. lanceolatum* X *T. dactyloides;* milo; field corn 'Florida 200'; sweet corn 'Silver Beauty'; 5 selections of sugarcane; *Euchlaena perennis* Hitch.; and *Tripsacum laxum* Nash. The last 2 hosts served as checks since they were found infected with this rust in the planting. *T. lanceolatum* and 3 other Tripsacum hybrids were also found infected in the nursery. Inoculum was gathered from naturally infected leaves by scraping the urediospores from the sori. The spores were then brushed onto the leaves using a wetted artist's brush and the plants were covered with polyethylene bags. The inoculated plants were placed in a mist chamber and the bags were removed after 48 hr. Plants brushed with water only served as controls. The pathogenicity tests were concluded by 1 July 1970 with none of the inoculated plants developing infection. Experimental conditions were less than ideal for this work. Very high levels of humidity and excessively high temperatures in the test chambers may have been the reason why no infection was obtained. The work was discontinued in order to keep risks of spread at a minimum. Similar inoculation studies at the Epiphytology Laboratory, USDA, ARS, Frederick, Maryland were also unsuccessful.

Because of the concern that *Physopella pallescens* or *P. zeae* might have persisted in a latent stage or have been re-introduced into this research planting, periodic inspection continued. On 5 April 1972, one of 40 clones from Cornell showed symptoms suggesting the presence of one of the introduced rusts. It was confirmed that the suspected rust was *Physopella pallescens.* The infected clone was removed on 10 April 1972, and burned. The area surrounding the affected plant was fumigated with methyl bromide at the rate of 2 lb/100 sq ft. All nursery plants in the environs were placed on a weekly spray schedule with zineb. No plants were permitted to be removed from the research block. This precautionary procedure was continued for a period of 1 year and re-evaluated. State and

federal regulatory authorities concluded that the research block was free of the introduced rust, but that a regular spray should be continued. As of October 1974, neither of the introduced rusts has been detected on additional clones in this research planting. They have presumably been eradicated from Florida, but continued, careful vigilance will be maintained on new introductions in this project.

TOMATO RESPONSE TO PLUG-MIX, MULCH AND IRRIGATION METHOD[1]

S. J. LOCASCIO

IFAS Vegetable Crops Department
Gainesville
and

J. MOSTELLA MYERS

IFAS Agricultural Engineering Department
Gainesville

Abstract. **During a relatively dry 1973 season, tomato seedling emergence was greatly enhanced by plug-mix seeding, polyethylene mulch and irrigation as compared with conventional seeding without mulch and irrigation. Yields from plug-mix seeded plots were 42% greater than from plots with conventional seeding. Mulch provided an 84% increase in fruit yields. Yields were increased over unirrigated plots 290% with overhead or trickle irrigation and 380% with trickle irrigation plus supplemental fertilizer. During the wetter 1974 season, seedling emergence was enhanced by plug-mix seeding but to a lesser degree than in 1973. Irrigation method and mulch had little influence on seedling emergence. Fruit yields were not influenced by plug-mix and only slightly by irrigation method. Mulching provided a significant yield increase over unmulched plots.**

Although polyethylene has been used for mulching strawberries for a number of years in Florida (3), only recently has its use on tomatoes become extensive. With the introduction of mulch for direct seeded tomatoes, seedling emergence problems have become a serious limitation to production. Hayslip (2) recently introduced the plug-mix technique of seeding tomatoes which has been very successful in providing reliable plant stands. The method consists of incorporating seed uniformity in a mixture of peat moss, vermiculite and fertilizer. Successful use of the plug-mix technique requires proper water management. Seedling emergence and subsequent crop growth can also be greatly influenced by application of water. Trickle irrigation provides a method of efficiently applying water under the mulch (4) and may provide further increases in seeding emergence and crop growth.

Experiments reported here were conducted to evaluate the response of direct-seeded tomatoes to the method of seeding, irrigation, mulching and fertilizer rate.

Experimental Procedure

'Walter' tomatoes *Lycopersicon esculentum* Mill., were grown in split-plot design experiments with three replications on a Kanapaha fine sandy soil at Gainesville during the spring of 1973 and 1974. Main plots were four irrigation treatments; (a) unirrigated, (b) overhead, (c) trickle, and (d) trickle plus supplemental fertilizer. Sub-plot treatments were mulches; (a) unmulched, and (b) mulched with 1.5 mil black polyethylene film. Sub-sub plots were 12 x 4 feet and were factorial combinations of two seedage methods; (a) seed alone, and (b) plug-mix, and two bedded fertilizer rates, (a) 2,000, and (b) 4,000 pounds per acre 6-8-8 containing 2 percent FTE 503. Beds were made 4-feet apart on April 11, 1973 and March 19, 1974. Fertilizer was applied broadcast and then beds were rototilled to incorporate the fertilizer. Mulch was applied immediately after rebedding. Tomato seed were planted on April 17, 1973 and March 20, 1974. The plug-mix treatment consisted of one bushel peat, one bushel vermiculite, 1 ounce tomato seed and eight quarts water. The mixture was applied with a hand applicator (2) at the rate of 1/4 cup per hill. Nutrients supplied as a supplement each week through the trickle irrigation

[1]Florida Agricultural Experiment Stations Journal Series No. 5632.