DEVELOPMENT OF A LOW INPUT, SUSTAINABLE PRODUCTION SYSTEM FOR FRESH MARKET VEGETABLES

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In 1994-95, Florida produced 19,600 ha of fresh market tomatoes using a production system consisting of raised, fumigated beds covered by low density polyethylene (LDPE) mulch. Since the 1970's methyl bromide plus chloropicrin has been the principal fumigant employed. High input costs and limited availability of land suitable for this production system impede the utilization of crop rotation practices which in turn have contributed to an increase of damaging levels of soilborne pests.

At the University of Florida, IFAS, North Florida Research and Education Center an alternative tomato production system consisting of strip tillage in rotation with pasture has been developed. This production system was designed with the multiple goals of reducing plant pests, minimizing disruption to the environment, conserving the cycling of water, nutrients and organic matter, reducing agricultural inputs and optimizing yields. Several weeks before planting, the pasture is mowed and a narrow strip is cultivated. Following transplanting, additional growth of the pasture is regulated through selective applications of herbicides and periodic mowing. In spring of 1995, a marketable yield of 25.1 mt/ha was obtained using this production system. For comparison, the statewide average for marketable yield was 32.3 mt/ha. Availability of phosphorus was hypothesized to be the limiting factor, due in part to competition with mycorrhizal fungi associated with the bahiagrass pasture. In spring of 1996, phosphorus rates were adjusted accordingly and a marketable yield of 42.0 tons/ha was obtained. When row spacing was decreased from 1.8 m to 1.2 m, a marketable yield of 86.2 tons/ha was obtained.

Minimum tillage in rotation with pasture provides many advantages over the raised bed, polyethylene mulch production system. Access to additional pasture permits the implementation of effective crop rotation practices. Rotation with pasture improves water infiltration, soil tilth, and organic matter and reduces the incidence of root-knot nematodes and soilborne diseases. Minimum tillage practices lower production costs associated with land preparation, reduce soil erosion, minimize injury to plants from blowing soil, eliminate soil compaction problems and provides a refuge for beneficial insects. Finally, savings of $1,250 to $1,500 per ha are obtained through the elimination of polyethylene mulch and methyl bromide.