

## Plasticulture Production Method for Specialty Vegetables

The ethnic and specialty vegetables and herbs investigated at the Central Maryland Research and Education Center, Upper Marlboro Facility 1999-2007 were species that typically are cultivated in the tropical regions of Africa, South America, India and the Caribbean. Hence, these vegetables thrive under hot growing conditions that occur in Maryland from the first week of June through the end of August, with the majority of mature fruit produced in the long hot days of July. This Maryland study has proven that the plasticulture techniques which utilize black plastic covered raised beds and trickle irrigation greatly enhanced production success for these specialty vegetables. With the utilization of plasticulture specialty vegetables and herbs may be successfully planted in mid-May to provide a range of harvest dates from Mid-June to September, as revealed for the twenty-seven vegetable species or varieties examined. Refer to the production report entitled: *Ethnic Vegetable Production Trials on a plasticulture System for the Development of an Ethnic Food Market in Southern Maryland*, (Myers and Tubene et al 2001).



Forming raised beds. Photo R. D. Myers

The plasticulture system approach requires a conventionally tilled field, that allows a bed maker to gather soil into a 6-8" raised bed that are 30" wide on 5' centers. Bed making and the laying of plastic may be combined in one pass when the desired height of the bed is not required to exceed 4 inches. However, it is recommended that for higher beds, make a pass to initially form the bed followed by a second pass to lay the plastic and install the trickle irrigation tube. The

raised plasticulture bed should be firmly crowned to shed water with a plastic to soil contact that is free of soil voids; Thus allowing solar heat to be effectively transferred to deeper reaches of the soil promoting faster and uniform early growth. Trickle irrigation systems require clean water that is filtered to avoid emitter plugging. Ponds or dedicated irrigation wells are required to irrigate fields that are larger than one acre in order to provide sufficient water volume. Trickle irrigation tubing is capable of high water volume delivery at a low operating pressure range from 6-12 pounds per square inch. For more information concerning the design and operation of trickle irrigation obtain a copy of the University of Maryland Extension Bulletin 356 *Trickle Irrigation for Cut Flowers, Vegetable, and Small Fruits*, (Ross 1997).



Laying plastic and trickle. Photo R. D. Myers

The plasticulture system should also incorporate an integrated pest management (IPM) system approach. For key pests IPM emphasizes the utilization of primary pest control tactics such as: selection for plant resistance; habitat alteration via cultural practices; direct mechanical pest intervention; and classical biological release or augmentation of beneficial organisms. When the combined primary tactics fail to keep a pest population below an economic injury level then a

prescriptive chemical application is warranted as a secondary pest control tactic. Pest management economic thresholds for insects and weeds are published for vegetables and field crops in the University of Maryland, *Pocket IPM Threshold Guide*, (Myers 2000).

Application of herbicides to the soil under the black plastic is not recommended for specialty vegetables. However, herbicides should be post directed to the soil between the plasticulture beds, applied after the plastic is laid and prior to transplanting the vegetables to reduce weed growth. Any herbicide on the plastic bed surface should be rinsed off by timely rainfall or overhead irrigation prior to transplanting.



Herbicide application between beds. R. D. Myers



University of Maryland greenhouse. R. D. Myers

Hardened transplants were produced for the study at the University of Maryland greenhouse. The process of growing hardened and conditioned transplants that are ready for field conditions is fully described in the following University of Maryland Fact Sheets: FS 551 Growing Vegetable Transplants, (McClurg 2001) and FS 552 Hardening Vegetable Transplants, (McClurg 2001).

Vegetable transplants may be planted by hand or with the aid of a water wheel transplanter. A water wheel transplanter punches the plastic, applies water and allows the placement of plants from a sitting position by the planting crew. At the time of planting water is essential for transplant survival. It is recommended that overhead irrigation be combined with trickle irrigation during the first week, especially when hot or windy weather prevails. The vegetables



Water wheel transplanter. R. D. Myers

require regular scouting for disease and insect presence during early establishment.

For detailed information concerning nutrient recommendations and the labeled herbicide, insecticide and fungicide options, obtain a copy of the University of Maryland Extension Bulletin 236: *Commercial Vegetable Production Recommendations*, (revised annually). The implementation of IPM practices during the University of Maryland research trials led to the achievement of project goals of highly marketable fruit, leafy greens and herbs. The research plots were also very aesthetic and would make an attractive addition as a market garden or U-pick when placed in proximity to on farm retail stands.



Specialty market garden. Photo R.D. Myers

This market garden approach may also be substantially augmented by utilizing season extension technologies. Plasticulture systems that utilize early spring and late fall in-field high tunnels and over-the-row low tunnels can significantly expand the market window. Growers in Southern Maryland have adopted these techniques readily and should be encouraged to always consider adding new vegetable and herb varieties.

For more information on season extension technologies obtain a copy of the University of Maryland Fact Sheet 760: *Extending the Production Season for Vegetables and Small Fruit*, (Butler and Ross 1999)



Low tunnels. Photo R. D. Myers



High tunnel. Photo R. D. Myers

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