EVALUATION AND MANIPULATION OF THE MAJOR ENVIRONMENTAL INFLUENCES IN TOMATO CULTIVATION DURING THE RAINY SEASON

By

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ABSTRACT

The conventional field vegetable cultivation in Sri Lanka is severely affected by excessive rain. Therefore, this study was conducted to identify the nature of rain damages of tomato and to examine the applicability of protected culture technology to overcome this problem. According to the survey, farmers in upcountry vegetable growing areas usually grow vegetables with high economic value. Adoption of recommended cultural practices and full-time farming were limited to areas with high crop productivity. Improper pest and disease control, post-harvest practices and marketing were the major factors that impede the income of farmers. The growth stages of vegetables upto fruit growth were susceptible to rain damages. The incidence of pest and diseases were the main cause of rain damages, and these were more sever in the upcountry than the midcountry.

In the second step, outdoor grown tomato was evaluated for the nature of rain damages. Based on the correlations of rainfall with growth and development of tomato positive effects of rainfall (under irrigation) during vegetative growth and mixed effects during reproductive development were evident. These effects were appeared to be caused by soil and climatic factors rather than pest and diseases. Late flowering and fruit ripening stages were identified critical with respect to yield while fruit growth and fruit ripening stages were identified critical with respect to fruit quality.

In the third step, growing tomato under protected culture and several improved technology under rainy conditions were examined during Yala in 1996. Protected (indoor) culture enhanced plant dry weight, flowering, fruit formation and locular material content, indicating the ability to protect plants from rain damages. Full covering (polythene house) appeared to be superior than partial covering (shed house) in terms of earliness of flowering and yield. However, the treatment effects were influenced by leaf curl virus and fruit rot diseases. The improved technology assured a greater field establishment, vegetative growth, reproductive development and fruit quality than the recommended technology.

In the fourth step, experiment 3 was repeated to examine the validity of results with respect to seasonal weather changes and pest & disease influences. The structural strength of the houses and improved technology were slightly modified. A prolonged dry period was prevailed beginning from the mid vegetative growth. In addition to the results of the third experiment, indoor culture showed a greater vegetative growth, flowering and marketable fruit number of tomato. The polythene house showed a more vigorous vegetative growth under rainy conditions but a lower growth and development during the dry period than the shed house.

Thus, indoor culture with the improved technology assured high growth and development of tomato under both rainy and dry conditions. The performances of tomato under two housing structures varied with the seasonal environmental changes.