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Factors Affecting the Early Production of Processing Tomatoes

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Abstract

A field experiment was conducted on the Karapoti brown sandy loam soil during the 1995-96 season on the Horticultural Field Plots at the Plant Growth Unit, Massey University. The objective of the research was to study the effect of black plastic mulch with fertigation and fabric row covers on crop growth, yield, quality and maturity of processing tomatoes (*Lycopersicon esculentum* Mill. cv. Cleo).

The rowcover (RC) treatment advanced by 2 days both the date of first flowering and 50% flower opening compared with no RC. There were no RC effects on growth during the first 8 weeks in the field. RC reduced the yield and number of factory grade fruit at optimum harvest. Thus the treatment was detrimental. These results suggested that the use of floating covers during early summer in New Zealand will cause fruit setting to be reduced by high temperatures ($>30^{\circ}\text{C}$). Bad weather delayed planting and resulted in relatively short use of the RC. If planting had taken place three weeks earlier, as planned, then RC may have improved earliness and not had a detrimental effect on yield. These results confirmed that the timing of rowcover application is critical for its successful use.

The nutrient concentrations in leaves of mulched plants maintained higher levels of N P K during establishment. During the period of the fruit swelling (28-91 days after transplanting) the nutrient levels in the leaves fell markedly. The leaf analysis data in this experiment suggests that N and P had an important role in improving early growth and fruit set and as a result increased fruit number and yield.

The results of this study showed that black plastic mulch plus fertigation provided for improvements in the early growth (relative growth rate) and development (number of flower clusters) and yield of total, red and factory grade fruit for the processing tomato cv Cleo. The optimum harvest time occurred 114 days after transplanting. Fertigation made a major contribution to the increase in yield. With cultivar Cleo the number and yield of factory grade and red fruit followed a normal distribution curve. This showed that advancing or delaying harvest by one week significantly reduced yield and it is suggested that the timing of harvest of processing tomatoes is more crucial than is commonly believed. A technique to predict the optimum harvest date for processing tomatoes should be developed.

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