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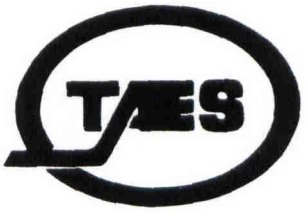

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THE TEXAS AGRICULTURAL EXPERIMENT STATION / Neville P. Clarke, Director / The Texas A&M University System / College Station, Texas

THE USE OF PERFORATED PLASTIC ROW COVERS FOR WIND PROTECTION IN EARLY SPRING TRANSPLANTED TOMATOES

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INTRODUCTION

Wind is a major factor in plant damage of early spring transplanted tomato plants in East Texas. It has been shown that yield and quality of tomatoes and beans are significantly reduced when exposed to excessive wind. In East Texas the maximum wind velocity per day increases from October to March then begins to decline (Fig. 1). Mean temperatures during the months of March and April are not normally detrimental to plant growth. Research workers found that dry weight and net photosynthetic rates were reduced in tomatoes when exposed to winds of 30 mi/hr for 10 and 20 minutes and wind plus sand for 10 and 20 minutes. Paterson and Earhart found in their study that a strip of roofing felt as protection at the base of wire cages resulted in a 46 percent decrease in loss of tomato plant stand due to wind. As early as 1956 it was demonstrated that plastic row covers could be used for producing early vegetables. Extensive work in California with polyethylene tubes and perforated and non-perforated plastic row covers also demonstrated that early quality production could be achieved.

This study reports the effects of perforated plastic row covers on plant stand, early and late production, and total yield of early spring transplanted tomatoes.

METHODS AND MATERIALS

Floramerica tomato plants were started in the greenhouse then transplanted to the field on 15 March 1984 in a randomized block design with 3 replications. The rows were in a north-south orientation. The plots were fertilized with 800 lb/A of 12-12-12 fertilizer applied in a double band beneath the row. Plants were set 18 in. apart in the row and 48 in. between rows. The plots were separated with a 64 in. alley. Dacthal 75 WP was applied at the rate of 14 lbs per acre for weed control. Nine gauge wire hoops, 70 in. long were placed 96 in. apart and pushed into the ground. Wooden

stakes 72 in. long were driven into the ground 12 in. deep and spaced 48 in. apart. Steel "T" posts were driven into the ground at each end of the plots. To these posts 16 gauge wire was attached and stretched 22 in. above the ground. Every 96 in. the hoops and wire were secured to the wooden stakes with twist ties. Clear, perforated, 2 mil plastic, 36 in. wide was placed on each side of the plots. This was done by digging a furrow along both sides and placing the edge of the plastic in the furrow and covering with soil. The two plastic sheets were brought up to the wire and overlapped. They were attached to the wire by large-spring wooden clothespins. One plot in each block was not covered and was used as a control treatment. To determine the effect of wind on growth and yield, the plastic covering was removed on one plot in each block on 12 April and then on all plots on 26 April.

All plants received normal cultural practices throughout the growing season. All plants were pruned and trained. All plots in the study had 3 early and 3 late harvests. The results were analyzed by analysis of variance procedures.

RESULTS AND DISCUSSION

Plant stand was affected by removal date of the plastic row cover (Fig. 2). On 2 April the check plots showed a 13% reduction in plant stand when compared to covered plots. A significant decrease in plant stand was observed on 16 April between those plots with the row covers remaining and those which were removed on 12 April (24%) and the control (30%). There was a 6% difference between 12 April removal and the control. When the remaining covers were removed on 26 April, significant differences were again observed on 30 April between the 12 April removal (26%) and the control (32%). Again, there was no significant difference in plant stand between the 12 April removal and the check (6%).

The date of cover removal also had an effect on early (June 1-14), late (June 20-July 10), and total yield of early spring-planted tomatoes (Fig. 3). Early yields were significantly increased by 20 cwt/ac when the cover was left in place till 26 April vs. the 12 April removal date, and by 45 cwt/ac when compared with the control.

There were no differences between the 12 April removal date and the control. This trend was also observed for late yields with yield differences of 76 and 106 cwt/ac for 12 April removal and the control, respectively. A highly significant difference of 95 cwt/ac was observed for total yield between the 26 and 12 April removal date and 156 cwt/ac when compared to the control.

CONCLUSION

It was found in this test that wind protection is essential in the early part of the growing season in East Texas to reduce plant damage and increase yields of tomatoes.

Further work in this area will include other vegetables besides tomatoes, and the uses of mulches, trickle irrigation, and fertigation.

ACKNOWLEDGMENTS

Appreciation is expressed to Harold Berg of the Monsanto Corporation for the plastic film and to Bernarr Hall, Professor Emeritus of the University of California, for his advice in this experiment.

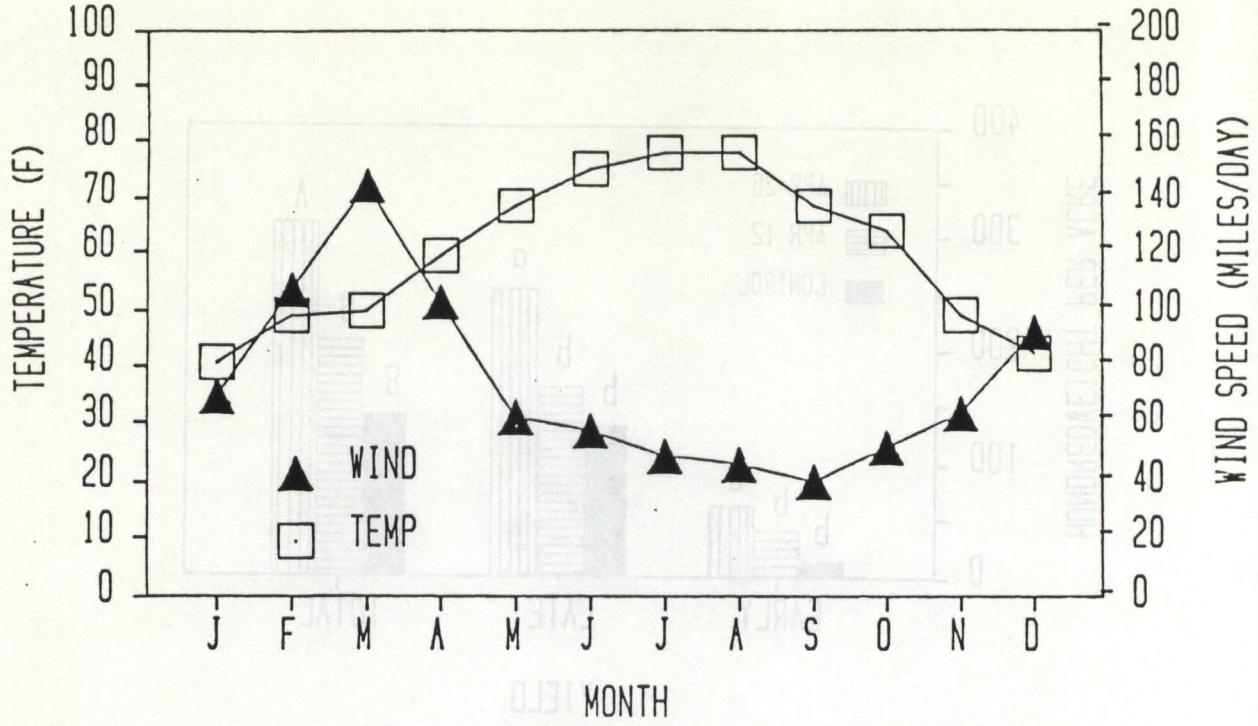

Fig. 1. Mean temperature and wind speed over a 14 year period at the Texas Agricultural Experiment Station, Overton.

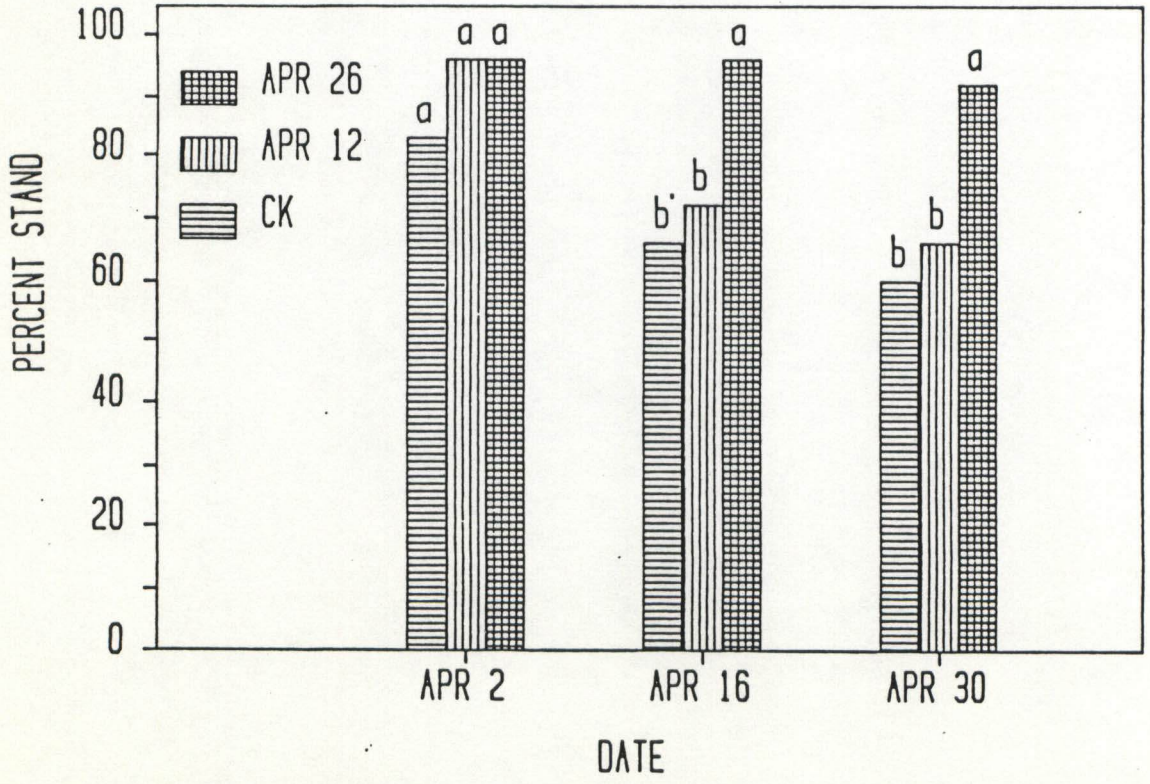

Fig. 2. Effect of cover removal on plant stand of early spring planted tomatoes at 3 dates during April. Mean separation by Duncan's Multiple Range Test, .05 level.

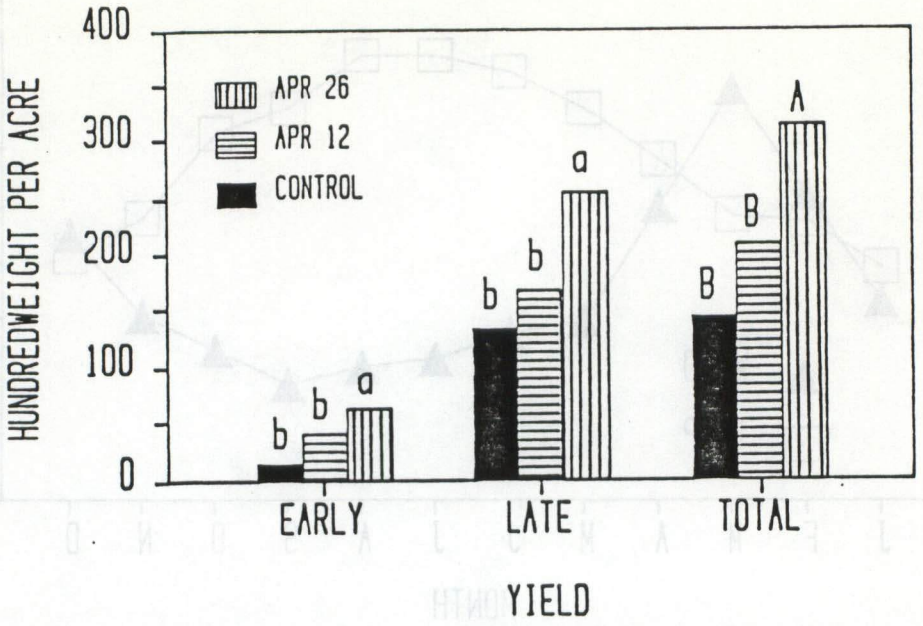

Fig. 3. Effect of cover removal on early, late, and total yield of early spring planted tomatoes. Mean separation by Duncan's Multiple Range Test, 1% (upper case), 5% (lower case).