UNIVERSITY OF SASKATCHEWAN

VEGETABLE CULTIVAR AND CULTURAL TRIALS 2001

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Plant Growth Control by Photoselective Filters

Many warm season vegetable crops benefit from the cover provided by low tunnels. The period that plants can be left in this protected environment is limited - as the plants quickly outgrow the available space. Recently, photoselective filters have been developed that alter the ratio of red to far-red light in incoming sunlight. Plants grown under this filtered light are short and robust - making them ideally suited for a confined growing environment. We conducted trials from 1999-2001 to determine if growing crops under row covers constructed of a photoselective type of polyethylene would produce a more compact growth habit - allowing the covers to be maintained over the crop for extended periods.

In 2000, Melons (cv Earligold) were transplanted into rows of IRT mulch in early June. At transplanting, sections of each row were covered with tunnels constructed of either standard perforated clear polyethylene or photoselective filter (Photomorphogenesis Control Film - YXE10 Mitsui Chemicals Inc.). The tunnels were supported above the crop using wire hoops. The ends of the tunnels were closed.

The period after transplanting was very warm and the plants in the both treatment suffered severe heat stress. The plants under the photoselective tunnels were particularly hard hit as this material was not perforated - resulting in extremely high temperatures in the tunnels. Due to this crop damage, this trial was terminated and the crop was replanted in late July. The lateness of the season was not relevant as the objective was to evaluate early crop growth. The ends of the tunnels were kept open in this trial to prevent overheating. At seven weeks after transplanting, five plants from each treatment plot were harvested and measured for vine length and fresh weight. The plants were just beginning to set fruit at this point.

In the 2000 trial, melon vines grown inside wavelength selective tunnels were longer and weighed less than those produced in the standard perforated poly tunnel. The changes in crop development caused by the photoselective cover in the 2000 trial were not desirable from the perspective of controlling elongation while maintaining crop health. As the wavelength selective covering was not perforated, it is possible that the results in 2000 were related to overheating.

In the 2001 trial, melons (cv. Earligold) and peppers (cv. Legionnaire) were transplanted into black mulch in early June. At transplanting, sections of each crop row were covered with tunnels constructed of either non-perforated clear polyethylene or photoselective filter The tunnels were supported above the crop using wire hoops. The ends of the tunnels were closed.. The covers were removed in mid-July at which time three plants from each treatment replicate were measured and weighed. The trial continued until the first frost at which at time the fruit were counted and weighed.

Results

Using wavelength selective plastics as row cover materials provided no appreciable benefits in terms of altering plant growth or enhancing yields. The changes in crop morphology were largely negative and could be attributed to the wavelength selective films producing a hotter and more shaded environment than standard plastics.

	Vine length (cm)	Vine Weight (g)	Specific weight (g/cm)
Standard poly	91	0.78	0.86
Photoselective	101	0.49	0.48

Table 1. Comparison of plant growth 7 weeks after transplanting for Earligold melons grown using wavelength selective or non-perforated clear polyethylene row covers. **2000 trial.**

	Vine length (cm)	Vine Weight (g)	Fruit Yield (kg/plant)
Standard poly	69	357	4.8
Photoselective	56	177	3.9

Table 2. Comparison of plant growth 6 weeks after transplanting and final fruit yields for Earligold melons grown using wavelength selective or non-perforated clear polyethylene row covers. **2001 trial**.

	Plant height (cm)	Plant Weight (g)	Fruit Yield (kg/plant)
Standard poly	62	310	1.36
Photoselective	65	260	1.35

Table 3. Comparison of plant growth 8 weeks after transplanting and final fruit yields for Legionnaire peppers grown using wavelength selective or non-perforated clear polyethylene row covers. **2001 trial**.