Planting Date and Rowcover Interactions in Broccoli Production in Cold Climates

M.P. Westcott, N.W. Callan, and M.L. Knox

Western Agricultural Research Center, Montana Agricultural Experiment Station, Montana State University, 580 Quast Lane, Corvallis, MT 59828

Additional index words. *Brassica oleracea Italica* Group, spunbonded polyester, netted polypropylene/polyamide, earliness, yield

Spring production of broccoli in western Montana is constrained by low early season temperatures. The crop is not normally transplanted to the field until early May, at which time soils average 16C at 0.1 m. Methods that would enable earlier transplanting could extend the harvest season. Rowcover materials may provide this opportunity through temperature moderation, protection from light frosts, and reduced insect damage (Wells and Loy, 1985), although research on applications to cool-season vegetables has been limited to bunching onions (Mansour and Hemphill, 1987) and seed broccoli (MacFarlane Smith and Newbould, 1988). The objective of this study was to assess possible benefits of floating rowcovers to the production of broccoli cultivars differing in maturity date when planted at standard and early dates in the spring.

Split-plot factorial experiments in a randomized complete-block design with six replications were conducted in 1988 and 1989 on a Burntfork sandy loam soil. Main-plot rowcover treatments consisted of control (no cover), spunbonded polyester (SBP, 20 g·m⁻²), and netted polypropylene/polyamide (NPP, 17 g·m⁻²). Main plots were two rows 0.46 m apart, each row containing eight plants at a spacing of 0.30 m. Single rows in each main plot were subplots of 'Packman' and 'Prominence'. This design was repeated each year in adjacent areas to attain early (13 Apr. 1988 and 18 Apr. 1989) and standard (9 May 1988 and 5 May 1989) transplanting dates.

The experimental plots were fertilized with N, P, and K at 112, 50, and 140 kg·ha⁻¹, respectively. Rowcovers were loosely draped over 6-week-old transplants, anchored in the soil at the edges, and left in place until the first harvest date for each plot. The top 15 cm of the inflorescence and main stem of the middle six plants in each subplot was harvested and weighed at maturity.

With the early transplanting dates (Table 1), both rowcover materials consistently pro-

moted earlier harvest and increased total yields in comparison to the control across cultivars and years. Significant rowcover × cultivar interactions with the first one or two harvest dates each year reflect the earlier maturity of 'Packman'. While yields tended to be higher with SBP than with NPP, these effects were not statistically significant.

Following standard transplanting dates (Table 2), both rowcovers promoted earliness of harvest compared to the control, as evidenced by significant rowcover effects at the first or second harvest dates. This occurred during both years of the experiment.

However, total cumulative yields were not affected by rowcovers or cultivar. Interactions between cultivar and rowcover treatments again reflect earlier harvests of 'Packman'.

The SBP and NPP rowcovers promoted earlier harvest and higher yields of broccoli planted 2 to 3 weeks before the standard early May transplanting dates. These effects were most consistent with SBP and likely reflect temperature modifications. At standard transplanting dates, the rowcovers promoted earliness but did not increase total yields over the uncovered treatment. Rowcovers, particularly SBP, are an effective tool for roadside growers wishing to reach market and attract customers earlier by planting broccoli earlier in the spring.

Literature Cited

- MacFarlane Smith, W.H. and D.C. Newbould. 1988. The effect of covering material and nitrogen application on seed yield and quality of *Brassica* multiplications in seed production tunnels. Seed Sci. & Technol. 16:445-455.
Mansour, N.S. and D.D. Hemphill, Jr. 1987. Bunching onion response to three floating row covers. HortScience 22:318-319.
Wells, O.S. and J.B. Loy. 1985. Intensive vegetable production with row covers. HortScience 20:822-826.

Table 1. Rowcover effects on cumulative yields and mean head weights of two broccoli cultivars transplanted 13 Apr. 1988 and 18 Apr. 1989.

Cultivar	Rowcover	Cumulative yield (g·m ⁻²)							
		Harvest date, June 1988			Harvest date, June 1989				
		7	10	15	7	20	13	23	
Packman	Control	52	281	281	0	64	371	371	
	NPP	358	427	427	42	265	553	553	
	SBP	447	507	507	189	431	634	634	
Prominence	Control	44	164	272	0	0	63	315	
	NPP	0	314	386	0	0	310	682	
	SBP	88	407	494	0	0	355	707	
Mean	Control	48	223	277	0	32	217	343	
	NPP	179	371	407	21	133	432	618	
	SBP	268	457	501	95	216	495	671	
LSD _{0.05} Cultivar (C)		72	66	NS	52	87	103	NS	
LSD _{0.05} Rowcover (RC)		105	107	119	57	126	127	147	
LSD _{0.05} C × RC		124	NS	NS	90	150	NS	NS	

Table 2. Rowcover effects on cumulative yields and mean head weights of two broccoli cultivars transplanted 9 May 1988 and 5 May 1989.

Cultivar	Rowcover	Cumulative yield (g·m ⁻²)						
		Harvest date, 1988				Harvest date, 1989		
		29 June	8 July	14 July	20 July	26 June	30 June	5 July
Packman	Control	0	212	605	668	215	686	686
	NPP	225	625	649	698	416	604	604
	SBP	187	543	649	681	647	647	647
Prominence	Control	0	80	506	883	0	259	556
	NPP	0	280	569	1016	0	640	640
	SBP	22	296	515	886	0	657	657
Mean	Control	0	146	557	776	108	473	621
	NPP	113	453	609	857	208	622	622
	SBP	105	420	582	784	324	652	652
LSD _{0.05} Cultivar (C)		97	133	NS	NS	130	70	NS
LSD _{0.05} Rowcover (RC)		NS	205	NS	NS	164	161	NS
LSD _{0.05} C × RC		NS	NS	NS	NS	225	121	NS

Received for publication 27 Aug. 1990. Montana Agricultural Experiment Station Journal no. J-2406. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.