

## COVER CROP SEEDING DATES

Stephen J. Herbert, Gerald V. Litchfield and Lui Zhi-yi  
 Department of Plant and Soil Sciences  
 University of Massachusetts

Cover crops help reduce the erosive forces of water and wind by means of the canopy of leaves intercepting rain and acting as small wind breaks. Their root systems further stabilize the soil, reducing erosion.

Seeding dates of four cover crops were evaluated during 1981-82 and 1982-83. These crops were Aroostook, a new release of winter rye selected as a cover crop by the Soil Conservation Service for greater growth during cool temperatures, Balbo rye, Ticonderoga winter wheat and Garry oat. Winter wheat has been used as a cover crop but oat is not normally grown because of its lack of winter survival, although it is known for its rapid growth until it is killed by frost.

Average minimum and maximum temperatures for September, October and November are shown in Table 1. Autumn temperatures in 1981 were below average while in 1982 they were above average.

Table 1. Average monthly temperatures ( $^{\circ}$ F) in Amherst, Massachusetts.

Month	1981 Temperatures		1982 Temperatures		Normal	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
September	50.9	70.7	52.0	74.3	50.4	74.1
October	37.6	58.6	38.8	63.3	40.3	63.3
November	33.1	48.2	35.4	53.1	32.2	48.7

Table 2 presents the visual rating for cover in both years and is the mean of four ratings for the 1981 cover crops and three ratings for 1982. As cover crops, each species only provided near adequate cover from the earliest seeding on August 27 in 1981 and August 24 in 1982. The warmer autumn temperatures in 1982 (Table 1) did allow sufficient early growth before freezing in the ryes and oat from the September 24 seeding, to provide more than 50% cover when the crops were rated December 29, 1982. In 1981 the September 24 seeding provided less than 30% cover irrespective of crop and some of this cover was only provided during the latter part of April 1982. The October 22 and 24 seedings both years provided less than 10-15% cover and these were entirely unsuitable.

Dry matter yields for spring sampling dates of the 1981-82 cover crops are shown in Table 3 and accumulations for the 1982-83 cover crops are shown in Table 4. There were marked differences in terms of dry matter produced among the cover crops and the seeding dates in both years. Dry matter accumulation was greatest in the earlier seeded crops for all species. Garry oat was completely killed by frost in the autumn but measurable dry matter did accumulate on the earliest seeding date in 1981-82 and the first and second plantings in 1982-83. The last seeding in all cover crops had only one leaf emerged in the first year before being frosted or covered by snow. In 1982-83 three leaves had developed by December 27.

Table 2. Ground cover ratings April 12 1982 for 1981-82 and December 29 1982 for 1982-83 cover crops.

Seeding Date	Cover Crop Rating†			
	Aroostook Rye	Balbo Rye	Ticonderoga Wheat	Garry Oat
Aug. 27, 1981	4.6§	4.4	4.2	3.4
Sept. 24, 1981	2.8	2.7	2.1	2.5
Oct. 22, 1981	1.3	1.1	1.3	0.9
Aug. 24, 1982	4.7	4.8	4.4	4.8
Sept. 24, 1982	4.3	3.4	2.8	3.0
Oct. 25, 1982	1.0	1.0	0.8	0.7

† 0 = no cover; 3 = 40-55% cover; 5 = 90% cover.

§ LSD 1981 = 0.49; 1982 = 0.55

Table 3. Cover crop dry matter production for 1981-82.

Harvest Date 1982	Seeding Date 1981	Cover Crop Dry Matter Production			
		Aroostook Rye	Balbo Rye	Ticonderoga Wheat	Garry Oat
		$\text{g/m}^2$			
April 30	Aug. 27	214†	133	101	108
	Sept. 24	119	82	46	-
	Oct. 22	22	24	17	-
May 18	Aug. 27	724	603	346	105
	Sept. 24	579	519	203	-
	Oct. 22	213	142	79	-

† LSD April 30 harvest = 48.2; May 18 harvest = 83.6.



Table 4. Cover crop dry matter production for the autumn of 1982.

Harvest Date 1982	Seeding Date 1981	Cover Crop Dry Matter Production			
		Aroostook Rye	Balbo Rye	Ticonderoga	Garry Oat
		g/m <sup>2</sup>			
Sept. 28	Aug. 24	96†	160	89	126
Nov. 2	Aug. 24	179	240	217	342
	Sept. 24	52	43	30	50
Dec. 27	Aug. 24	231	224	210	290
	Sept. 24	183	165	73	91
	Oct. 25	8	5	8	11

+ LSD for harvests Sept. 28 = 5; Nov. 2 = 53; Dec. 27 = 57

Aroostook rye appeared to have a small growth advantage over the commonly grown Balbo rye in 1981-82 (Table 3) but this was not evident up to the last sampling date (December 27) in 1982-83 (Table 4). Also the growth advantage of Aroostook rye over Balbo rye in 1981-82 was small compared to Ticonderoga winter wheat which accumulated less than 50% of the dry matter of the ryes and compared to the negligible oat dry matter accumulation. Before freezing in the fall of 1982 the Garry oat had accumulated more dry matter than any other cover crop at the same date (Table 4).

The results of this two year study clearly show that early seeding is essential for the establishment of sufficient protective cover. In most years a September 25 seeding date if used as the last date for seeding in cost-share programs in Massachusetts is not likely to provide sufficient cover to warrant the participation of both the farmer and the Federal Agency. The environment in Amherst, where the experiments were established, normally has autumn growing conditions as favorable or more so than most of Massachusetts, except the east and southeast coasts. Increasing the seeding rate above 100 lb/ac, the normally accepted seeding rate, would help compensate for later seeding by increasing cover but this would also increase the cost of the practice. Clearly, farmers should look for ways to establish cover crops early. This may involve combining cover crop establishment with corn chopping, or leaving some time each day during corn harvest for cover crop establishment. Farmers should also give thought to harvesting the corn and getting cover crops established first on the steepest fields and those most prone to erosion.