### INFLUENCE OF PLANTING DATE AND HARVEST DATE ON COVER CROP PERFORMANCE IN A CORN PRODUCTION SYSTEM

H.J. Mascagni, Jr. and D.R. Burns<sup>1</sup>

#### INTRODUCTION

White the provided state of the second state o

Optimal planting dates for corn in northern Louisiana range from mid-March to early April (Mascagni and Boquet, 1996). Thus, the ideal time for cover crop termination would be mid-February to mid-March. Biomass produced between planting and termination determines a cover crop's effectiveness. The more dry matter produced, the greater the benefits from soil erosion control, improved soil properties and N contribution from leguminous-type cover crops. The objective of this study was to determine the influence of cover crop planting date and termination date (harvest date) on dry weight for several winter cover crops that may be used in a corn production system.

#### **MATERIALS AND METHODS**

Field experiments were conducted in 1995/1996 and 1996/1997 on a Sharkey clay (very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts) at the Northeast Research Station near St. Joseph, Louisiana, and on a Gigger silt loam (fine-silty, mixed, thermic Typic Fragiudalf) at the Macon Ridge Research Station at Winnsboro, Louisiana, to evaluate the influence of planting date and termination date (harvest date) on dry weight and N content of several winter cover crops that may be used in a corn production system. Cover crops evaluated were crimson clover ('Robin' and 'Dixie') (*Trifolium incarnatum* L.), berseem clover ('Bigbee') (*Trifolium alexandrinum* L.), Austrian winter pea (*Dolichos lignosus* L.), winter wheat ('Buckshot 2368') (*Triticum aestivum* L.) and native vegetation (only in 1997). Cover crop planting dates at St. Joseph were 18 October and 15 November in 1995 and 7 October, 4 November and 11 December in 1996. Planting dates at Winnsboro were 20 October and 15 November in 1995 and 3 October, 1 November and 21 November in 1996.

Experimental design was a randomized complete block with four replications. Cover crop treatments were harvested 4 March and 1 April at both locations in 1996 and 18 March and 9 April at St. Joseph and 18 March and 10 April at Winnsboro in 1997. Total above-ground plant matter was collected from separate areas within each plot for each harvest date. Sampling area was 1 m<sup>2</sup> for each harvest date. Plant tissue was dried at 70 C, ground, and analyzed for total N. Analyses of variance of dry weight data were conducted using GLM procedures of SAS. The LSD (P  $\leq$  0.05) was calculated for mean separation.

#### **RESULTS AND DISCUSSION**

#### St. Joseph

Each year, only the October planting date survived the winter with adequate stands on the Sharkey clay soil. In 1996, cover crop dry weight for the 4 March harvest date ranged from 537 lb/acre for Dixie crimson clover to 2497 lb/acre for Austrian winter peas (Table 1). Total N in harvested plant parts ranged from 15 lb N/acre for Dixie crimson clover to 118 lb N/acre for Austrian winter peas. Dry weight increased for each cover crop, except winter wheat, as planting date was delayed.

There were fewer differences for dry weight among cover crops in 1997. Dry weight ranged from 641 lb/acre for native vegetation to 2227 lb/acre for Austrian winter peas (Table 2). Dixie crimson clover, berseem clover, Austrian winter peas and winter wheat had similar dry weights. Dry weight at the 10 April harvest date increased for each cover crop, except Austrian winter peas.

#### Winnsboro

In 1996, only the 20 October planting date survived the winter with an adequate stand. Dry weight for the 4 March harvest date ranged from 854 lb/acre for berseem clover to 1818 lb/acre for Austrian winter peas (Table 3). Total N in harvested plant parts ranged from 30 lb N/acre for winter wheat to 67 lb N/acre for Austrian winter pea. Dry weight at the second harvest date increased for each cover crop, except for winter wheat.

<sup>&</sup>lt;sup>1</sup>Louisiana State University Agricultural Center, Northeast Louisiana Station, St. Joseph, LA.

The 3 October and 1 November planting dates in 1997 had adequate stands; however, the 21 November planting date did not survive the winter in 1997. Highest cover crop dry weight occurred at the 3 October planting date (Table 4). Both crimson clovers, Austrian winter peas and winter wheat had similar dry weights for each planting date. Each crimson clover doubled in dry weight as harvest date was delayed, probably accounting for the significant cover crop x harvest date interaction.

#### SUMMARY

In summary, cover crops should be planted in north Louisiana no later than October, particularly on the poorly drained clay soils, for maximum biomass production. On the clay soil at St. Joseph, Austrian winter peas had the most consistent performance for biomass production. Crimson clover, Austrian winter peas and winter wheat had the highest dry weight on the loessial silt loam of the Macon Ridge. Austrian winter peas had the highest N content of the four legume cover crops evaluated. Total N in harvested plant parts indicates that Austrain winter peas > crimson clover > berseem clover > wheat in providing N for subsequent crops.

#### LITERATURE CITED

- Mascagni, H.J., Jr., and D.R. Boquet. 1996. Starter fertilizer and planting date effects on corn rotated with cotton. Agron. J. 88:975-982.
- Torrey, K.D. 1992. Influence of conservation tillage and winter cover crops on cutworm management strategies in corn. M.S. thesis, Louisiana Tech University, Ruston.

Table 1. Influence of two harvest dates on dry weight, nitrogen (N) content and N in harvested plant parts of five cover crops (planted 18 October 1995) on Sharkey clay at St. Joseph, Louisiana in 1996.

		March 4			April 1	
Cover Crop	Dry wt.	Ν	N content	Dry wt.	N	N content
	lb/acre	%	lb N/acre	lb/acre	%	lb N/acre
Crimson Clover ('Robin')	544	3.43	18.8	2331	2.19	50.0
Crimson Clover ('Dixie')	537	2.49	14.7	1771	2.52	47.3
Berseem Clover	806	4.17	33.6	2181	3.20	69.5
Austrian Winter Peas	2497	4.68	117.9	3300	2.79	89.4
Wheat	1305	1.78	23.2	1232	1.34	16.4
LSD (0.05)	229	0.74	21.4	1108	0.69	25.7

## Table 2. Influence of two harvest dates on dry weight of six cover crops (planted 7 October 1996)

on Sharkey clay at St. Joseph, Louisiana in 1997.				
Cover Crop	March 18	April 10		
	dry weight, lb/acre			
Crimson Clover ('Robin')	1434	4393		
Crimson Clover ('Dixie')	1850	3901		
Berseem Clover	2226	4140		
Austrian Winter Peas	2227	2202		
Wheat	2004	2509		
Native Vegetation	641	1534		
LSD (0.05)	521	1106		

## Table 3. Influence of two harvest dates on dry weight, nitrogen (N) concentration, and N in harvested plant parts of five cover crops (planted 20 October 1995) on Gigger silt loam at Winnsboro, Louisiana, in 1996.

Cover Crop	4 March			1 April		
	Dry wt.	N	N content	Dry wt.	N	N content
	lb/acre	%	lb N/acre	lb/acre	%	lb N/acre
Crimson Clover ('Robin')	1596	3.71	59.0	2199	3.50	77.5
Crimson Clover ('Dixie')	1489	3.44	51.2	2619	3.67	95.7
Berseem Clover	854	2.98	25.7	1284	3.32	42.2
Austrian Winter Peas	1816	3.75	66.8	2444	3.59	87.7
Wheat	1382	2.19	30.2	1215	2.29	26.9
LSD (0.05)	307	0.68	10.2	562	0.79	18.7

	Harve			
Cover Crop	18 March 10 April		Average	
	dry weight, lb/acre			
Planting Date - October 3				
Crimson Clover ('Robin')	3004	6608	4806	
Crimson Clover ('Dixie')	2819	7885	5352	
Berseem Clover	1640	3071	2356	
Austrian Winter Peas	2771	4382	3577	
Wheat	2841	3585	3213	
Native Vegetation	734	961	848	
Average	2302	4415	3359	
Planting Date - November 1				
Crimson Clover ('Robin')	1861	6474	4168	
Crimson Clover ('Dixie')	2118	3605	2862	
Berseem Clover	861	3231	2046	
Austrian Winter Peas	1818	3439	2629	
Wheat	1914	2155	2035	
Native Vegetation	296	1489	893	
Average	1478	3399	2439	
Planting Date - Average				
Crimson Clover ('Robin')	2433	6541	4487	
Crimson Clover ('Dixie')	2469	5745	4107	
Berseem Clover	1251	3151	2201	
Austrian Winter Peas	2295	3911	3103	
Wheat	2378	2870	2624	
Native Vegetation	515	1225	870	
LSD (0.05):				
Planting Date (PD)	49	92		
Cover Crop (CC)	85	52		
Harvest Date (HD)	49	92		
CC X HD `´	120	06		

# Table 4. Influence of two planting dates and harvest dates on<br/>dry weight of six cover crops (planted 1996) on Gigger silt<br/>loam at Winnsboro, Louisiana, in 1997.