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Field Crops
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Aerial Seeding of Wheat

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Aerial seeding of winter wheat into soybeans just prior to soybean leaf drop is a practice that has been used in recent years as an alternative to conventional seeding. Seeding winter wheat in early to mid September increases winter survival and yield potential in most situations. However, factors such as wet soil conditions, labor and machinery restrictions, and delayed soybean harvest may prevent farmers from reaching this goal. Past experience by growers have resulted in both success and failure with aerial seeding.

Research conducted from 1991 to 1994 at Arlington, Wisconsin compared aerial seeding winter wheat before and after soybean leaf drop with aerial or drill seeding after soybean harvest. Each of these methods were compared using two varieties (Merrimac and Cardinal), two seeding rates (40 and 60 seeds/sq. ft.) and two soybean row spacings (7 and 30 inch). None of the wheat survived in 1992, therefore results from three years are discussed here.

Seeding Method

When averaged over four years and two varieties aerial seeding before soybean leaf drop (BSLD) produced higher yields than other aerial or drilling times (Table 1). The average date of this seeding was September 10 or one month before soybean were harvested for grain. The only time this method of seeding was not the best was in 1991 when nearly all early planted wheat in Wisconsin was infected with Barley Yellow Dwarf Virus (BYDV). In this year aerial seeding after soybean leaf drop (ASLD) or drilling after soybean harvest (ASH) was better than the other methods of seeding. Other conventional seeding date research has shown that highest wheat yields occur with early September seeding dates except when insect transmitted diseases such as BYDV occur. Yields in 1994 were the highest during the four years of this study. Cardinal, a moderately winterhardy variety, produced 92 bu/acre when aerial seeded BSLD on Sept. 10 and 85 bu/acre when drilled ASH on Oct. 8.

Conclusion: When seeding winter wheat following soybeans, aerial seeding immediately before soybean leaf drop is preferred over delayed aerial seeding times or drilling after soybean harvest.

Variety

Cardinal out-yielded Merrimac every year regardless of seeding method. We had anticipated that the more winter-hardy varieties like Merrimac would have an advantage at the later planting dates, but this did not occur. In 1993, both varieties winterkilled when aerial seeded ASH and in 1992 neither variety survived regardless of seeding method or time. In each of the three years there was a highly significant variety by seeding method interaction. This was primarily the result of Cardinal response to early planting and no response by Merrimac.

Conclusion: When aerial seeding winter wheat following soybeans, select the highest yielding varieties available rather than the most winter-hardy varieties.

Seeding rate

Differences in seeding rate between seeding methods were only observed in 1991 when the lower seeding rate of 40 seeds/sq. ft. consistently out-yielded the higher seeding rate of 60 seeds/sq. ft., Table 2. This was primarily due to the Merrimac variety. When averaged over three years we found no advantage to the higher seeding rates regardless of seeding method. The 40 seeds/sq. ft. rate is approximately 130 lb/acre or 2.2 bu/acre, while 60 seeds/sq. ft. is 195 lb/acre or 3.3 bu/acre. When conventional drilling before Sept. 15, we recommend 25-35 seeds/sq. ft. for varieties like Cardinal and 15-25 seeds/sq. ft. for varieties like Merrimac.

Conclusion: Adequate plant stands for maximum yields can be achieved by aerial seeding wheat at 40 seeds/sq. ft. Aerial seeding rates do not need to be increased more than 15% over the currently recommended rates when drilling.

Soybean Row Spacing

We compared wheat seeded in soybeans that were grown in both solid stands (7 inch rows) and in wide rows (30 inch rows). We had anticipated that wheat seeded in solid stands of soybean would be more uniformly distributed and would have a more uniform distribution of soybean leaves covering the seed than from row soybean. However, this was not the case and we found no differences in wheat stands or wheat yields due to soybean row spacing.

Conclusion: Winter wheat can be successfully seeded in soybean planted using either solid stands or wide rows.

Summary:

Advantages of aerial seeding winter wheat into standing soybean are:

- Earlier planting is possible (30 days)
- Yields are higher than when planting after soybean harvest
- Labor and equipment savings are possible
- Wheat is seeded in equidistant spacings
- Early wheat growth can provide for erosion control

Disadvantages of aerial seeding winter wheat into standing soybean are:

- Little protection of wheat crown thus increasing chances of winter injury.
- Early seeding may result in higher disease incidence
- Seed costs are 10-15% higher
- Aerial seeding costs are \$10-15/acre
- Success in stand establishment is more weather dependent

Table 1. Winter wheat yields (bu/acre) as influenced by seeding method/date and variety. Arlington, WI 1989-94.

Seeding Method*	Date	Year/Variety								Avg.
		1989		1991		1993		1994		
Aerial BSLD	9/10	Argee	Merrimac	Cardinal	Merrimac	Cardinal	Merrimac	Cardinal		
Aerial ASLD	9/25	68	41	59	36	54	58	92	58	
Aerial ASH	10/10	56	45	64	22	30	52	80	50	
Drilled ASH	10/10	43	42	52	0	0	55	66	37	
		65	45	64	24	29	53	85	52	
Mean		58	43	60	21	28	55	81		
LSD 10% Seeding Method		5	2	2	3	3	5	5	2	
Variety			2		3		5			

* BSLD = Before soybean leaf drop; ASLD = After soybean leaf drop; ASH = After soybean harvest. Yields are the average of two seeding rates, 40 and 60 seeds/sq. ft.

Table 2. Winter wheat yields (bu/acre) as influenced by seeding method and seeding rate. Arlington, WI 1991-94.

Seeding		Year/Seeding Rate (seeds/sq. ft.)							
		1991		1993		1994		Avg.	
Method*	Date	40	60	40	60	40	60	40	60
Aerial BSLD	9/10	51	49	45	45	77	73	58	56
Aerial ASLD	9/25	56	53	25	28	66	66	49	49
Aerial ASH	10/10	48	47	0	0	57	64	35	37
Drilled ASH	10/10	58	51	25	27	69	68	51	50
Mean		53	50	32	33	67	68	48	48
LSD 10%									
Seeding Method		2	2	3	3	4	4	2	2
Variety		2		NS		NS		NS	

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