FORAGE RESEARCH UPDATES

WISCONSIN- Closing the Alfalfa Yield Gap

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Ifalfa is the third most valuable field crop in the U.S., providing high nutritive value to dairy and beef industries, as well as many ecosystem services. Alfalfa research has provided improved varieties and management practices, significantly increasing yield potential. However, there is a yield gap of two- to threefold between average and top-tier farmers. Bridging the gap can greatly improve farm profitability and product availability (Russelle, 2013). This project attempts to identify management practices relating to high alfalfa yields.

Preliminary results of 1st year. Yields of 6 farmers varied between stands and ages, with 4 tons/ac being the overall mean (2.2 tons/ac 1st-year to 6.4 tons/ac 2nd-year) as expected (Undersander, 2001); higher than the 2.4 tons/ ac reported for WI in the 2007 Census and the 3.63 tons/ac 2020 season average collected by Team Forage (Bertram, 2020), confirming these are top-tier farmers. Additionally, DM proportion was 41% on average,

similar to the mean obtained by Team Forage for 2020 (42%), independent of stand age (Table 1). We obtained management information from 17 farmers (22 fields; Table 2). More than half spring-planted alfalfa and had corn as a previous crop. A high proportion seeded 15-20 lbs/ac, a little higher than the recommended 12-15 lbs/ ac (Undersander, 2011). This varied with field, environmental conditions, and stand type (pure vs mixed) at seeding. More than half planted pure alfalfa. Row spacing (7.5") and target depth (0.25") were the same for all farmers, likely related

to similar equipment used. Also, cutting height (2-5") and width (26-36') were similar, following good management practices (Wiersma and Wiederholt, 2000). Most tilled their soil, but the rest utilized vertical tillage or no tillage to reduce soil erosion. None used traffic control. Half used liquid manure with other nutrient sources and 78% applied fertilizer before seeding and after the 1st and 3rd cuttings. This is crucial to fulfilling nutrient requirements needed for growing plants – the second factor defining yield after soil pH (Undersander, 2001). More than half applied weed control herbicides and a third applied insecticides. Initial analysis of the survey results indicates a wide range of management practices which may give more insight to yield potential as more data is collected and analyzed in future years.

Table 1. Age of the alfalfa stand, DM yield (tons/ac), % DM, and range of dates for each cut of 12 alfalfa fields (6 farmers) in Wisconsin.

	Age 1		Age 2		Age 3		Age 4*		Average	
Fields	3		4		4		1			
	DM Yield (tons/ac)	% DM								
Total/year	3.5	40	4.9	42	4.6	41	3	43	4	41
Max/year	4.6	43	6.4	45	5.4	43	N/A	N/A	5.5	44
Min/year	2.2	36	3.9	35	3.7	36	N/A	N/A	3.3	36

*Only 1 Farmer.

Table 2. Management practices during the seeding year and the cuttings of the 22 fields surveyed.

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Practice	Seedi	ng Date	Seeding Rate			V	ariety	Grass Intercrop		Previous Crop			
	April 10 - May 5	August	15-20 lbs/ac	>20 or <15 lbs/a		RR	R No RR	Yes	No	Soybean	Corn Small grain		
Fields (%)	58	42	78	22		44	56	44	56	9	59	32	
	Tillage						Fertilization			Fertilization date			
Practice	No Tillage	Vertical Tillage	Convent Tilla	entional Traffi llage Contr		c ol	Only Manure	Manur +Othe	r Othe	r Before Seeding	Before Seeding Seeding After 1 st 3 rd Cut		
Fields (%)	14	19	67		0		7	50	43	21	78		
Practice	Herbicide Fi						Ingicide	5		Insecticide			
	Yes				Yes					Yes			
Fields (%)	56				9					33			



References

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