

**Bio-Stimulant and Harvest Energy in
Barley, Dry bean, RR sugarbeet, and Alfalfa**

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Dry Bean

Plots were established under furrow irrigation at the Powell Research and Extension Center, WY to evaluate dry bean response to Bio-Stimulant and Harvest Energy. Plots were 4.5 by 20 ft. with three replications arranged in a randomized complete block design. Dry bean (var. Maverick) was seeded at the rate of 75 lb/A on May 28, 2010 in a clay loam soil (40% sand, 24% silt, 36% clay, 1.3% organic matter, and pH 7.6). Bio-stimulant and harvest energy were applied at different rates at 6-8 leaf stage or at the beginning of flowering stage. 10 ft of row were harvested from of each plot. Dry bean plants were hand pulled on September 10 and threshed on September 14.

No bean injury was recorded in treated plots. Dry bean yield ranged between 3935 and 4205 lb/A. The check yield was similar to that of plots treated with Bio-stimulant and Harvest-energy at flowering stage regardless of the rate used. The plots treated with Bio-stimulant and Harvest-energy when the beans were 6 to 8 leaves yielded 92 to 270 lb/A higher than the check depending on the rate used. The highest yield (4205 lb/A) was achieved with the combination Bio-stimulant at 24 oz/A plus Harvest-energy at 16 oz/A. It appears that the Bio-stimulant rate had more effect on bean yield than Harvest energy. As the bio-stimulant rate increased from 16 to 24 oz/A, dry bean yield increased from 4027 to 4205 lb/A. Also, It should be noted that seed quality (100 seed weight) with bio-stimulant at 24 oz/A was higher than any other treatment (40.2 grams).

Table. Dry bean response to Bio-Stimulant and Harvest Energy treatments

Treatment	Application			Dry bean		
	Rate (oz/A)	Timing (stage)	Injury (%)	Biomass (lbs/A)	Seed yield (lbs/A)	100 seed wt (grams)
Bio-S + Harvest-E	20 + 20	6-8 Lf	0	7284	4112	39.5
Bio-S + Harvest-E	24 + 16	6-8 Lf	0	7361	4205	40.2
Bio-S + Harvest-E	16 + 24	6-8 Lf	0	7168	4027	39.2
Bio-S + Harvest-E	20 + 20	Flower	0	7034	3940	39.4
Bio-S + Harvest-E	24 + 16	Flower	0	7125	3938	38.4
Bio-S + Harvest-E	16 + 20	Flower	0	7132	4089	38.0
Check	--	--	0	7141	3935	38.4

RR-Sugarbeets

Plots were established under furrow irrigation at the Powell Research and Extension Center, WY to evaluate Roundup Ready sugarbeet response to several rates of Bio-Stimulant and Harvest Energy tank mixed with glyphosate (Power-Max) and applied at 4 and/or 8 leaf sugarbeet stages. Plots were 7.5 by 25 ft. with four replications arranged in a randomized complete block design. Roundup Ready sugarbeet (var. Hilleshoq 9120) was seeded to stand on April 20, 2010 in a clay loam soil (40% sand, 24% silt, 36% clay, 1.3% organic matter, and pH 7.6). From each plot, the two middle rows were harvested and weighed on September 20. Subsamples from each plot were sent to Western Sugar Coop. Billings, Montana for sugar analysis.

No Injuries were recorded in treated plot. Sugarbeet yield ranged from 23.3 to 25.5 T/A. The Highest yield (25+ T/A) was recorded in plots treated with Bio-stimulant at 24 oz/A + Harvest-energy at 16 oz/A applied as a single application at 4-leaf or 8 leaf stage or as asplit application 4 and 8 leaf. There is a trend showing that as bio-stimulant rate increased sugarbeet yield increased. Sugar content was similar with all treatments.

Table. Effect of Bio-stimulant and Harvest-energy applied at different rates and timings on sugarbeet root yield.

Treatment	Application		Injury	Sugar	Sugarbeet		
	Rate	Timing			Stand	Yield	R.Sugar*
	(oz/A)	(leaf#)	(%)	(%)	plants/A	ton/A	T/A
Bio-S + Harvest-E	20 + 20	4 Lf	0	16.0	46520	24.1	3.86
Bio-S + Harvest-E	24 + 16	4 Lf	0	15.2	44659	25.5	3.88
Bio-S + Harvest-E	16 + 24	4 Lf	0	15.7	45441	23.7	3.72
Bio-S + Harvest-E	20 + 20	8 LF	0	15.7	46114	24.5	3.85
Bio-S + Harvest-E	24 + 16	8 LF	0	15.1	46035	25.2	3.81
Bio-S + Harvest-E	16 + 24	8 LF	0	15.5	45441	23.8	3.69
Bio-S + Harvest-E	10 + 10	4/8 LF	0	15.5	46629	23.3	3.61
Bio-S + Harvest-E	12 + 8	4/8 LF	0	15.5	44768	25.0	3.88
Bio-S + Harvest-E	8 + 12	4/8 LF	0	15.5	44877	23.8	3.69
Check			0	15.8	45929	23.7	3.75

*R.Sugar= Recoverable sugar (sugar content time yield)

Barley

Plots were established under furrow irrigation at the Powell Research and Extension Center, WY to evaluate barley response to Bio-stimulant and Harvest-energy tank mixed with several broadleaf and grass herbicides. Plots were 9 by 30 ft. with four replications arranged in a randomized complete block design. Barley (var. Merit) was seeded to stand on March 22, 2010 in a clay loam soil (40% sand, 24% silt, 36% clay, 1.3% organic matter, and pH 7.6). From each plot, the middle area (5.5 x 15ft) was harvested on August 14.

No stand reduction; however 5 to 7% injuries were recorded in plots containing Puma or Wolverine. These two herbicides are known to cause slight injury when weather conditions are somewhat cold around time of application. With the exception of these two herbicides, Barley yield was increased by an average of 2 bu/A with the other herbicides when Bio-stimulant and harvest energy was added. All the treatments were compared to bronate+axial without Bio-stimulat+harvest-energy (Check).

Table. Barley response to Bio-stimulant and Harvest-energy tank mixed with several herbicides.

Treatment	Application		Barley		
	Rate (oz/A)	timing (leaf #)	Injury (%)	Height (in)	Yield (bu/A)
Bronate+Axial	12.8+16	4-5	0	31.36	112
Bronate+Axial+ BS/HE	12.8+16+20+20	4-5	0	30.28	114
Bronate+Puma+BS/HE	12.8+10.5+20+20	4-5	7	29.46	105
Huskie+Axial+BS/HE	13.5+16+20+20	4-5	0	31.69	115
Huskie+Puma+BS+HE	13.5+10.5+20+20	4-5	5	30.92	106
MCPA+Axial+BS/HE	8+16+20+20	4-5	0	31.66	115
Wolverine+BS/HE	27.4+20+20	4-5	7	30.86	105
Starane+Axial+B/HE	5.5+16+20+20	4-5	0	31.92	113
WideMatch+Axial+BS/HE	10+16+20+20	4-5	0	31.61	114

Alfalfa

Plots were established under furrow irrigation at the Powell Research and Extension Center, WY to evaluate Alfalfa response to several rates of Bio-Stimulant and Harvest Energy applied 10 days after the first cutting. Plots were 7.5 by 25 ft. with four replications arranged in a randomized complete block design. Alfalfa stand was three year old. Soil in the experimental site is a clay loam (40% sand, 24% silt, 36% clay, 1.3% organic matter, and pH 7.6). From each plot, the middle area (5.5 x 20ft) was harvested and weighed on September 20. Subsamples from each plot were oven dried and dry matter yield was calculated.

Bio-stimulant and harvest energy applied at the rate 24+16 oz/A respectively, increased alfalfa dry matter yield by at least 0.4 T/A

Table. Alfalfa second cutting response to Bio-stimulant and Harvest-energy

Treatment	Application		Alfalfa
	Rate	Timing	DM Yield
	(oz/A)	--	(T/A)
Bio-Stimulant + Harvest Energy	20 + 20	After 1 st cutting	2.00
Bio-Stimulant + Harvest Energy	24 + 16	After 1 st cutting	2.34
Bio-Stimulant + Harvest Energy	16 + 24	After 1 st cutting	2.00
Check	--	--	1.92