

Ryegrass Harvesting: A comparison of cutting fronts

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Background

- The introduction of high groundspeed windrowing of ryegrass using the John Deere Legacy Air grass front raises questions on its effectiveness compared with a traditional windrower.
- The Legacy front uses disc mowers and has foils to move the cut grass into the swath with reduced shaking and potentially reduced seed loss.

Cutting options

- Traditionally in NZ side mounted disc-mowers (usually 2.2 m wide) are used for cutting ryegrass;
- Traditional windrowers cut with a reciprocating sickle bar knife.
- The Legacy windrow front uses disc mowers and has foils to move the cut grass into the windrow with reduced shaking and potentially reduced seed loss;

Legacy front

Conventional
windrower



Disc mower windrower front



Harvest loss assessments

- Harvest loss has been assessed by vacuum sucking up seeds on the ground after harvest;
- The vacuum samples were sieved, rubbed and blown to remove straw, leaf and soil to achieve a clean seed sample;
- Losses at cutting and during drying in the swath was assessed using Al-foil pie dishes;

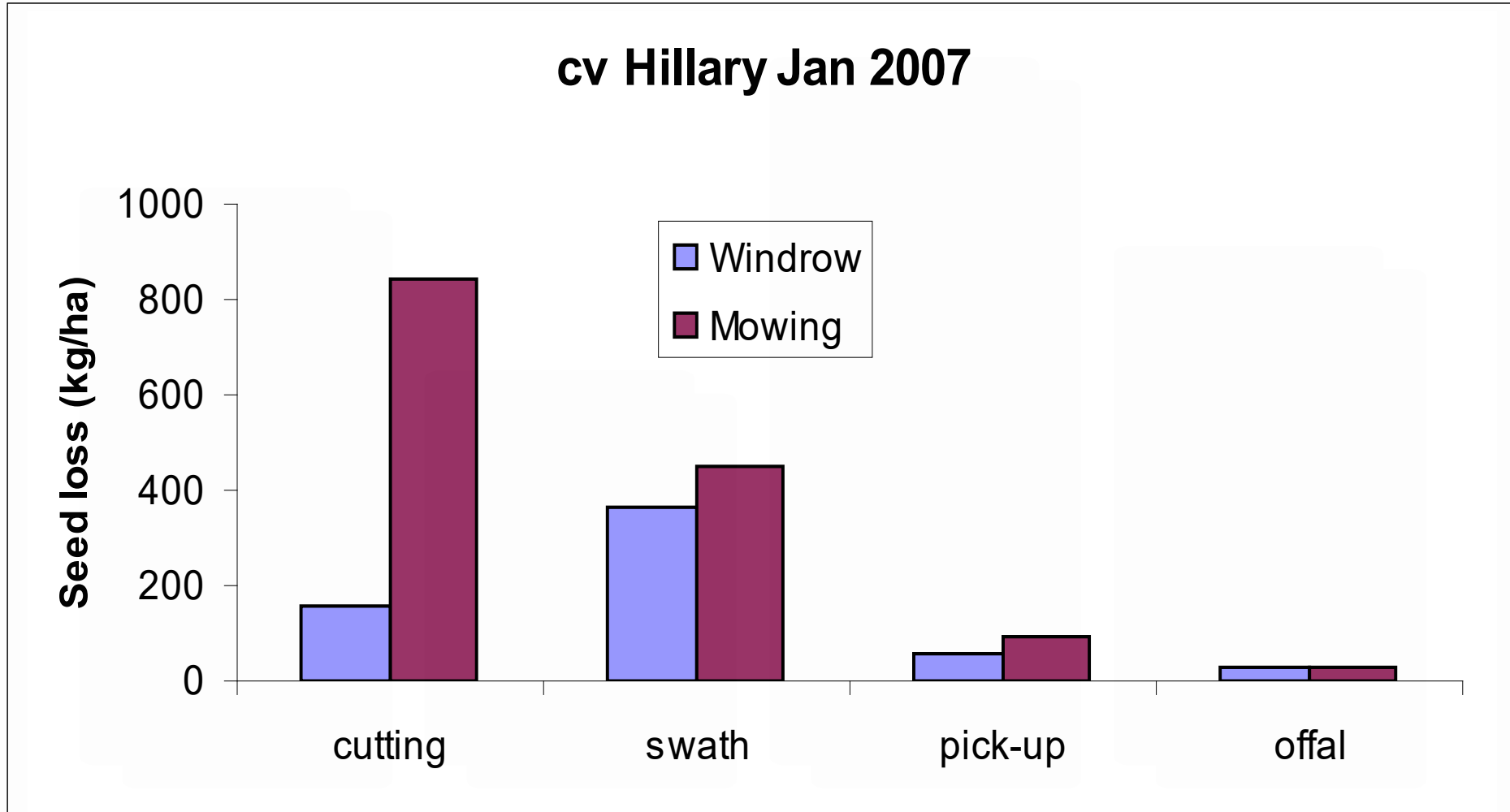
Disc Mowing losses - 8 fields

Field	Loss (kg/ha)	Seed Yield (kg/ha)	% loss
1	660	2400	22
2	1300	2500	34
3	350	950	27
4	430	2000	18
5	600	1700	26
6	640	1290	33
7	940	1230	43
8	270	790	25
AVG	650	1610	29

Windrow loss - 5 fields

Field	Loss (kg/ha)	SY (kg/ha)	% loss
1	560	2500	18
2	190	3100	6
3	370	1660	18
4	510	2670	16
5	560	2200	20
AVG	440	2430	16

Trial 3. Ryegrass growers harvest



Method

- Four trials (over 3 years) 2017 – 2020;
- Four ryegrass cultivars: a forage hybrid type, a forage perennial ryegrass and two turf ryegrasses;
- Large plots – usually 300+ m long x 24 m wide;
- 2 Replicates, randomized;
- Legacy operated by a contract operator, disc and windrower by grower;
- Cut when crop seed moisture was between 40 and 42%;
- Combine harvested at ca. 12% SMC for disc mown plots, field dressed samples were tested for SMC and clean seed yields adjusted to 14%.

Treatments

Cutting type	Width of cut (m)	Speed (kph)	Area (ha/hour)
Disc mower	2.2	11.5	2.7
Auger Windrower	4.3	9.4	4.9
Legacy Front	4.7	14.0	6.5

Method weigh wagon yield assessment



Results – seed yield (kg/ha)

Cultivar	Year	Legacy	Standard	Disc
		Windrow	Windrow	Mower
Shogun (hybrid)	2016/17	3200	2990	2640
DLF 46-600 (turf)	2017/18	3110	2830	n/a
Bokser (turf)	2017/18	2920	2680	2660
Hustle (perennial forage)	2019/20	3000	2830*	2640
Mean seed yield		3060	2830	2650
LSD 5%			160	
F.prob			0.005	

* Grasshopper disc windrower

Discussion

- In our trials, cut at 40 – 42% SMC the faster cutting Legacy front had higher seed yields than auger windrower cutting;
- Both the Legacy front and auger windrower had significantly higher seed yields than traditional disc mowing;
 - Legacy 15% (410 kg/ha better than disc mower);
 - Windrower 7% (180 kg/ha better than disc mower)
- In Oregon trials cut at 35% SMC seed yields with Legacy front were lower than conventional windrowers;

Discussion

- In one trial, wet harvest conditions the larger volume of a swath cut by the Legacy front took longer to dry and the harvested seed had a higher SMC than windrowed or disc mowing;
- There is a role for disc mowers when damp conditions threaten harvest, because they dry faster, have less bulk and can be combined at higher SMC;
- Data from previous harvest loss trials suggest that most seed loss at cutting is on the divide;
- Wider cutting fronts have fewer divides; and this partially explains some of the differences between types of cutting fronts.

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