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Harvesting silage with two types of silage trailer (feed rotor with knives and precision chop)

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Introduction Harvesting silage with a silage trailer that combines both a precision chopper and a trailer in the same machine is common in Sweden. A silage trailer with a feed rotor and knives has recently been put on the market. The objective of this study was to compare the two systems

Material and methods The crop was second harvest in second year ley 2 (timothy, red clover and meadow fescue). Two types of silage trailer were used, one with a feed rotor with knives (Pöttinger Jumbo 7200) and the other with a precision chopper (JF ES 3600). The same tractor was used for both trailers (CASE IH MXM190). The power required was measured at the PTO and the harvesting speed was measured with an extra ground wheel. The material from the two trailers was ensiled in separate bunker silos.

Results The dry matter (DM) of the herbage harvested was 35%. The herbage harvested by the trailer with rotor was longer (30% <40 mm) compared to that harvested by the trailer with precision chopper (84% <40 mm). Compared to the precision chopper trailer, the rotor trailer had a greater volume, a higher loading rate and required less energy (Table 1). There was no difference in density of silage or amount of bad silage. However, in the corners of the bunker with silage from the rotor trailer there was some more bad silage. The silage process had gone longer in the material from the chopper trailer.

Table 1 Power and capacity comparison between two types of silage trailers

		Precision chopper ES 3600 ProTec	Rotor with knives Jumbo 7200
Maximum speed in windrow	m/s	2.5	5.0
	km/h	9	18
PTO power at max speed	kW	112	104
PTO power at 2.5 m/s	kW	112	61
PTO power required	kW	43.3*m/s +3.6	17.2*m/s +18
at speed range	m/s	1-2	2-5
Loading time in windrow/load	s	399	407
Forage/load	kg	8061	13559
Average loading rate	kg/s	20	33
Density in trailer	kg/m^3	224	307
Average unloading time	s	128	139
Fuel consumption diesel (harvest + transport)	l/ton	1.20	0.82

Conclusions The higher loading rate and lower power requirement of the rotor trailer compared to the chopper trailer might be explained by: longer cut of the material, different system of cutting, different system of transporting the material within the wagon and compaction in the wagon.

There was no difference in volume weight in the bunker silos between the systems. It was expected that density would have been less in the rotor silo since the material was longer. The quality of silage was the same in both bunkers. However, in both silages there were high levels of butyric acid that may have resulted from the low density and high DM content. If additives had been used (normally recommended) the result would most probably have been improved.

With a long material it is normally harder to get good silage. In the current work, there was more bad silage in the corners at the ends of the bunker with the silage made from the longer chop rotor material.