Comparison of technologic and economic parameters of drills for grassland oversowing

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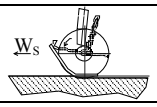
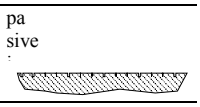
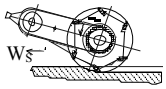
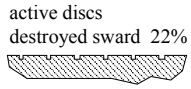
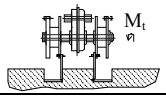
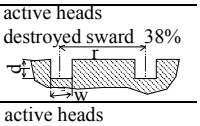
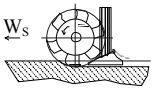
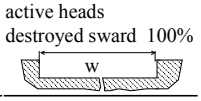
Introduction Direct grassland oversowing is a very important technology in Slovakia as some 350,000 ha (42 %) of grassland are on unploughable sites that dominate mountain regions. Slope inclinations >16° and shallow soil layers (150-200mm) limits ploughing on these sites (Tiley & Frame, 1988).

Materials and methods After 2000, 2 types of drills for direct oversowing were developed: SPP 6 and SP 16, respectively, for band- and strip- oversowing (see Table 1). Both prototypes were tested in mountain conditions (Gonda, 2003) together with series-produced machinery: drill VREDO 125.07.05 (Netherlands) and HORSCH SE 3 (Germany), used for row and total (wide) oversowing, respectively. Soil was shallow rocky clay (<200 mm), altitude 400-600 m and slope inclination 12°; seed rate 40kg grass/clover mixture /ha (20/80 clover/grass).

Results Table 1 compares technological and economic parameters of 4 main oversowing systems of grassland renovation in Slovakia.

Table1 Technical and economical evaluation of oversowing technology in upland grasslands in Slovakia

Technology	Machinery Tractor Drill	Engine power (kW) Working width (mm)	Productive efficiency[#] (ha/h)	Price (€)	Technological costs (€/h)	Technological costs (€/ha)	Technology system	Sward profile
Row oversowing	ZETOR - 7540	57.0	-	31010.0	23.74	19.79		
	VREDO 125.07.05	2 500.0	1.20	15972.6				
Strip oversowing	ZTS 123 45	90.5	-	39345.7	32.68	38.91		
	SP 16	2 400.0	0.84	15444.4				
Band oversowing	ZTS 163 45	121.0	-	48892.2	41.50	44.63		
	SPP 6	2 700.0	0.93	26649.2				
Total (wide) oversowing	ZTS 183 45	136.0	-	80504.0	50.51	50.51		
	SE 3 HORSCH	3 000.0	1.00	26164.7				

[#] Full production: no idle time w... width of the row; r... row distance; d ... row depth

Row oversowing needs little energy and is cheap. It suits less-demanding soil conditions but not highly degraded grassland because it only partially destroys the turf (5%) and the microrelief stays undestroyed. **Strip oversowing** best suits shallow rocky soils with considerably degraded grassland. It does not destroy the microrelief and does not cause soil erosion or herbage contamination. **Band oversowing** needs much energy and is expensive. It mainly suits deep plateau-land soils without stones and considerably degraded grassland. It destroys turf (38%) and creates excellent conditions for root development, but can cause erosion at slope inclinations >12°. Strongly devastated microrelief needs rolling to prevent soil contamination of herbage. **Total (wide) oversowing** has the highest energy demands and costs of the 4 methods. It suits severely degraded grassland where total destruction of the root system of the original sward is needed and excellent conditions for the development of a dense sward are created. It cannot be used on shallow and rocky soils.

Conclusions The 4 oversowing technologies do not compete with each other. Instead, they offer a choice after consideration of all soil, climatic and energetic conditions and the degradation degree of the grassland.

References

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