Competitive effects of crop species on skeleton weed populations

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In recent times the populations of skeleton weed biotypes resistant to biological control have increased dramatically in south eastern Australia. Skeleton weed is now as severe a problem as it was prior to the release of the highly effective skeleton weed rust *(Puccinia chondrillina)* in the 1970's (1). Skeleton weed is a problem predominantly on the sandhill soils in the Malice regions of south eastern Australia where crop and pasture production is much lower compared with the more productive Mallee soils found between the sand dunes. On interdune soils, crop and pasture competition effectively maintains skeleton weed populations at a manageable level. Currently there arc a number of alternate crop species suitable for production on sandhill soils. These, and more traditional crop species, were evaluated for their competitive effects on skeleton weed when grown on sandhill soils.

Methods

Six crops (wheat, barley, triticale, rye, lupins and mustard) were evaluated for their ability to compete with skeleton weed. The crops were direct drilled into a pasture infested with skeleton weed; untreated areas were left as the control treatment. The parameters measured to evaluate competition on skeleton weed populations and dry matter production were crop light interception (using a tube solarimeter and volt meter), water use, dry matter production and grain yield.

Results and discussion

The results in Table 1 show that all crops effectively reduced skeleton weed populations at anthcsis and to a lesser degree at harvest. Barley was the only crop to reduce skeleton weed dry matter at harvest. The increased competitive ability of barley over the other crops was apparently due to a combination of pre-anthesis shading effects and soil water use. Despite reductions in skeleton weed populations by all crops the weed numbers and dry matter productions remain high in comparison to those found on interdune soils. Therefore research is continuing to determine if successive population reductions can be achieved in cropping rotations over several seasons.

Table 1. Crop water use(WU), light interception(LI), crop and pasture dry matter (DM) and yield. skeleton weed populations (SW) and dry matter (SWDM). in a number of crops on a sandhill soil.

Crop	Anthesis				Harvest			
	DM (t/ha)	WU (mm)	LI (mV)	SW (plants/m^2)	WU (mm)	SW (plants/m^2)	SWDM (t/ha)	Yield (t/ha)
Wheat	1.4	108	2.1	26	53	26	1.1	0.3
Barley	1.6	181	3.3	28	-15	18	0.4	0.4
Triticale	1.4	111	2.2	27	33	20	0.8	0.4
Rye	1.4	156	4.0	22	31	17	0.5	0.4
Lupins	1.4	99	4.3	26	76	24	0.9	0.3
Control	0.7	141		43	34	33	0.9	
l.s.d. (p=0.05)	0.4	55	0.9	10	34	14	0.5	0.1

References

1. Groves. R.H. 1991. Proc. Aust. Workshop on Mgt. Skeleton Weed, Walpeup. pp.7-1 2.