Grazing and herbicide manipulation of pasture composition the effects on direct drilled cereal production

C W Thorn

Plant Research Division, Department of Agriculture, Western Australia.

The brume (Brats diandrus), barley (Bordeum leporiniun) and silver grasses (Vidpia sp) have assured greater importance as weeds in direct drilled cereal crops since the development of selective in-crop herbicides for the control of ryegrass (Lolium rigidum). No herbicides are currently available to control all of these grasses in cereal crops, and one alternative is to control grasses in the pasture phase prior to cropping. The aim of this experiment was to determine the effect of stocking rate and chemically controlling annual grasses in the pasture phase of a rotation on subsequent crop grass weed levels, and to determine the benefits of using post planting pre-energent and post emergent herbicides in a direct drilling system on grain yield.

Methods

The experiment was conducted at Mora, W.A., with a growing season rainfall of 421 mm. The pasture consisted of a mixture of cwalgalup sub. clover, rye, barley and brane grass. Four main treatments; 2 stocking rates (SR) [4 and 8 weaner wethers/ha); 2 pasture treatments (PI') [untreated and sprayed with Kerb WP.50 Q) Propyzamide at 0.75 kg a.i./ha to oontrol annual grasses) were replicated 3 times in a randomised block design. The Kerb treated pasture was sprayed in June 1981 and all pastures set stocked during 1981 and 1982. In 1983 the main treatments were split into three crop herbicide treatments; unsprayed; Hoegrass C) (diclofop-methyl) applied at 562 a.i./ha 30 days after seeding; SSH COe6 (tri.qn.i.6e) applied at 800 9/ha 5 days after seeding. Each herbicide sub treatment was split for 5 rates of nitrogen (N) [0, 10, 20, 40 and 80 kg/ha N) applied as ammonium nitrate at seeding. The pasture %es sprayed with Sprayseed R at 21/ha and direct drilled with Eradu Wheat on 15th June, 1983.

Results and discussion

There was a significant (P 0.05) SR x PT effect on grass numbers under the crop with the untreated and Kerb treated pastures having 97 and 71 plants/m^2 at the stocking rate of 4/ha and 39 and 2 plants/m^2 at 8/ha. There wee also a significant (P < 0.001) PT x crop herbicide interaction. The unsprayed crop had 88 and 61 plants/m^2; the Hoegrass treated had 97 and 32 plants/m2; SSH 0860 had 18 and 14 plants/m^2 for the untreated and Kerb treated pasture respectively. There were significant (P (0.01) SR x FT x N and crop herbicide x N interactions on final grain yield (Table 1). There %es a significant (P < 0.001) quadratic grain yield response to applied nitrogen.

Table 1 Grain yield (kg/ha) responses showing the effect of stodKing rate (SR) x pasture treatment (PT) x nitrogen and the effect of in-crop herbicide x nitrogen interactions.

Main Treatments		Sub-treatment	Grain Yield (GY) Response
SR	PT	Crop herbicide	
4	Untreated		$GY = 1729 + 18.0 N - 0.08 N^2$
4	Kerb		$GY = 2206 + 11.2 N - 0.08 N^2$
8	Untreated		$GY = 2029 + 14.0 N - 0.08 N^2$
8	Kerb		$GY = 2046 + 13.0 N - 0.08 N^2$
		Unsprayed	$GY = 1710 + 15.2 N - 0.08 N^2$
		Hoegrass	$GY = 1892 + 15.1 N - 0.08 N^2$
		SSH 0860	$GY = 2404 + 11.9 N - 0.08 N^2$

The experiment highlights the effect of heavy grazing prior to cropping on reducing grass weed levels. It also shows that using herbicides in the pasture phase 2 years prior to cropping may reduce grass weed levels in a following crop and that SSH 0860 gave excellent grass weed control regardless of the previous pasture treatment. The use of herbicides in the pasture phase prior to cropping is one method of controlling annual grasses in a direct drilling cropping system.