Interference of Burclover (*Medicago hispida*) in Wheat (*Triticum aestivum*)

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Infestation of broadleaf weeds is one of the major deterrents in sustaining of wheat [*Triticum aestivum* (L.) emend. Fiori & Paol.] productivity in Madhya Pradesh. Among different broad-leaved weeds, burclover (*Medicago hispida* Gaertn) of late is becoming a serious problem in irrigated wheat in Jabalpur region. There are certain situations where this weed alone is coming up in large numbers and causing appreciable yield reduction in wheat. Such significant yield losses due to this weed certainly prompt post-emergence control measures. However, decisions on implementing control measures are more difficult where weed infestation is near to economic threshold. The correct weed management decision will, therefore, depend on knowing the relationship between weed densities and corresponding wheat yield losses.

In order to estimate the quantum of yield losses caused by varying densities of this weed on wheat, a field experiment was conducted during winter season of 2001-02 at the National Research Centre for Weed Science, Jabalpur. The soil was clay loam (Typic Chromusterts), low in available nitrogen (240 kg ha⁻¹), medium in available phosphorus (16.0 kg P ha⁻¹) and high in exchangeable potassium (410 kg K ha⁻¹) content with neutral pH (6.7). Treatments consisted of eight burclover densities (0, 10, 20, 40, 80, 160, 320 and 640 m⁻²) with uniform density (200 m⁻²) of wheat. The treatments were replicated thrice in a randomized block design. The wheat variety 'Sujatha' was sown in rows 20 cm apart in 1 m² micro-plots on 31 October 2001. There was a natural infestation of burclover in the field and different densities of the weed were maintained as per the treatments at 20 days after sowing. All the other weeds except the test weed were removed from each plot by hand pulling. However, after 45 days, no attempt was made to remove freshly germinated weeds, if any, except in weed-free plots. In weed-free plots, all weeds were removed as and when

they emerged by hand pulling. Recommended package of practices was followed to raise the crop.

The adverse effect of burclover density as evidenced by per cent reduction in seed yield of wheat was evaluated using a simple empirical model. The data were fitted to non-linear equations available in 'Curve Expert 1.3' statistical package using Logarithm Fit as follows :

$$Y = a + b \ln.x$$

Where,

   Y = Per cent reduction in grain yield

   a = Estimate of Y in the absence of burclover

   b = Estimate of the rate of increase in Y as burclover infestation increases

   ln = Natural log

   x = Burclover density

The correlations of different weed parameters with yield and yield attributes were computed as per Snedecor and Cochran (1967).

An increase in the density of burclover increased its dry biomass. Maximum dry biomass (1227 kg ha⁻¹) was obtained at its highest density of 640 m⁻², which was significantly higher than the rest of the treatments. The differences in increase in dry biomass with increase in density from 10 to 80 m⁻² were non-significant. There was a progressive decline in yield (3.4 to 38.9%) with increasing densities of the weed from 10 to 640 weeds m⁻² over weed-free treatment. The yield levels under 10 and 20 weeds m⁻² were statistically comparable to that of weed-free treatment indicating that 10 to 20 weeds m⁻² is considered to be the threshold level. The relationship of burclover density with per cent yield reduction of wheat was fitted well with Logarithm model (Fig. 1).

The burclover density was positively correlated with its dry biomass ('r' value : 0.9623) and per cent reduction in wheat yield ('r' value : 0.7271) and negatively correlated with yield
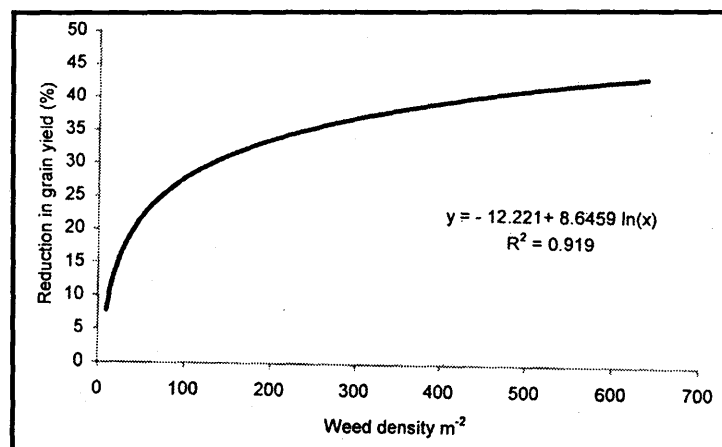
$$y = -12.221 + 8.6459 \ln(x)$$
$$R^2 = 0.919$$

Fig. 1. Effect of burclover density on reduction in wheat yield.

Table 1. Correlation matrix among density and dry weight of burclover and yield attributes and yield of wheat

Character	Burclover dry weight (kg ha⁻¹)	Plant height (cm) of wheat	Spikes m⁻² of wheat	Grains spike⁻¹ of wheat	100-grain weight (g)	Grain yield (kg ha⁻¹) of wheat	Reduction (%) in grain yield of wheat
Burclover density	0.9623**	-0.7842*	-0.9681**	-0.8106*	-0.5165	-0.7272*	0.7271*
Burclover dry weight (kg ha⁻¹)		-0.8680**	-0.9022**	-0.9363**	-0.7082*	-0.8688**	0.8687**
Plant height (cm) of wheat			0.9143**	0.9029**	0.7228*	0.9008**	-0.9008**
Spikes m⁻² of wheat				0.9623**	0.8174*	0.9912**	-0.9912**
Grains spike⁻¹ of wheat					0.8868**	0.9419**	-0.9419**
100-grain weight (g)						0.7906*	-0.7906*
Grain yield (kg ha⁻¹) of wheat							-1.0

attributes and yield of wheat (Table 1). The yield attributes were positively correlated with its grain yield and negatively correlated with per cent reduction in grain yield.

REFERENCE

Snedecor, G. W. and W. G. Cochran, 1967. *Statistical Methods*. Oxford and IBH Publishing Co. Pvt. Ltd., Bombay.