

Effect of Targa® Super (Quizalofop-P-ethyl) Against Weeds in Chilli Cultivation in Mannar District

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Introduction

Chilli (*Capsicum annum* L.) is one of the most valuable cash crops grown in Sri Lanka, and an important condiment and a culinary supplement. A large extent of chilli cultivation is prominent in the dry zone of Sri Lanka, especially in Mannar, Jaffna and Vavuniya districts. The annual national chilli production has decreased over the years, and more than 30,000 t is imported annually to meet the shortfall (Department of Agriculture, 2012).

Weeds are a major problem in chilli cultivation, and one reason for this is the poor competition of chilli plants with weeds (Gonza' lez and Salas, 1999). So the productivity of chilli depends largely on weed free condition. Both monocotyledonous and dicotyledonous weeds are reported in chilli (Gonza' lezet *et al.*, 1992). They compete for nutrients, moisture, sunlight and space during both the vegetative and reproductive stages of the crop (Singh, 2009), causing yield losses from 30 (Mohmoodet *et al.*, 2006) to 78% (VedPrakashet *et al.*, 2003). Herbicide application is an efficient method of managing weeds. Mostly pre-emergence herbicides have been used to control weeds in chilli cultivation (Muthusankaranarayananet *et al.*, 1997; Narasalagi, 1999; Adigun, 2001; Frost and Hingston, 2004), and it is the same condition in Sri Lanka, as well. But in chilli cultivation, late-emergence weeds are a severe problem (Singh *et al.*, 1993), and the management of these weeds is critical to increase the crop yield (Singh, 2009).

Targa® Super (Quizalofop-P-ethyl) is a new post-emergence, systemic herbicide, which controls grasses and shows excellent selectivity over non-graminaceous crops (The Pennsylvania State University, 2007). This product is used on the crop plantations at 20 to 30 days after establishment (Technology Commercialization, 2012), and hence will be effective at controlling even late emergent grass weeds. The objective of this study was to determine the effect of 'Targa Super' against weeds in chilli cultivation and to compare its effect with the pre-emergence herbicide, Stomp.

Methodology

This research was conducted in a farmer's field in Mannar district. The experiment was laid out in a Randomized Complete Block Design (RCBD). The land was prepared in to three blocks and each block was divided in to three plots. Each plot contained six planting holes, and three chilli seedlings aged 8 to 11 days were transplanted in each planting hole. The plots in a block were separated by Aluminium sheets to avoid contamination from the neighboring treatments during application. Targa Super and Stomp were diluted in water and applied at the label rate. One plot in each block received one of the three treatments: Targa Super, Stomp or water. Treatments were applied using a Knapsack sprayer, according to a pre-determined schedule (Table 1). When the spraying of Stomp and water was done on the same day, 5DAT, water was applied first.

Weeds were uprooted in each plot separately on 75 DAT. The weeds were first washed, and then sun dried for 8 days. Subsequently they were oven dried at 70°C until constant weight was received. The dry weight of weeds in each plot was measured separately using an electric balance. The data were analyzed using Proc Mixed procedures of ANOVA in SAS (SAS Institute, 2002-2008). The mean weed dry weight of plots that received different treatments were compared using Tukey's test. The significance was tested at P=0.05. Weed control efficiency (WCE) was calculated using the following formula.

$$WCE (\%) = \frac{\text{Weed dry weight in unweeded control (g)} - \text{Weed dry weight in treatment (g)}}{\text{Weed dry weight in unweeded control (g)}} \times 100$$

Source: Kumar and Tamadaddi, 2008.

Table 1. Treatments, dilution, concentrations and date of application

Treatments	Application details*
Targa® Super5EC	0.01 mL in 5 L water, 1L/ha at 25 DAT
Stomp 330E	0.06 mL in 5 L water, 6L/ha at 5DAT
Water	6L/ha at 5 DAT

*DAT- Days After Transplanting

Results and Discussion

The plot treated with water had the maximum weed dry weight. The dry weight of weeds in the plot treated with Stomp was significantly lower than other treatments (P=0.0497). Weed dry weight in the plot treated with Targa Super was not significantly different from Stomp (P=0.4942) or water (P=0.2271). Weed control efficiency in plots treated with the two herbicides differed. The plots treated with Stomp recorded higher weed control efficiency than that received Targa Super. Targa Super was effective in controlling grass weeds whereas Stomp controlled the broad-leaved weeds.

Singh (2009) reported that the grass weeds in chilli cultivation were better managed by the Pendimethalin and other pre-emergence herbicides Butachlor, Alachlor and oxyfluorfen compared to the post-emergence weedicide Haloxypop. He also reported that Pendimethalin has a higher WCE (85.21%) than Haloxypop (84.78%).

Table 2: Weed control efficiency of herbicides

Treatments	Total dry weight of weeds(g)	WCE (%)
Targa Super	85.26	20.83
Stomp	70.84	34.22
Water	107.69	

Conclusions

Targa Super controls late-emergence grass weeds in chilli cultivation. However, as Stomp controls early-emergence weeds with a higher WEC, the use of both Targa Super and Stomp would be beneficial in the weed management in chilli cultivation. In future studies, TargaSuper needs to be tested for its success in the management of weeds in chilli cultivation in other areas of Sri Lanka.

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