Effectiveness of Tronador to control brittlebush in buffelgrass pastures at central Sonora, México

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Introduction

Buffelgrass (*Cenchrus ciliaris* L.) is an introduced species which is planted in low productive semi-arid rangelands in northern Mexico to increase productivity and ranchers profit. Brittlebush (*Encelia farinosa*) is a native half size shrub of low forage value that invades buffelgrass stands. Buffelgrass pastures lose productivity as brittlebush densities increase.

Once brittlebush infestations occur plant densities do not decline unless brush control practices are applied. Mechanical treatments are mainly used when grass seeding is needed. Prescribed burning and manual control as well as granular herbicides have resulted on good plant control. Most liquid herbicides are either not as effective for plant control or not economically feasibles. Tronador is a new released herbicide but no data is available for its use. This study was conducted to evaluate several doses of Tronador to control brittlebush infestations and measure buffelgrass forage responses.

Methods

The study was conducted at rancho San Juan (Latitude 29º 05´11.0" N and Longitude 110º 35´13.1" W) 35 km east of Hermosillo in buffelgrass pastures highly infested by brittlebush (mean of 8,420 pl/ha). Treatments were foliar application of Tronador (9.0 g of Aminopyralid acid/L + 180.0 g of 2,4-D acid/L) at 0.5, 1.0, 1.5, and 2.0 % in water and the untreated check. Treatments were applied with an 18 L capacity back pack sprayer calibrated to deliver a total volume equivalent to 300 L/ha. Treatments were applied during August 15 of 2010 when plants were actively growing.

Variables evaluated were: brittlebush mortality and buffelgrass density, height, basal cover and forage production. Brittlebush mortality was estimated by difference with untreated plots, plant density by counting plants on three 1m^2 quadrants, randomly selected per plot. Plant height was measured with a tape in all plants within these three quadrants. Plant basal cover was estimated in the same quadrants by individually measuring the basal area of each plant. Annual forage production was estimated by clipping ten 1 m^2 forage samples, randomly selected in each plot. All variables were evaluated during 2010 and 2011.

Plot size was 40 m^2 and all treatments were replicated three times in a randomized complete block design. Data were analyzed by ANOVA ($P \leq 0.05$). When differences were detected the Duncan´s Multiple Range Test was used for mean comparison.

Table 1. Response of buffelgrass to different brittlebush control treatments at central Sonora Mexico. Means within a row followed by a different letter are significantly different at ($P<0.05$)

Variable	Tronador				Control
	0.5%	1.0%	1.5%	2.0%	
Brush mortality (%)	20.0 c	80.0 b	100.0 a	100.0 a	0.0 d
Grass density (pl/m^2)	4.5	5.2	4.9	5.5	4.8
Grass height (cm)	163 a	168 a	172 a	175 a	142 b
Grass basal cover (%)	12.1 a	11.9 a	12.5 a	12.3 a	8.9 b
Forage production (t/ha)	2.34 b	2.41 b	2.92 a	3.05 a	1.82 c

Results and Discussion

Precipitation was 246.4 and 258.0 mm during 2010 and 2011 which was 19 and 13 % below the 20 year average. Brittlebush mortality was different ($P \leq 0.05$) among treatments averaging 20 and 80 % in for Tronador at 0.5% and 1 % respectively with 100 % mortality after application of Tronador at both 1.5 and 2 % (Table 1). Buffelgrass plant density was similar ($P \geq 0.05$) among treatments and varied from 4.5 to 5.5 plants/m^2. Buffelgrass height, basal cover and forage production was significantly increased ($P \leq 0.05$) where brittlebush densities were reduced (Table 1) ($P \leq 0.05$). Buffelgrass plants were 142.0 cm tall in the control and where brittlebush densities were reduced were

14.8 to 23.2 % taller. Average basal cover of buffelgrass was 8.9 % in the control which increased by 33.7 to 40.4 % where brittlebush density was reduced. Forage production of buffelgrass averaged 1.95 t/ha dry matter in the control increasing by 28.6 to 67.6 % on plots where brittlebush density was reduced.

The results of this study agree with those of Morton *et al*. (1990) and Fimbres *et al*. (1999) where the elimination of invasive shrubby species increased basal cover and forage production of grasses in rangelands. Vegetation responses are the results of plant competition reduction which aid in the establishment of forage species in areas previously occupied by the invading species (Heaton *et al*. 2003, Holecheck *et al*. 2004). In this study buffelgrass crowns responded significantly to reduce competition from brittlebush. Other studies report similar results with this and other grass species in the Chihuahuan and Sonoran Deserts in North America (Ibarra *et al*. 1986, Fimbres *et al*. 1999, McGinty *et al*. 2009).

Conclusion

Individual foliar applications of Tronador herbicide at 1.5 % in water during August, at the peak of the summer growing season, is an effective treatment in controlling brittlebush in buffelgrass pastures. Total forage production increased between 28.6 and 67.6 % after brittlebush control. We conclude that Tronador herbicide is a good alternative to rehabilitate buffelgrass pastures infested with brittlebush in the Sonoran Desert.

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