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Effects of Different Formulations of Betanal Progress of Herbicide on Weeds Control at Sugar Beet Field

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ABSTRACT

This study was conducted to evaluation of different formulations of Betanal Progress OF herbicide on weeds control of sugar beet field. The experimental design was factorial on the basis of randomized complete block with four replications. Treatments consisted of four different formulations of the herbicide Betanal Progress F (Iranian, Spanish, German and Chinese) with four different doses (3, 4, 4.5 and 5 liters per hectare). Evaluated traits included frequency of weed and dry weight at 15 and 30 days after spraying. Result showed that German formulation and 4.5 liter per ha Betanal Progress F had highest weed control at sugar beet field.

Introduction

Sugar beet is grown on about 192 thousand ha in Iran with an annual production rate of 6 million metric tons, (Anonymous, 2003), Sugar beet has slow growth rate in early season, which makes it vulnerable to weeds (Norris, 1996), thus the sugar beet yield reduction is estimated to be about 33-100% (Ghanbari Birgani et al., 1998 & 2000). Weeds compete with beet for space, light, moisture and nutrients and this will result in yield reduction. A two year study of Rahbari and colleagues (2006) has shown that the combination of Safari herbicide and Betanal Progress AM is the best method to control the weeds in sugar beet seedbed preparation during autumn. In the combat between weeds and sugar beet, the sugar beet is the loser which leads to reduction of sugar beet harvest; Weeds also are a threat to cultivation and harvest operations (Hembree and Norris, 2005).The objective of this research was evaluating the efficacy of different formulations of Betanal Progress OF herbicide on weeds control of sugar beet field in Iran.

Material and methods

This study was conducted in field conditions for factorial experiment in a randomized complete block design with four replications. First factor included: Iranian, Spanish, German and Chinese and second factor was dosage of herbicide (3, 4, 4.5, 5 Liters per hectare). In this study, the cultivar was Shirin, Its growing period is 160-170 days. After planting, the irrigation done by leaking method. Data analysis was performed by using of SAS statistical program.

Result and discussion

Composition of weeds species

Six herbicide with high frequency were observed at field and they included: *Amaranthus retroflexus, Heliotropium lasiocarpum, Chenopodium album, Solanum nigrum,* and *Convolvulus arvensis.* In this order, Kucheki et al., (2008) reported that *Amaranthus retroflexus* is dominant weed in sugar beet field.

Weed Frequency after 15 and 30 days

According of ANOVA, Dosage and herbicide formulation had significant effect on weed frequency. German and Spanish formulations and doses of 4, 4.5 and 5 liters per hectare had the greatest percent reduction in the frequency of weed. German and Spanish formulation in dose of 5 liters per hectare showed lowest frequency. After 30 days, In between treatments, maximum reduction of frequency was obtained by using of Spanish formulation and 4.5 and 5 liter/ha.

Dry weight of weed after 15 and 30 days

Dosage and herbicide formulation had significant effect on Dry weight of weed. Doses of 4.5 and 5liters per hectare had the lowest dry weight also 4, 4.5 and 5 treatments showed largest reduction of weeds dry weight and 5 liter per hectare Germanium herbicide showed highest performance. According of ANOVA, Dosage and herbicide formulation had significant effect on dry weight of weed after 30 days. German herbicide was the best formulation with minimal weight (4/46 grams per square meter). Also, Comparisons of mean treatments stated that the best dose was 4 liters and it showed lowest weed dry weight (18.5 grams per square meter). The highest percentage of weight loss were belonging to the German formulation with 5 liters per ha dosage.

Weed dry matter at harvest time

According of ANOVA, Dosage and herbicide formulation had significant effect on weed dry matter at harvest time. Among the studied formulations, German formulation with the lowest weed dry matter (30.99 gr/ m^2) and Iranian formulation with greatest weight (52.33 grams per square meter) were the best and worst herbicide, respectively. Also among the different doses of herbicides, 4.5 and 5 treatment showed lowest weed dry matter and this treatment introduced as best dosage. The highest percentage of weight loss was observed by German formulation. Mazaheri (1998) said that about broadleaf are 70% of weeds in sugar beet fields and the rest belongs to the narrow leaf weeds. Barrosa et al., (2005) reported that by increasing the dose of herbicide, weed control increases. In general, increasing the dose of the herbicide causing more efficiently of herbicide and weed population was reduce by German formulation.

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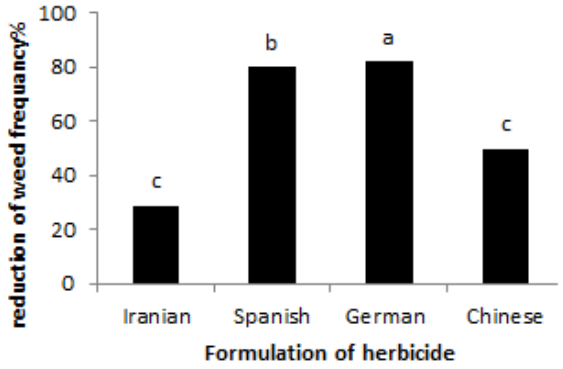

Fig 1. Reduction of weed frequency in response to formulation of herbicide after 15 days

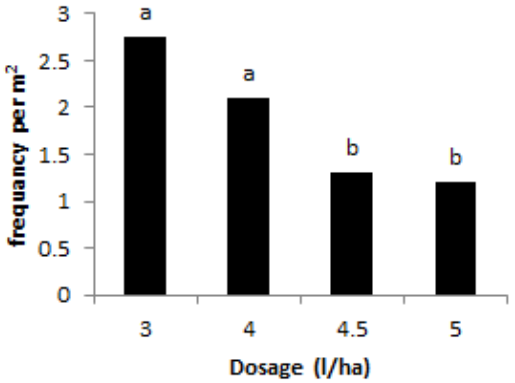

Fig 2. weed frequency in response to dosage of herbicide after 15 days.

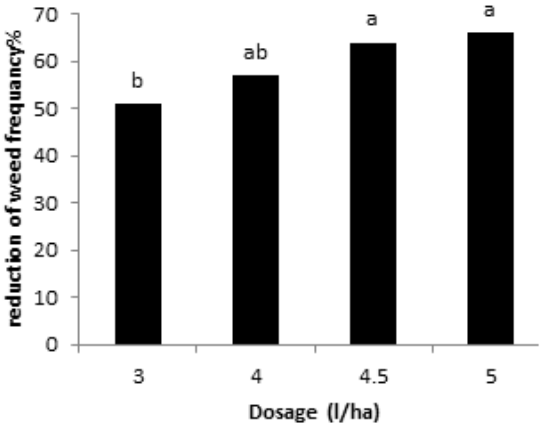

Fig 3. Reduction of weed frequency in response to dosage of herbicide after 15 days.

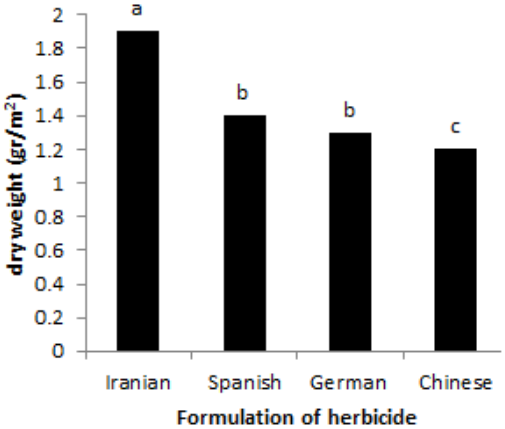

Fig 4. Dry weight of weed in response to formulation of herbicide after 15 days.

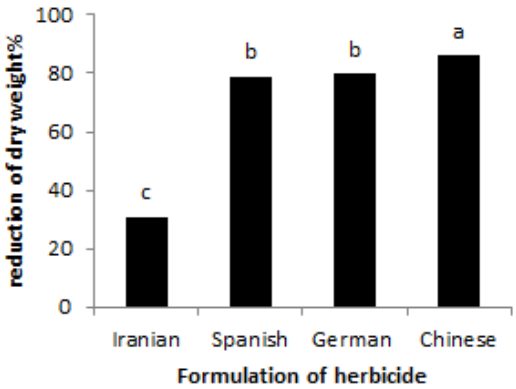

Fig 5. Reduction of dry weight in response to formulation of herbicide after 15 days.

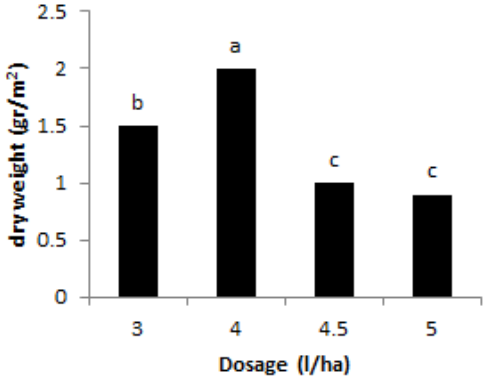

Fig 6. Dry weight of weed in response to dosage of herbicide after 15 days.

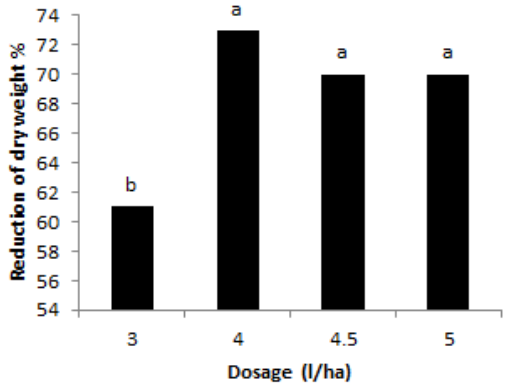

Fig 7. Reduction of dry weight in response to dosage of herbicide after 15 days.

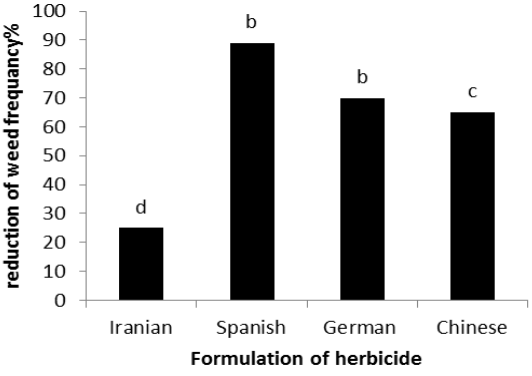

Fig 8. Reduction of weed frequency in response to formulation of herbicide after 30 days.

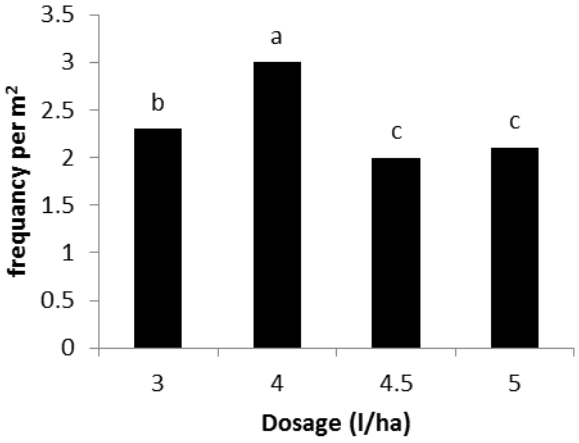

Fig 9. weed frequency in response to dosage of herbicide after 30 days.

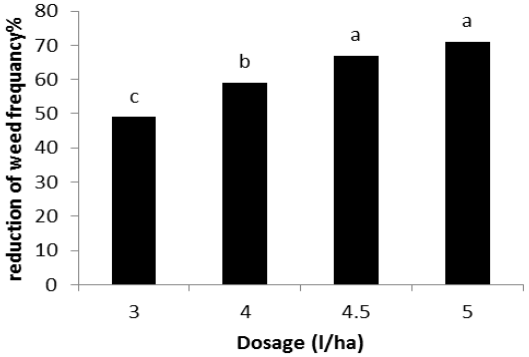

Fig 10. Reduction of weed frequency in response to dosage of herbicide after 30 days.

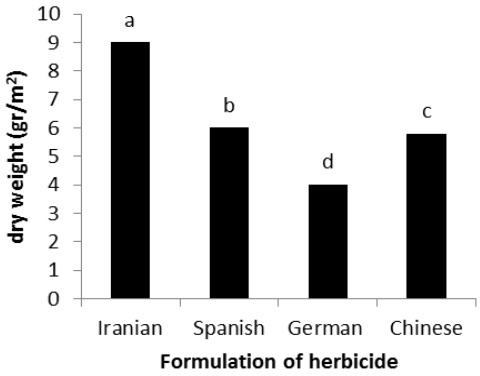

Fig 11. Dry weight of weed in response to formulation of herbicide after 30 days.

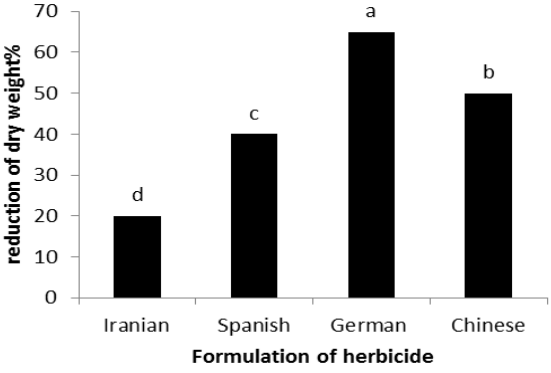

Fig 12. Reduction of dry weight in response to formulation of herbicide after 30 days.

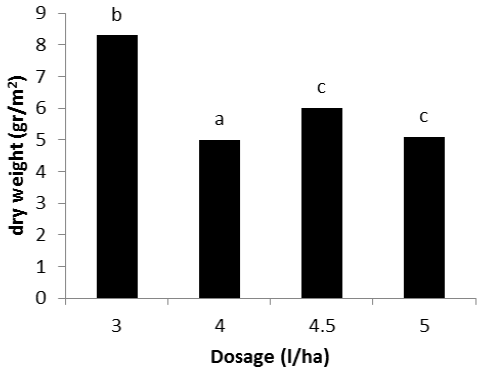

Fig 13. Dry weight of weed in response to dosage of herbicide after 30 days.

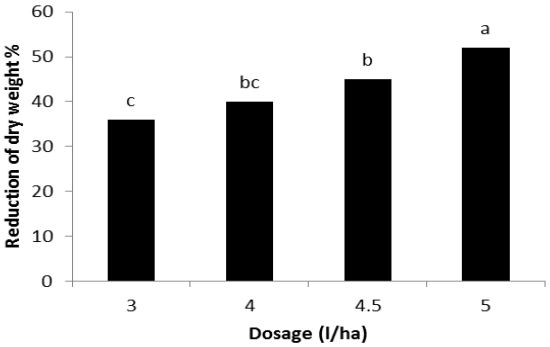

Fig 14. Reduction of dry weight in response to dosage of herbicide after 30 days.

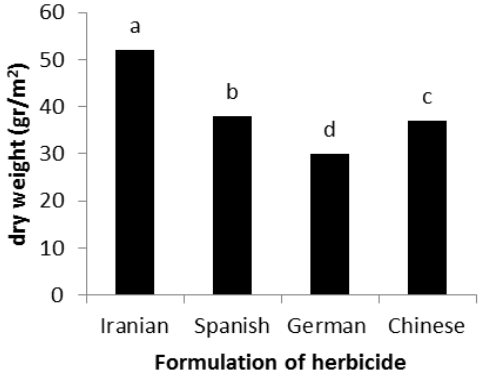

Fig 15. Dry weight of weed in response to formulation of herbicide at harvest time.

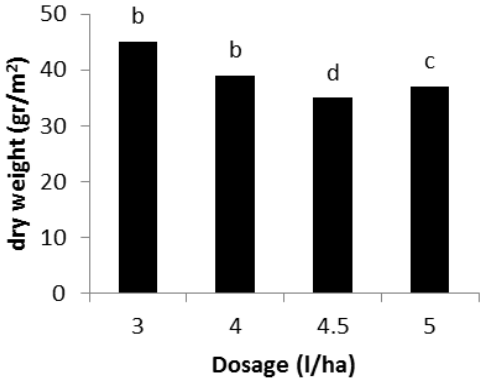

Fig 16. Dry weight of weed in response to dosage of herbicide at harvest time.

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