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Effect of Different Materials to Control *Conyza stricta* Weed in Sugarcane Crop

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Abstract: The effect of different materials to control *Conyza stricta* weed in sugarcane (Co. 1148) crop during 1999-2000 was evaluated. The treatments used were 2,4-D, Gesapex combi, Visa combi, Eucalyptus extract, Hand weeding, and Plastic covering along with control. The statistical analysis of the data showed that maximum *Conyza stricta* population and plant height was observed in control plots, while the minimum was in hand weeded plots. There was complete eradication of weeds in plastic covered plots. 2,4-D minimized the weed counts m^{-2} over Gesapex combi and Visa combi and other treatments except plastic covering. Among the herbicidal treatments, 2,4-D gave the lowest plant height. The highest fresh weight and dry weight of *Conyza stricta* was observed in control plots, while the lowest was in hand weeded plots. The various herbicides reduced sufficiently the fresh weight of *Conyza stricta*. 2,4-D reduced the dry weight of *Conyza stricta* than other tested expensive herbicides. It can be concluded that 2,4-D eradicate the broad leaved weeds in sugarcane and was found to be the best among chemicals, while plastic covering gave complete eradication.

Key words: Herbicides, weed, sugarcane, hand weeding, 2,4-D.

Introduction

In Pakistan, sugarcane (*Saccharum officinarum* L.) was grown over about an area of 1155.1 thousand hectares during 1998-99 with total production of 55191 tons. The average yield per hectare for the same year was 47.8 tones. The area under cultivation of sugarcane in N.W.F.P. during 1998-99, was 103.3 thousand hectares and total production was 47195 tones with an average of 45.7 tones per hectare (Anonymous, 1999). Due to increasing demand of sugar as a result of population increase, area under sugarcane is constantly increasing since independence. However, yield per unit area is decreasing rapidly for the last few years. The average yield of 38 tones per hectare is the lowest in the world (Habib *et al.*, 1985). The most important reason for low yield of sugarcane is improper weed control.

Conyza stricta weed in D.I. Khan frequently infests the sugarcane crop resulting in heavy loss of cane and sugar yield. The exact loss due to this weed to the cane yield and its components have never been assessed, so far in this region. In other countries, researchers as Harahab *et al.* (1994) and Ibrahim (1984) have registered a loss of 20 to 70% of cane yield and 10-20% sugar loss. Mechanical or manual weeding itself is a problem, particularly at the time when weeds are luxuriantly growing in sprouting cane and the growers are busy in the management of other crops at that time. Moreover, demand for higher wages of the labour force is another serious problem faced by the growers of the area. Thus under these circumstances the only alternative left for the growers to deal effectively with weeds is to use herbicides. Keeping in view the high cost of herbicides and pollution hazards, it was imperative to evaluate the efficiency of other materials along with herbicides for proper control of *Conyza stricta* weed in sugarcane crop under the ecological conditions of D.I. Khan (NWFP), Pakistan.

Materials and Methods

The experiment was carried out at the Agronomic Research Area, Faculty of Agriculture, Gomal University, D.I.Khan during the year 1999-2000. The experiment was laid out in a Randomized Complete Block Design with 7 treatments and 4 replications, using a net plot size of 4.5 x 7.5 m^2 . The sugarcane variety Co-1148 was planted in rows, 90 cm apart on 20th February 1999. The recommended amount of NPK at the rate of 175-70-45 $kg ha^{-1}$, respectively, was applied. The phosphorus and potassium along with one third of nitrogen was applied at seedbed preparation. The remaining nitrogen

was applied in two splits. The treatments included in this study were control, 2,4-D @ 3 $kg ha^{-1}$, Gesapex combi 80 w.p. @ 2.5 $kg ha^{-1}$, Visa combi @ 2.5 $L ha^{-1}$, aqueous extract of Eucalyptus (1:10) @ 24 $L ha^{-1}$, hand weeding and plastic covering.

All herbicides and aqueous extracts of Eucalyptus were applied at early growth stage of weeds. These materials were applied with the help of knapsack sprayer equipment having nozzle beam, for efficient spraying. In plastic covering treatments, weeds were fully covered with plastic sheets in between the rows of sugarcane. The data were recorded before spray and 30 days after spray on the following parameters. Weed count m^{-2} , weed plant height (cm), weed fresh weight (g) and weed dry weight (g).

Plant height was taken with the help of a meter rod. Plant population was recorded by counting the number of weeds m^{-2} . For fresh weight, five plants were taken randomly from each treatment and then the weight of each plant was taken. To record the dry weight, these plants were kept in sunlight for three days and then were kept in an oven for three days at 70 °C. After three days, plants were taken out from the oven and dry weight was recorded with the help of electric balance. The data recorded on different parameters were statistically analyzed according to appropriate statistical techniques (Steel and Torrie, 1984) for randomized complete block design.

Results and Discussion

Weed counts m^{-2} : Data with statistical analysis are presented in Table 1. The plant population was nearly similar in all the plots before application of various herbicides and other materials in sugar cane crop. The effect of various herbicides and materials on *Conyza* population was significant after 30 days in control plots, weed population was maximum (13.02) as the weeds were allowed to grow without any disturbance. Plastic mulching gave the best results by killing all the weeds in their respective plots. This could be the effect of plastic sheet on various physiological functions of plants leading to death by suffocation. As far as, the effect of materials on *Conyza* population is concerned, they had a significant effect on weed over control. However, they showed non-significant effect on plant population among themselves. So, plastic covering proved to be the best materials to control *Conyza stricta* during the early growth of sugar cane. 2,4-D, Visa combi and Gissapex combi showed almost similar results. Therefore, 2,4-D seemed to be the cheapest herbicide to control the *Conyza stricta* weed in sugarcane. Eucalyptus

Table 1: Effect of different materials on growth parameters of *Conyza stricta* weed in sugar cane.

Treatments	Weed counts m ⁻²		Weed plant height (cm)		Weed fresh weight (g)		Weed dry weight (g)	
	Before spray	After 30 days of spray	Before spray	After 30 days of spray	Before spray	After 30 days of spray	Before spray	After 30 days of spray
Control	11.27	13.02	37.58	132.61	49.03	96.38	20.92	35.67
2,4-D	14.70	1.00	36.58	46.75	48.00	39.33	18.58	7.75
Gissapex combi	10.70	1.00	35.32	47.76	46.33	39.25	18.25	8.65
Aqueous extract of Eucalyptus	15.00	8.41	35.92	129.4	46.33	86.58	18.58	18.52
Visa Combi	12.80	1.55	34.50	48.65	46.91	39.75	18.75	7.98
Hand weeding	13.14	0.66	34.92	0.82	47.50	5.52	18.50	2.33
Plastic covering	12.78	0.00	35.33	0.00	45.58	0.00	19.63	0.00
LSD at 0.05	NS	1.52	1.60	32.84	NS	3.54	NS	1.41

NS = Non-significant

extract suppressed the weeds but was not as efficient as other materials. Sunil and Khara (1991) reported similar results and found the inhibitory effect of Eucalyptus extract on root and shoot development of broad leaved weeds.

Weed plant height (cm): There was significant difference in *Conyza* plant height among various treatments (Table 1). The highest plant height (37.58 cm) was recorded in control followed by 2,4-D (36.58 cm), while the lowest (34.50 cm) was recorded in hand weeded plots. There was no significant difference in plant height among Gissapex combi, hand weeding and plastic covering. Similarly there was no significant difference in plant height recorded in aqueous extract of Eucalyptus and visa combi. The maximum plant height (132.61cm) was observed in control plot. *Conyza* plants were completely suppressed by plastic covering. Hand weeding gave minimum (0.816 cm) plant height. The probable reason of low plant height might be root damage by tools in hand weeding. Sunil and Khara (1991) reported similar results and found the inhibitory effect of Eucalyptus extract on root and shoot development of broad leaved weeds. Songwu *et al.* (1996) concluded that a wide range of herbicides and mechanical methods are needed for successful weed control, while Eucalyptus extract only inhibit the weed growth in sugarcane.

Weed fresh weight (g): Analysis of variance of the data showed that the variation among various treatments regarding fresh weight of *Conyza* before spray was non-significant (Table 1). However, maximum fresh weight (49.037 g) was observed in control plots. While minimum (39.583 g) was in plots covered with plastic sheet. Different herbicides and materials significantly affected the fresh weight of *Conyza* after spray. The highest fresh weight (86.01g) was observed in control plots while the minimum fresh weight (11.41g) was found in hand weeded plots. All the three herbicides affected the fresh weight of *Conyza* significantly with respect to control. However, the effect of herbicides was non-significant among themselves. No new plant was either germinated or sprouted in plots where plastic mulching was practiced. Singh *et al.* (1987) and Nawanaki *et al.* (1991) reported the control over broad leaved weeds with the application of different herbicides. While Songwu *et al.* (1996) concluded that a wide range of herbicides and mechanical methods are needed for successful weed control while Eucalyptus extract only inhibit the weed growth in sugarcane.

Weed dry weight (g): It is clear from Table 1 that the variation regarding dry weight of *Conyza* before spray among various treatments was not significant. Data regarding the dry weight of *Conyza stricta* after spray indicated that different herbicides and materials had a significant effect on dry weight. Maximum

Conyza stricta dry weight (35.67 g) was recorded in control treatment. Minimum dry weight (2.33 g) was recorded in hand weeded treatment. All the three herbicides had a significant effect on dry weight with respect to control. However the effect of Gesapex combi and aqueous extract of Eucalyptus was significant with respect to control and non-significant with each other. Similarly herbicides 2,4-D and Visa combi had a significant effect on dry weight with respect to control and non-significant with one another. The probable variation in dry weight among various treatments can be attributed to the stunted growth of *Conyza stricta* by herbicides and materials effect resulting in low dry weight as compared to control treatments. Afghan (1996) reported that post emergence application of Gesapex combi, 2,4-D, atrazine and Tritan exhibited effective control of both broad leaved and grassy weeds in sugarcane.

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