Effect of Pendimethalin on Weed flora and Yield component of Brinjal under Agro- climatic condition of Tripura

Subhra Shil
SMS (Horticulture),
And
Dipak Nath
SMS (Agril. Extension)
KVK, West Tripura

Abstract

The field experiments were carried out at the "INSTRUCTIONAL FARM" of Krishi Vigyan Kendra, West Tripura, Chebri, Tripura during Rabi season of 2014 to evaluate the effect of pendimethalin in controlling weeds of Brinjal (*Solanum melongena* L.). Treatment comprised of T_1: Hand weeding at 30 DAT, T_2 : Pendimethalin (@ 1.5 lit/ha): 3-5 DAT, T_3: Pendimethalin (@ 1.5 lit/ha) 3-5 DAT + Hand weeding 30 DAT, T_4: Control. It is observed that weed dry matter at all the stages of crop growth period is significantly higher in case of un weeded control due to unchecked growth of weeds; lowest weed dry biomass 4.34, 11.49, 33.54 and highest weed control efficiency (WCE %) 84.23, 73.39, 47.61 recorded at 30, 60 and 90 DAT incase of Pendimethalin (@ 1.5 lit ha^{-1} at 3-5 DAT + Hand Weeding at 30 DAT at all the stages of crop along with highest yield attribute 21.43t/ha.

Key words: *Weed, Brinjal, Tripura*

Introduction

Brinjal (*Solanum melongena* L.) is an important commercial vegetable crop. It belongs to the family solanaceae. Brinjal is also variously known as Egg plant or Aubergine (French name) or Guineasfaush. It is one of the most common, popular and principal vegetable crops grown in India and other parts of world. Brinjal is a source of phosphorus (47 mg/100g) Carotene (74 µg) 12mg/100g of vitamin C, as well as possessing some medicinal properties (Shukla and Naik, 1993). In India, it is cultivated in about 5.66 lakhs hectares with a production of 9.596 million tonnes and productivity of 16.9 t/ha (Anon 2008).Weeds emerge fast and grow rapidly competing with the crop severally for growth resources *viz*., nutrients, moisture, sunlight and space during entire vegetative and early reproductive stages of tomato. Presence of weeds reduces the photosynthetic efficiency, dry matter production and its distribution to economical parts and there by reduces sink capacity of crop resulting in poor fruit yield. Weeds pose most serious problem in brinjal cultivation because of liberal use of

farmyard manure, chemical fertilizers and frequent irrigations that help the weeds to grow vigorously. It has been well established that losses from weeds accounts for 45 per cent more than when compared to insect, pest and diseases about 30 and 20 per cent, respectively (Rao, 1993). Yield reduction due to weed competition in brinjal is in the range of 49 to 90 per cent (Reddy *et al*. 2000). In most of the vegetables crops, the early growth period is the most critical stage at which stresses of any kind affects the economic yields. Weed competition is one such important stress during this period. Besides, this period coincides with the season of peak labour activity leading to scarcity of labour for weeding. This adds to the already high costs of production. So proper weed control method, therefore, is the prime need and very much essential to give herbicide usage its share to obtain maximum productivity. The choice of any weed control measures therefore, depends largely on its effectiveness and economics. Use of pre-emergent herbicides would make the herbicidal weed control more acceptable to farmers, which will not change the existing agronomic practices but will allow for complete control of weeds (Adhikary and Ghosh, 2014). Keeping all this in view, the present study was carried out to find out the effect of pendimethalin on weed control efficiency, and yield attributes in brinjal.

Material and Methods

The field experiment was conducted during Rabi season of 2013 at the experimental field of KVK, West Tripura. The experimental soil was well drained, alluvial in nature and sandy loam in texture, having pH 5.5. The variety used in this experiment was Bombai. The treatments consisted of T_1: HW at 30 DAT, T_2: Pendimethalin @ 1.5 lit ha^{-1} at 3-5 DAT, T_3: Pendimethalin @ 1.5 lit ha^{-1} at 3-5 DAT + HW 30 DAT, T_4: Control. Spraying was done with knapsack sprayer with floodjet deflector WFN 040 nozzle using 500 littre of water ha^{-1}. All the recommended improved package of practices was followed in this experiment including the plant protection measures. Predominant weed biomass, weed control efficiency were recorded at 30, 60 and 90 DAT.

Dry weight of weeds (g/0.25 m2): The weeds were uprooted from the 0.25 m2 area selected at random each time and were oven dried to a constant weight at 65°C and the oven dry weight of weeds was recorded. The dry weight of weeds was expressed as g per 0.25 m2.

Weed control efficiency (%): Weed control efficiency (WCE) denotes the magnitude of weed reduction due to weed control treatment. It was worked out by using the formula suggested by Mani *et al.* (1973) and expressed in percentage.

WUE (%) = Dry weight of weeds in unweeded control – Dry weight of treatment plot / Dry weight of weeds in unweeded control X 100

The data were subjected to statistical analysis by analysis of variance method. The correlation studies were made to reveal the association among the variables in the investigation (Gomez and Gomez, 1984). As the error mean squares of the individual experiments were homogenous, combined analysis over the years were done through weighted analysis. Here, the interaction between years and treatments were not significant.

Result and Discussion

Efficiency of different treatment studied in the experiment in controlling the weeds in brinjal found effective in decreasing the weed dry weight and increases the weed control efficiency. Weed dry matter is a better parameter to measure the competition than the weed number (Murthy, 1982, Chnnappagoudar *et al*, 2013). In the present study, unweeded control recorded significantly higher weed dry matter at all the stages of crop growth period due to unchecked growth of weeds (Table 1). WCE at 30 DAT is almost equal incase of T_2 (84.34) and T_3 (84.23). But WEC gradually decreases incase of T_3. Among all the treatment lowest weed dry biomass 4.34, 11.49, 33.54 and highest weed control efficiency (WCE) 84.23, 73.39, 47.61 recorded at 30, 60. 90 DAT incase of Pendimethalin (@ 1.5 lit ha^{-1} at 3-5 DAT + Hand. The lower weed dry weight in weed control treatments may be ascribed to the less number of weeds, rapid depletion of carbohydrate reserves of weeds through rapid respiration (Dakshinadas, 1962) and may be due to reduced photosynthetic activity (Hilli and Santkemann,1969). The herbicides when used in combination with one or two hand weedings, improves their efficiency and the pre-emergent herbicides are beneficial to keep the crop weed free in the early stages. During later stages, hand weeding helps to reduce the cost of weeding and keep the weed population below the economic threshold level throughout the crop growth period. (Shivalingappa *et al*., 2014)

Table 1: Effect of treatments on Weed

Treatment	Weed dry biomass ($g.m^{-2}$)			Weed control Efficiency (WCE)		
	30 DAT	60 DAT	90 DAT	30 DAT	60 DAT	90 DAT
HW at 30 DAT	27.47	11.42	35.43	0	73.55	44.65
Pendimethalin (@ 1.5 lit ha^{-1} at 3-5 DAT	4.30	17.26	38.02	84.34	60.03	40.60
Pendimethalin (@ 1.5 lit ha^{-1} at 3-5 DAT + HW 30 DAT	4.34	11.49	33.54	84.23	73.39	47.61
Control	27.47	43.18	64.01	0	0	0
$LSD_{0.05}$	1.65	1.21	1.25	-	-	-

Table 2: Effect of treatments on Yield

Treatment	No. of fruits plant $^{-1}$	Individual Fruit weight (g)	Fruit Yield (t ha^{-1})
HW at 30 DAT	20.33	58.64	18.10
Pendimethalin (@ 1.5 lit/ha): 3-5 DAT	17.55	53.21	17.22
Pendimethalin (@ 1.5 lit/ha): 3-5 DAT + HW 30 DAT	23.53	63.47	21.43
Control	14.73	53.71	13.76
LSD $_{0.05}$	1.75	1.96	2.13

Data presented in Table: 2 revealed that yield and yield component of brinjal is significantly influenced by different weed control method. The data on numbers of fruits per plant, Individual fruit weight, total fruit yield indicated significant difference due to herbicide treatments and crop weed competition. Highest fruits per plant (23.53), Individual fruit weight (63.47) and total fruit yield (21.43) is recorded in case of Pendimethalin (@ 1.5 lit/ha): 3-5 DAT + Hand Weeding at 30 DAT (T_3) followed by hand weeding at 30 DAT (T_1). Similar findings were also reported by Singh *et al.*(1997) , Mekki *et al.* (2010) and Kunti and Singh (2012). However, lowest fruits per plant, Individual fruit weight, total fruit yield is recorded in case of unweeded control (T_4).

Conclusion

The present study revealed that Pendimethalin @ 1.5lit ha^{-1} as pre-emergence herbicide along with One hand weeding at 30 DAT have more significant among treatments which results less dry weight (g), high weed control efficiency (WCE %) and highest yield attribute comparing with all the treatments at 30, 60, 90 DAT.

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