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Influence of Weeding on the Performance of White Maize Varieties

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Abstract

The experiment was conducted at agronomy farm of Sher-e-Bangla Agricultural University, Dhaka from November 2017 to April 2018 to investigate the influence of weeding regimes on the performance of white maize varieties. The experiment comprised two varieties *viz.* YANGNUO-3000 and PSC-121, designated as V_1 and V_2 respectively combined with four weed control treatments *viz.* T_0 = No weeding, T_1 = One hand weeding at 60 DAS (days after sowing), T_2 = two hand weeding at 40 DAS and 60 DAS and T_3 = Weed free after 40 DAS. The experiment was laid out in RCBD (factorial) with three replications. PSC-121 showed the superior performance in terms of plant height, leaf number plant^{-1}, number of grains cob^{-1} (468.75), 100 grains weight (35.0837 g), grain yield (8.28 t ha^{-1}), stover yield (6.56 t ha^{-1}) and harvest index (55.58%) over YANGNUO-3000. In the case of weed control treatments, the highest plant height, leaf number plant^{-1}, number of grains cob^{-1} (464.54), 100 grains weight (37 g), grain yield (9.25 t ha^{-1}) and stover yield (7.46 t ha^{-1}) were reported from T_3. All the parameters studied were found lowest with T_0. However, in terms of interaction, no single interaction was superior to other alternatives. But in most of the cases V_2T_3 showed the highest values regarding the maximum plant height, leaf number plant^{-1}, number of grains cob^{-1} (494.97) and 100 grains weight (38 g). V_2T_3 showed the highest grain yield (9.33 t ha^{-1}), whereas, V_1T_0 showed the lowest grain yield (5.49 t ha^{-1}). The lowest weed density and weed biomass (12.17 no. m^{-2} and 4.33 g·m^{-2}) was recorded from T_3. The highest weed control efficiency (94.38%) was also recorded from T_3. In the case of variety V_2 showed better performance in terms of weed density, weed biomass and WCE (46.32%).

Keywords

White Maize, Hand Weeding, Yield, PSC-121, Hybrid Variety

1. Introduction

Among the cereal crops maize is the third most important one in the world providing a major source of food in many countries. It is mainly grown as fodder and feed. In the industrialized countries, it is used as raw material for manufacturing pharmaceutical and other industrial products [1]. Rice is the major staple food in Bangladesh but globally the yield growth of rice has become either stagnated or slowed down [2]. At present, agricultural land is shrinking due to urbanization, industrialization and infrastructure development but the demand for food is increasing with growing population and rising income. Introduction of white maize in Bangladesh as human food can be a viable alternative for sustaining food security given the productivity of maize much higher than rice and wheat [3]. Maize is a comparatively new crop in Bangladesh. It is suitable for rice-maize cropping system and has been expanded rapidly in the northern districts of Bangladesh [4], mainly in response to increasing demand for poultry food [5]. Currently maize is planted to about 307,000 ha producing 2.12 million tons of grains annually [6]. In the Chittagong Hill Tracts (CHT) maize is grown since long as a secondary staple crop for the ethnic communities contributing to 2.1% of national production. With the advancement in breeding and biotechnology high yielding modern varieties and hybrids of maize are developed. In addition, improvement in agronomic management practices also contributes greatly to increasing grain yields [7]. However, the yield performance differs remarkably across hybrids depending on environmental conditions, agronomic management and choice of varieties. The growth and yield attributes of maize differ among and between local and hybrid maize varieties [8] [9]. Different agronomic management has different degrees of impact on growth and yield of maize. Among those agronomic management practices weeding is the most important one. Weed management practices significantly influenced the growth attributes at different growth stages [10]. White maize is most sensitive to weed competition during its early growth period. The growth of white maize plants in the first week is rather slow and weeds establish rapidly and become competitive during this period. Maximum weed competition in white maize occurs during 3-and 14 leaf stage of plant development which is 2 to 6 weeks after sowing. It is important to maintain the fields weed free during this critical period of weed competition. Worldwide maize production is decreased to about 40% due to competition from weeds, which are the most dominant pest groups [11]. Another report shows that yield losses in maize fields due to weeds infestation range from 50% - 90% in Central and West Africa [12]. Weed control in white maize has not received adequate attention on the part of farmers and season in which weeding operations are performed depends on the availability of time, labor and cash. An appropriate weeding frequency can help to alleviate yield losses due to weeds. There are different kinds of weed control methods *viz*., Chemical methods, biological methods, hand weeding method etc. Different levels of hand weeding were used to conduct this experiment. Therefore, the objective of this

work was set: to compare the growth and yield of different white maize varieties, to evaluate the performance of different weed control treatments on the performance of white maize varieties, to evaluate the interactions of white maize varieties and weed control treatments.

2. Materials and Methods

The present experiment was conducted at Agronomy farm of Sher-e-Bangla Agricultural University, Dhaka, Bangladesh. The location of the experimental site is 23˚74'N latitude and 90˚35'E longitude and at an elevation of 8.2 m from sea level. The experimental area was under the sub-tropical climate. The soil of the experimental area is medium high land having red brown terrace soil. Two factors were used in the present experiment to get 8 treatment combinations which were as Factor A: Variety (02) (V_1 = Yangnuo-3000, V_2 = PSC-121). Factor B: Weed control treatments (04) (T_0 = No Weeding, T_1 = One hand weeding at 60 DAS (days after sowing), T_2 = Two hand weeding at 40 DAS (days after sowing) and 60 DAS (days after sowing), T_3 = Weed free after 40 DAS (days after sowing)). Eight treatment combinations are as follows-V_1T_0, V_1T_1, V_1T_2, V_1T_3, V_2T_0, V_2T_1, V_2T_2 and V_2T_3. The experiment was laid out in factorial RCBD with three replications. The total number of unit plots was 24. The size of each unit plot was 2.40 m × 2.50 m. The distance maintained between the unit plots and blocks were 0.70 m and 1.0 m respectively. Healthy seeds of PSC-121 and Yangnuo-3000 were collected from the seed store of Krishi Gobesona Foundation. The experimental field was first opened on September, 2017 with the help of a power tiller and prepared by three successive plowing and cross-plowing followed by laddering. All kinds of weeds and residues of previous crop were removed from the field. Individual plots were cleaned and finally leveled with the help of wooden plank. Manures and fertilizers that were applied to the experimental plot presented in Table 1. Total amount of TSP, MoP (murate of potassium), Gypsum, Zinc sulphate, Boric acid and half of Urea were applied as basal dose at the time of land preparation. The rest amount of Urea was applied at 25 days after seed sowing and before flowering. Seeds were sown on the 23rd November, 2017 in line sowing method. Seeds were sown by maintaining the spacing of 60 cm × 20 cm with two seeds per hill. The intercultural operations like thinning, irrigation were done for ensuring the normal growth of the experimental crop. Weeding was done as a part of the treatment factor B. The sampling was done consecutively at 40, 60, 80 DAS and finally at harvest. At each sampling, five plants were selected randomly from each plot. The crop was harvested at 10th April, 2018 when the leaves, stems become yellowish and the base of the grain turns into black color. After collecting the necessary data like Weed species present in the field, Weed density (no. m^{-2}), Weed biomass ($g{\cdot}m^{-2}$), Weed control efficiency (WCE %), Plant height (cm), Number of leaves $pant^{-1}$, Number of grains cob^{-1}, 100 grains weight (g), stover and grains (at final harvest) were oven dried at 60˚C for 72 hours to record constant dry weights to

Table 1. Dose and method of application of fertilizers in white maize field.

Name of manure and fertilizer	Doses	Methods of application
Cow dung	5 t ha^{-1}	Total as basal
Urea	525 kg ha^{-1}	1/3rd as basal and 2/3rd as top dressing
TSP	250 kg ha^{-1}	Total as basal
MoP	200 kg ha^{-1}	Total as basal
Gypsum	250 kg ha^{-1}	Total as basal
$ZnSO_4$	12.5 kg ha^{-1}	Total as basal
Boric acid	6.0 kg ha^{-1}	Total as basal

Source: KGF, 2016.

collect the data like Grain yield (t ha^{-1}), Stover yield (t ha^{-1}) and Harvest index (%).Weed control efficiency was analyzed by following the formula, WCE% = $\{(W_0 - W_t)/W_0 \times 100\}$ (Where, WCE = Weed control efficiency, W_0 = No. weed present in per square meter of weedy check plot, W_t = No. of weed present in per square meter of treated plot). The yield per hectare was computed by converting the yield per plant to yield per hectare by using the following relation: Yield per hectare = [{(mean grain yield per plant × 83,000) ÷ 1000} ÷1000]; (83,000 plants stand when planting spacing is maintained to 60 cm × 20 cm) [13]. After that the stover yield of the mean dry weight value of the five plants was derived by using the following formula: Stover Yield = [{(mean dry weight of shoot excluding cob × 83,000) ÷ 1000} ÷ 1000]; (83,000 plants stand when planting spacing is maintained to 60 cm × 20 cm) [13]. The following formula was used to calculate. Harvest index (%) = {(Grain yield/Biological yield) × 100}. The analyses of variance were done following RCBD (factorial) with the help of a computer package program Statistix-10. The mean values were compared using LSD at 5% level of significance.

3. Results and Discussion

The results obtained from the study have been presented, discussed and the possible interpretation has also been given under the following headings.

3.1. Weed Parameters

Figure 1 shows the effect of variety on weed parameters. From the experiment it was found that though there was a numerical difference between the varieties in terms of weed parameters but the difference was not statistically similar. Higher weed population (118.33 no. m^{-2}) and weed biomass (74.42 $g{\cdot}m^{-2}$) was found from V_1 as compared to that of V_2. On the other hand, the maximum weed control efficiency (46.32%) was recorded from V_2 as compared to that of V_1 (44.92%). PSC-121 was reported as better performer than Yangnuo-3000 in terms of most of the growth parameters [14].

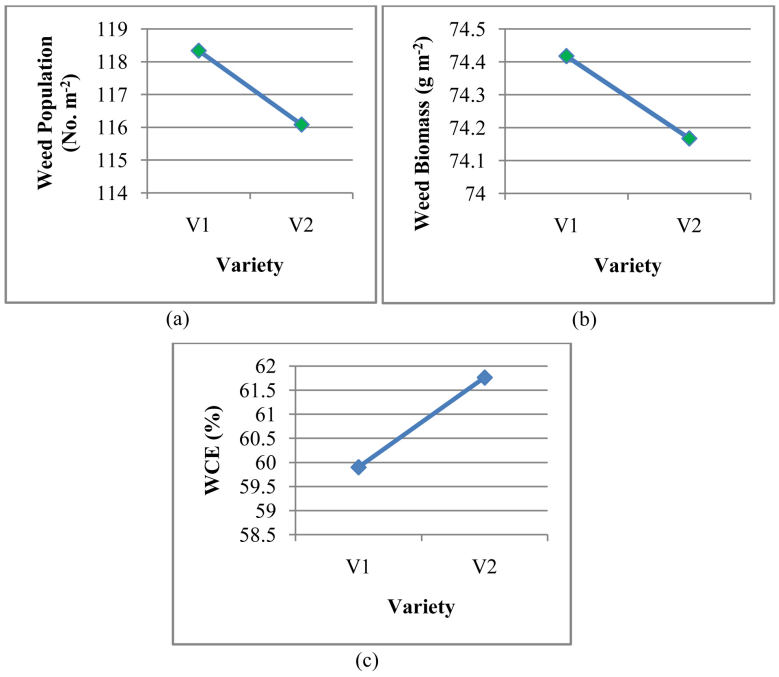

Figure 1. Effect of variety on weed parameters [(a): Weed Population (no. m^{-2}); (b): Weed Biomass ($g \cdot m^{-2}$); (c): Weed Control Efficiency (WCE%)]. V_1 = YANGNUO-3000, V_2 = PSC-121 ($LSD_{0.05}$ = 9.60, 5.80 and 3.52 for (a), (b) and (c) respectively).

The weed community of the experimental field was comprised of *Eleusine indica*, *Cyperus rotundus*, *Cynodon dactylon*, *Jussiaea repens*, *Commelina benghalensis*, *Physalis heterophylla*, *Desmodium trifolia*, *Brassica kaber.* Among the weed species, *Eleusine indica* was of most abundant one counting more than fifty percent of total weed community were present in per square meter of the experimental field. From the experiment it was revealed that the T_3 (Weed free after 40 DAS) treated plots showed supreme result regarding reduced weed density (12.17 no. m^{-2}), minimum weed biomass (4.33 $g \cdot m^{-2}$) and weed control efficiency (94.38%) and it was followed by T_2 (two hand weeding at 40 DAS and 60 DAS) (Table 2). However, T_0 gave the worst result giving the highest weed density in terms of both weed number and biomass per meter square. All the four treatments were significantly different from each other in terms of weed density (no. m^{-2}), weed biomass ($g \cdot m^{-2}$) and weed control efficiency. Atrazine 1 kg ha^{-1} with hand weeding and 2 hand weeding with paddy straw mulching that helps to minimize weed population [15].

Interaction effect of variety and weed control treatments are presented in the Table 3. There was no significant difference among the treatments. From the experiment it was observed that V_2T_0 showed the maximum weed density (211.67 no. m^{-2}) and it was statistically similar with that of V_1T_0. However, the lowest weed density (11.67 no. m^{-2}) was recorded from V_1T_3. In case of weed biomass, the highest result (153.33 $g \cdot m^{-2}$) was recorded from V_1T_0 whereas the lowest one was recorded from V_1T_3 and V_2T_3 simultaneously. On other hand, the

Table 2. Effect of weed control treatments on weed density, biomass and weed control efficiency at harvest.

Treatments	Weed density (No. m^{-2})	Weed biomass ($g \cdot m^{-2}$)	WCE (%)
T_0	216.00 a	153.17 a	0.00 d
T_1	154.83 b	96.33 b	27.94 c
T_2	85.83 c	43.33 c	60.16 b
T_3	12.17 d	4.33 d	94.38 a
$LSD_{(0.05)}$	**13.58**	**8.21**	**4.99**
CV (%)	**9.36**	**8.93**	**8.83**

T_0 = no weeding; T_1 = one hand weeding at 60 DAS; T_2 = two hand weeding at 40 DAS and 60 DAS; T_3 = weed free after 40 DAS.

Table 3. Interaction effect of variety and weed control treatments on weed parameters.

Treatments	Weed density (No. m^{-2})	Weed biomass ($g \cdot m^{-2}$)	WCE (%)
V_1T_0	220.33 a	153.33 a	0.00 d
V_1T_1	157.67 b	99.33 b	27.51 c
V_1T_2	83.67 c	40.67 c	58.13 b
V_1T_3	11.67 d	4.33 d	94.04 a
V_2T_0	211.67 a	153.00 a	0.00 d
V_2T_1	152.00 b	93.33 b	28.36 c
V_2T_2	88.00 c	46.00 c	62.19 b
V_2T_3	12.67 d	4.33 d	94.72 a
$LSD_{(0.05)}$	**19.20**	**11.61**	**7.05**
CV (%)	**9.36**	**8.93**	**8.83**

V_1 = YANGNUO-3000; V_2 = PSC-121; T_0 = no weeding; T_1 = one hand weeding at 60 DAS; T_2 = two hand weeding at 40 DAS and 60 DAS; T_3 = weed free after 40 DAS.

highest weed control efficiency (94.72%) was recorded from V_2T_3 which was statistically similar with that of V_1T_3.

3.2. Growth Parameters

3.2.1. Plant Height (cm)

Table 4 shows the variety have a significant effect on plant height at all stages except 80 DAS and harvest stage. In all four stages (40, 60, 80 DAS and at harvest) V_2 showed the highest plant height (85.63 cm, 121.38 cm, 172.75 cm and 203.68 cm at 40, 60, 80 DAS and at harvest respectively) over V_1. The white maize modern variety (Suvra) showed the highest value of plant height over landraces (plough 201 and plough 202) while conducting an experiment in Bangladesh [9].

Influence of weed control treatments on plant height is shown on Table 5. The highest plant heights (83.00 cm, 121.25 cm, 180.33 cm and 204.03 cm at 40, 60, 80 DAS and at harvest respectively) were recorded from T_3 followed by T_2.

Table 4. Effect of variety on growth parameter.

Variety	Plant height (cm)				Number of leaves per plant			
	40 DAS	60 DAS	80 DAS	Harvest	40 DAS	60 DAS	90 DAS	Harvest
V_1	70.45 b	107.12 b	172.35 a	188.58 a	4.61 a	8.75 b	11.833 a	12.4 b
V_2	85.63 a	121.38 a	172.75 a	203.68 a	4.75 a	11.04 a	12.5 a	13.29 a
$LSD_{(0.05)}$	**3.60**	**7.92**	**ns**	**ns**	**ns**	**0.88**	**ns**	**0.64**

V_1 = YANGNUO-3000 and V_2 = PSC-121, ns = nonsignificant.

Table 5. Effect of weed control treatments on growth parameter.

Weed control treatments	Plant height (cm)				Number of leaves per plant			
	40 DAS	60 DAS	80 DAS	Harvest	40 DAS	60 DAS	90 DAS	Harvest
T_0	72.68 c	106.85 b	156.92 b	188.89 b	4.61 a	9.42 b	12 a	12.73 a
T_1	76.27 bc	112.67 ab	176.12 a	194.03 ab	4.61 a	9.5 b	12 a	12.77 a
T_2	80.20 ab	116.25 ab	176.83 a	197.57 ab	4.72 a	9.92 ab	12.33 a	12.85 a
T_3	83.00 a	121.25 a	180.33 a	204.03 a	4.78 a	10.75 a	12.33 a	13.03 a
$LSD_{(0.05)}$	**5.09**	**11.20**	**13.12**	**13.86**	**ns**	**1.24**	**ns**	**ns**

T_0 = no weeding; T_1 = one hand weeding at 60 DAS; T_2 = two hand weeding at 40 DAS and 60 DAS; T_3 = weed free after 40 DAS and ns = nonsignificant.

Both T_3 and T_2 were statistically similar to each other. The lowest plant heights were recorded from T_0 and it was statistically similar with T_1 at all four stages except 80 DAS. Weed management practices have no significantly influence on growth attributes as plant height at different growth stages.

Interaction effect of variety and weed control treatments are listed in **Table 6**. No significant difference among the means was recorded. In case of plant height at 40 DAS and at harvest, the highest (90.89 cm and 217.00 cm respectively) and the lowest (63.23 cm and 176.58 cm respectively) plant height was found from V_2T_3 and V_1T_0. While, the maximum and the minimum plant height of 128.5 (V_2T_1) cm and 96.83 cm (V_1T_1) respectively were recorded at 60 DAS. In case of 80 DAS, V_2T_3 showed the highest plant height (184.00 cm) and V_2T_0 showed the lowest plant height of 150.00 cm.

3.2.2. Leaf Number Plant^{-1}

Table 4 represents the significant difference between varieties regarding leaf number plant^{-1} at 60 DAS and at harvest. At 40 and 80 DAS the parameter was not significant between varieties. The maximum leaf number plant^{-1} (4.75, 11.04, 12.5 and 13.29 at 40, 60, 80 DAS and at harvest respectively) was recorded from V_2 and the lowest result was obtained from V_1. The number of leaves in the modern varieties differed from 11.66 to 13.66 plant^{-1} with a mean value of 12.88 plant^{-1} [9].

Influence of different weed control treatments are shown in **Table 5**. There was no significant difference among the weed control treatments regarding leaf number plant^{-1}. The highest leaf number plant^{-1} was recorded from T_3 followed by T_2. The lowest outcome was recorded from T_0. Initial stage of growth

Table 6. Interaction effect of variety and weed control treatments on growth parameter.

Treatment Combinations	Plant height (cm)				Number of leaves per plant			
	40 DAS	60 DAS	80 DAS	Harvest	40 DAS	60 DAS	80 DAS	harvest
V_1T_0	63.23 e	110.83 b-d	163.83 bc	176.58 c	4.44 a	7.66 e	12.00 a	12.40 ab
V_1T_1	68.66 de	96.83 d	176.57 ab	194.00 bc	4.56 a	9.00 de	11.33 a	11.86 b
V_1T_2	74.77 d	104.83 cd	172.33 ab	192.67 bc	4.89 a	9.00 de	12.00 a	12.46 ab
V_1T_3	75.11cd	116.00 a-c	176.67 ab	191.07 bc	4.56 a	9.33 c-e	12.00 a	12.86 ab
V_2T_0	82.11bc	102.87 cd	150.00 c	201.20 ab	4.78 a	11.16 ab	12.00 a	13.06 ab
V_2T_1	83.87ab	128.50 a	175.67 ab	194.07 bc	4.67 a	10.00 b-d	12.67 a	13.66 a
V_2T_2	85.63 ab	127.67 a	181.33 ab	202.47 ab	4.56 a	10.83 a-c	12.67 a	13.23 a
V_2T_3	90.89 a	126.50 ab	184.00 a	217.00 a	5.00 a	12.16 a	12.67 a	13.20 a
$LSD_{(0.05)}$	**7.20**	**15.84**	**18.55**	**19.60**	**ns**	**1.76**	**ns**	**1.28**
CV(%)	**5.27**	**7.92**	**6.14**	**5.71**	**9.50**	**10.20**	**7.48**	**5.70**

V_1 = YANGNUO-3000; V_2 = PSC-121; T_0 = no weeding; T_1 = one hand weeding at 60 DAS; T_2 = two hand weeding at 40 DAS and 60 DAS; T_3 = weed free after 40 DAS and ns = nonsignificant.

maize is highly susceptible to weed competition [16].

Table 6 shows that there was no significant difference among the interactions in all four stages. The maximum number of leaf plant^{-1} (5.00, 12.17 and 12.67) at 40, 60 and 80 DAS respectively from V_2T_3 while, at harvest, the maximum number of leaf plant^{-1} was recorded from V_2T_1 (13.67). The minimum number of leaf plant^{-1} was recorded from V_1T_0 (4.44 and 7.67 at 40 and 60 DAS respectively) and V_1T_1 (11.33 and 11.87 at 80 DAS and at harvest respectively).

3.3. Yield Parameters

3.3.1. Number of Grains Cob^{-1}

Effect of variety on number of grains cob^{-1} is shown in Table 7. From the experiment it was found that there was significant difference between varieties regarding the number of grains cob^{-1}. V_2 showed the maximum number of grains cob^{-1} (468.75) over V_1 (427.06).

Table 8 revealed that the effect of weed control treatments on number of grains cob^{-1}. The highest number of grains cob^{-1} was recorded from T_3 (464.54) which followed by T_2. The lowest number of grains cob^{-1} was obtained from T_0 (418.53). T_3 and T_2 were statistically significant over T_0. The highest number of grains cob^{-1} come from hand weeded plot over the no weeding and other treatment plots [5] [17].

The experiment revealed that there was no significant statistical difference among weed control treatments irrespective of numerical difference among treatments (Table 9). From the experiment it was revealed that the maximum number of grains cob^{-1} (494.97) was given by V_2T_3. However, V_2T_1 and V_1T_2 were statistically similar with V_2T_3. The minimum number of grains cob^{-1} (375.72) was recorded from V_1T_0.

Table 7. Effect of variety on yield parameter.

Variety	Number of grains cob^{-1}	100 grains weight (g)	Grain yield (t/ha)	Stover yield (t/ha)	Harvest Index (%)
V_1	427.06 b	32.25 b	7.37 b	6.45 a	53.06 a
V_2	468.75 a	35.08 a	8.28 a	6.56 a	55.85 a
$LSD_{(0.05)}$	**0.69**	**1.39**	**0.58**	**ns**	**ns**

V_1 = YANGNUO-3000 and V_2 = PSC-121 and ns = nonsignificant.

Table 8. Effect of weed control treatments on yield parameter.

Weed control treatments	Number of grains cob^{-1}	100 grains weight (g)	Grain yield (t/ha)	Stover yield (t/ha)	Harvest Index (%)
T_0	418.53 b	29.67 d	6.77 c	5.33 c	55.46 a
T_1	447.15 a	33 c	7.21 c	6.47 b	52.64 a
T_2	461.41 a	35 b	8.08 b	6.76 ab	54.36 a
T_3	464.54 a	37 a	9.25 a	7.46 a	55.36 a
$LSD_{(0.05)}$	**0.97**	**1.97**	**0.82**	**0.78**	**ns**

T_0 = no weeding; T_1 = one hand weeding at 60 DAS; T_2 = two hand weeding at 40 DAS and 60 DAS; T_3 = weed free after 40 DAS and ns = nonsignificant.

Table 9. Interaction effect of variety and weed control treatments on yield parameter.

Treatment Combinations	Number of grains cob^{-1}	100 grains weight (g)	Grain yield (t/ha)	Stover yield (t/ha)	Harvest Index (%)
V_1T_0	375.72 c	28.66 e	5.49 d	5.08 d	51.92 b
V_1T_1	432.48 b	32.33 cd	6.38 d	6.14 bcd	50.94 b
V_1T_2	465.94 ab	32.00 cd	8.44 abc	6.97 ab	54.76 ab
V_1T_3	434.11 b	36.00 ab	9.17 ab	7.61 a	54.61 ab
V_2T_0	461.33 b	30.66 de	8.03 bc	5.58 cd	59.00 a
V_2T_1	461.82 ab	33.66 bc	8.05 bc	6.80 ab	54.33 ab
V_2T_2	456.87 b	38.00 a	7.71 c	6.54 abc	53.96 ab
V_2T_3	494.97 a	38.00 a	9.33 a	7.30 a	56.09 ab
$LSD_{(0.05)}$	**33.58**	**2.79**	**1.16**	**1.11**	**5.93**
CV(%)	**4.28**	**4.74**	**8.46**	**9.78**	**6.22**

V_1 = YANGNUO-3000; V_2 = PSC-121; T_0 = no weeding; T_1 = one hand weeding at 60 DAS; T_2 = two hand weeding at 40 DAS and 60 DAS; T_3 = weed free after 40 DAS.

3.3.2. 100 Grains Weight (g)

Table 7 shows the significant effect of variety on 100 grains weight. The maximum weight of 100 grains (35.08 g) per cob was found from V_2. V_1 showed the 100 grains weight of about 32.25 g. PSC-121 was reported as better performer than Yangnuo-3000 in terms of most of the yield parameters [14].

Table 8 represents the effect of weed control treatments on 100 grains weight. From the experiment it was found that the treatments were statistically significant. The highest 100 grains weight was recorded from T_3 (37.0 g) which was followed by T_2 (35.0 g). The lowest weight of 100 grains per cob was obtained

from T_0 (29.67 g).

Interaction effect of variety and weed control treatments on 100 grains weight is placed in Table 9. From the experiment it was obtained that the highest weight of 100 grains (38.0 g) was obtained from V_2T_3 and V_2T_2 simultaneously and they were statistically similar with each other. The lowest weight of 100 grains (28.67 g) was recorded from V_1T_0.

3.3.3. Grain Yield (t ha^{-1}) and Stover Yield (t ha^{-1})

Table 7 represents the effect of variety on grain and stover yield. In case of grain yield, a significant difference between varieties was found. However, the difference was not significant in case of stover yield. The maximum grain yield (8.28 t ha^{-1}) and stover yield (6.56 t ha^{-1}) were recorded from V_2. On the other hand, the minimum grain yield (7.37 t ha^{-1}) and stover yield (6.45 t ha^{-1}) was obtained from V_1. PSC-121 was reported as better performer than Yangnuo-3000 in terms of most of the yield parameters and giving grain yield of 7.76 t ha^{-1} where grain yield of 6.44 t ha^{-1} was obtained from Yangnuo-3000 [1].

Effect of weed control measures on grain yield (t ha^{-1}) and stover yield (t ha^{-1}) is showed in Table 8. In case of grain yield, the best result (9.25 t ha^{-1}) was obtained from T_3 and it was followed by T_2 (8.08 t ha^{-1}). There was a statistically significant difference between T_3 and T_2. On the other hand, the maximum stover yield was given by T_3 (7.46 t ha^{-1}) which was followed by T_2 (6.76 t ha^{-1}). However, the difference between T_3 and T_2 was not significant. In case of both grain yield and stover yield the minimum finding was recorded from T_0 (6.77 t ha^{-1} and 5.33 t ha^{-1} respectively). T_0 varied from other weed control treatments significantly in respect of grain yield and stover yield.

Interaction effect of variety and weed control treatment interaction on grain yield (t ha^{-1}) and stover yield (t ha^{-1}) is shown in Table 9. From the experiment it was found that the maximum grains yield (9.33 t ha^{-1}) and stover yield (7.61 t ha^{-1}) was obtained from V_2T_3 and V_1T_3 respectively. V_1T_2 interactions showed the best result out of V_1T_3 and V_2T_3 interactions in case of both grain yield and stover yield. The minimum grain yield (5.49 t ha^{-1}) and stover yield (5.08 t ha^{-1}) was given by V_1T_0. There were a statistically significant difference among V_1T_0 with V_1T_3 and V_2T_3.

3.3.4. Harvest Index (%)

Effect of variety on harvest index is shown in Table 7. The experiment revealed that there was no significant statistical difference between varieties regarding harvest index. V_2 showed the maximum harvest index (55.85%) over V_1 (53.06%). The maximum harvest index obtained from PSC-121 (V_2) [14].

The experiment revealed that there was no significant statistical difference among weed control treatments irrespective of numerical difference (Table 8). T_0 showed the maximum harvest index (55.46%) and it was followed by T_3 (55.36%). The minimum harvest index was reported from T_1 (52.64%).

Interaction effect of variety and weed control treatments on harvest index is

placed in Table 9. The experiment revealed that there was no significant statistical difference among weed control treatments irrespective of numerical difference. V_2T_0 showed the maximum harvest index (56.09%) and it was followed by V_2T_3 (56.09%). The minimum harvest index was reported from V_1T_1 (50.94%).

4. Conclusion

From the above findings it can be concluded that PSC-121 is the best performer regarding growth and yield attributes of white maize. Weed free (T_3) is the most suitable one to control weeds in white maize fields but almost in all cases T_2 was statistically similar to T_3. Treatments V_2T_3 and V_1T_3 were the most effective combination offering the maximum growth and yield in white maize. On the other hand, in the consideration of weed tolerance capacity, the best interaction to be recommended is V_1T_2.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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