Natural Mulches Effect on the Yield of White Maize

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Abstract

The experiment was conducted at the experimental field of Sher-e-Bangla Agricultural University during the period from November 2015 to May 2016, Sher-e-Bangla Nagar, Dhaka-1207, to find out the effect of organic mulches on the yield of white maize. This experiment was comprised of two factors. Factor A: Variety (2): V1 = Shuvra; V2 = KS-510 and Factor B: Indigenous mulch materials (5): T1 = Control (without mulch); T2 = Water hyacinth; T3 = Rice straw; T4 = Rice husk; T5 = Ash. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications and the differences between means were separated by both Duncan’s New Multiple Range Test (DMRT) and Least Significant Difference (LSD) test at 5% level of probability. Mulches showed significant effects on most of the parameters. In the case of variety, the highest grain yield (12.963 ton per ha) was recorded from V2. Different organic mulch materials showed different values, the highest values were recorded from T3. Due to this (T3) mulch material. The water retentive capacity of the mulched soil was higher at all the stages of plant growth and ranked in the order of rice straw > water hyacinth > rice husk > ash > control. The highest grain yield (17.407 ton per ha) was recorded from T3. In case of interaction all yield attributing characters include grain yield (19.043 ton per ha) was recorded from V2T3. So, KS-510 variety and rice straw mulch combinedly had outstanding superiority for morphophysiological and yield attributes in white maize over the other organic mulches.

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1. INTRODUCTION

Maize is one of the most important cereal crops in the world agricultural economy both as food for men and feed for animals including poultry. Maize can be considered and introduced as the first, an important cereal crop to meet up this requirement [1]. Maize is the highest grain yielding cereal crop compared to wheat, rice, and other cereals. Global maize production is highly concentrated within a few locations: Just four countries (United States, China, Brazil, and Argentina) produce 68% of the world’s maize, and the top four maize-exporting countries combined (United States, Brazil, Argentina, and Ukraine) account for 87% of global maize exports [2]. Averaged over the 2012–2017 period, global annual maize exports were 125 million tons and global maize production was 986 million tons [2]. The origin of maize in Mexico and now it is principle crop in many countries of temperate region.

Maize is a very important crop for malnutrition because it contains many nutrients such as carbohydrate, protein, fat, fiber, vitamin A, vitamin E, etc. which quantity is greater than wheat nutrient contains. It is consumed as flake, bread, chapatti, powder, popcorn, cornflower, corn soup, sucrose (2.5%), corn oil, boiled corn, corn hotchpotch, corn biscuit, corn curry, corn cake, corn sweet, corn starch, corn porridge, Horlicks, boost, corn syrup, Mantova, canned sweet corn, etc. [3]. Young maize plants are also used as cattle feed and used for made thatched houses, organic matter, and fuel in different countries.

Nowadays white maize is very important because it is highly delicious and proteinaceous. The flour of white maize is so finer than yellow maize as a result it is the principal food of people of many countries in the world. More than 30 species have been discovered from these white maize. The types of delicious food are made from rice and wheat, similar types of food are also made from white maize.

Shuvra variety was different characteristics. The kernel color of the composite variety is white and semi-flint type. Ears are conical shaped. Plant height is higher than the local variety. Height of the ears 60-70cm. Grain white, large size, and ear fulfill with grain, the upper portion of the leaf is smaller than lower portion and comparatively narrow. Strong anthocyanin and 1st leaf sheath and medium pigmentation in leaf sheath at the 2-leaf stage. Developed by Bangladesh Agriculture Research Institute (BARI), Gazipur, Bangladesh. Method of development/origin. The variety was derived from the CIMMYT population (Mix.1×col. GPO.1) ×ETO. KS-510 variety was double-crossed hybrid, bold grain quality, stays green at maturity, good crop standability, and drought tolerant. It was developed by the proline seed company, India. Crop duration was medium, maturity period 90-100 Days, harvesting time after attaining physiological maturity.

The main characteristic of white maize is it needs only one irrigation as a result farmers get more yield with less cost. Mulching is a very useful practice to retain soil moisture in the crop fields. Organic mulches include formerly living material such as chopped leaves, straw, grass clippings, compost, wood chips, shredded bark, sawdust, pine needles, and even paper and also improve the soil as they decompose [4]. The lower-cost natural mulches are water hyacinth, rice straw, rice husk, ash are effective to retain soil moisture in the maize field. Water hyacinth Eichhornia crassipes (Pontederiaceae, Liliales) is a floating aquatic weed is considered as a valuable source of macronutrient such as phosphorous, nitrogen, potassium, that are indispensable for plant nutrition [5-8]. The mulching practice also enhanced the number of cob/plant, cob length, cob diameter, tassel length, number of seed row/cob, number of seed/row, the weight of rachis/cob, 1000 grain weight, grain yield, and higher Harvest Index (HI). The grain yield of rice straw and water hyacinth is more than double that unmulched plant under non-lith conditions. The experiment was aimed to evaluate the natural mulches effect on the yield of white maize.

2. MATERIALS AND METHODS

2.1 Location of the Experiment

The experiment was carried out at the research field of Sher-e-Bangla Agricultural University (SAU), Dhaka-1207, during Rabi season from November 2015 to April 2016. The geographic coordinates of the experiment were AEZ- Madhupur Tract (28), General Soil Type- Shallow red-brown terrace soil, Land type-
Medium High land Soil series Tejgaon, Topography- Fairly leveled, Flood level- Above flood level, Drainage- Well drained.

2.2 Experimental Soil Characteristics

The topsoil of the experimental site is characterized by olive-grey with common fine to medium especially dark yellowish-brown mottle with silty clay in texture. Soil pH was 5.6 and organic carbon was 0.45% sufficient for maize production. The experimental area was of good drainage and irrigation system and above from flood level and the plot of experimental field was medium to high land. The physical and chemical properties of the initial soil were Sand 27 %, Silt 43 %, clay 30, Textural class silty-clay, Organic matter (%) 0.78, Total N (%) 0.03, Available P (ppm) 20.00, Exchangeable K (me/100 g soil) 0.10, Available S (ppm) 45 (Source: Soil Resources Development Institute (SRDI)).

2.3 Experimental Materials

Two white maize varieties Shuvra(V₁) which is developed by BARI and KS-510(V₂) an Indian hybrid variety was used as plant materials. Natural mulches I. Water hyacinth II. Rice straw III. Rice husk IV. Ash. The treatments are: T₁= Control(without mulch), T₂= Water hyacinth, T₃= Rice straw, T₄= Rice husk, T₅= Ash.

2.4 Design and Layout of the Experimental Field

The experiment was set up in the field following the experimental design Randomized Complete Block Design (RCBD). The field was divided into 3 blocks to represent 3 replications. There were 30 unit plots altogether in the experiment. The size of each unit plot was 6 m² (3m × 2m). Distance maintained between replication to replication was 1m and plot to plot was 0.5m. Plant to plant distance maintained was 0.25 and row to row distance was 0.75m.

2.5 Application of Manure and Fertilizers

Cowdung was used as decomposed organic matter @ 6.0 ton per ha before final land preparation. Then the chemical fertilizers were applied as Urea, TSP, MOP, Gypsum, Zinc Sulphate, and Boric acid at the rate of 172-168-96-144-10 and 5 kg per ha in case of Shuvra and 500-240-180-240-10 and 5 kg per ha in case of KS-510 hybrid variety. All fertilizers and one-third portion of urea were applied as basal dose at the time of final land preparation. The rest of the Urea was applied after 30 DAS and 50 DAS at two installments.

2.6 Seed Treatment and Seed Sowing

Seeds were treated with Vitavex at the rate of 0.2% to 0.3% of seed weight. Seeds were sown in maintaining a row to row distance as per treatments having 2 seeds hole⁻¹ for Shuvra and 3 seeds hole⁻¹ for KS-510.

2.7 Mulch Materials Application

Mulch materials were applied on the field after seed sowing. There were four types of mulch materials these were water hyacinth, rice straw, rice husk, and ash. Mulches were applied at the rate of 10 ton/ha maintaining proper thickness in each plot.

2.8 Intercultural Operations

Thinning, gap filling, weeding, spraying of insecticides, fungicides, etc, were applied in the necessary time and also protect the crop from harmful things.

2.9 Data Recording and Analysis

Different morphophysiological and yield attributing parameters were recorded. All the collected data were tabulated and analyzed statistically using analysis of variance technique and subsequently Least Significance Difference (LSD at 5%) for comparing the treatment means, by MSTAT-C software [9].

3. RESULTS AND DISCUSSION

3.1 Seed Weight Cob⁻¹

Variatel effect significantly influences on seed weight/cob of maize. The maximum seed weight/cob (148.17 g) was found from V₂. On the other hand, the minimum seed weight/cob (139.61 g) was found from V₁. Variety V₂ performed better than V₁, it might be genetically influenced Table 1. Different mulches of materials significantly influenced on seed weight/cob of maize. The maximum seed weight/cob (168.47 g) was found in mulches treatment T₃ and it was statistically similar with T₂ (159.53 g) and T₄ (146.97 g). On the other
hand, the minimum seed weight/cob (114.07 g) was found in T1, Table 1. Seed weight/cob significantly influenced by the interaction effect of different mulches and maize varieties. The maximum seed weight/cob (176.87 g) was recorded from the combination of V2T3 and it was statistically similar with V2T2 (5166.7g). On the other hand, the minimum seed weight/cob (1663.2 g) was recorded from the combination of V1T1 Table 2.

3.2 Per Cob Wt. (g)

Per cob, weight varied significantly for different maize varieties. The highest per cob weight (258.16 g) was obtained from V2. On the other hand, the lowest per cob weight (242.37 g) was found from V1, Table 1. Statistically, significant variation was recorded per cob weight due to different mulches. The highest per cob weight (299.77 g) was found from T3, which was statistically similar to T2 (284.17 g), whereas the lowest (189.17 g) was recorded from the control treatment (Table 1). Interaction effect of different mulches materials and maize varieties showed a significant variation on per cob weight. The highest per cob weight (310.87 g) was found from the combination V2T3, which was statistically similar to V2T3 (297.13 g), whereas the lowest (185.27 g) was observed from the combination V1T1 Table 2.

3.3 No. of Seeds Cob-1

Significant variation in no. of seeds/cob was observed for maize varieties. V2 was produced an increased number (218.80) of seeds/cob than V1 (188.13) Table 1. Significant variation was observed for a number of seeds/cob due to different mulches of materials. The maximum number of seeds/cob (304.35) was found from T3, which was statistically similar to T2 (267.13), whereas the minimum number (95.35) was found from the control treatment Table 1. Rice straw mulches improved the soil condition and provide the best environment to the plant for nutrient uptake, so that plant can achieve the best growth rate and potential. Interaction effect of different mulches materials and maize varieties showed a significant variation on no. of seeds/cob. The highest no. of seeds/cob (572.13 g) was found from the combination V2T3 which was statistically similar to V1T3 (522.93 g), V2T2 (521.20) and V2T4 (517.47), whereas the lowest (408.60 g) was observed from the combination V1T1 Table 2.

3.4 Seed Weight Plant-1

Seed weight/plant varied significantly for different maize varieties. The highest seed weight/plant (218.80 g) was recorded from V2, whereas the lowest (188.13 g) was found from V1, Table 1. Statistically, significant variation was recorded for seed weight/plant to different mulches materials. The highest seed weight/plant (304.35 g) was recorded from the combination of V2T3, while the lowest (92.43 g) was found from the combination of V1T1 Table 2.

3.5 Cob Length

The main effect of variety significantly affected the cob length of maize. However, the main effect of mulches, as well as the interaction effect of variety, significantly affects this parameter. Cob length increased significantly when the mulches were changed from control to water hyacinth to rice straw. Changing the mulches application beyond the rice straw didn’t affect this parameter. Maximum cob length (21.62 cm) was recorded at the treatment T3 and minimum cob length (17.98 cm) was at T5 treatment Table 1. The highest cob length (23.02 cm) was recorded from the combination of V2T3, while the lowest (16.97 cm) was found from the combination of V1T5 Table 2.

3.6 Cob Diameter

The tallest cob diameter (5.08 cm) was obtained at the mulches treatment T3 and the lowest (4.52 cm) was obtained at the mulches treatment of T1 Table 1. The lower cob diameter obtained at the control mulches treatments might be due to retarded growth owing to limited moisture and nutrient availability. The result generally showed an increase in cob diameter of maize when mulches application from control to water hyacinth and rice straw application. A similar result was also found by Rahman [10] who reported that control or untreated plant gave the lower length and breadth of cob.
3.7 No. Of Row Cob

The number of rows varied significantly for different maize varieties. The minimum number of row/cob (4.72) was found from V1, whereas the maximum number (4.84) was obtained from V2 Table 3. Different mulches varied significantly for a number of row/cob. The maximum number of row/cob (15.57) was recorded from T3, whereas the minimum number (13.07) was from the control treatment. Significant variation was recorded due to the interaction effect of different mulches and maize varieties in terms of a number of row/cob. The maximum number of row/cob (15.73) was found from the combination of V2T3, which was statistically similar to V1T3 (15.40), whereas the minimum number (12.93) was observed from the combination of V1T1 Table 4.

3.8 No. of Seeds Row

No. of seeds/row varied significantly for different maize varieties. The highest no. of seeds/row (34.96) was recorded from V2, whereas the lowest (33.17) was found from V1 Table 3. Statistically, significant variation was recorded for no. of seeds/row due to different mulches

Table 1. Effect of varieties and different natural mulches on seed wt. /cob, per cob wt., no. of seeds/cob, seed wt/plant, cob length, and cob diameter

| Variety   | Seed wt/cob (g) | Per cob wt (g) | No. of seeds/cob | Seed wt/plant (g) | Cob length (cm) | Cob diameter (cm) |
|-----------|-----------------|----------------|------------------|-------------------|-----------------|-------------------|
| V1        | 139.61          | 242.37         | 462.96 b         | 188.13b           | 18.23b          | 4.72              |
| V2        | 148.17          | 258.16         | 510.37 a         | 218.80a           | 20.70a          | 4.84              |
| LSD(0.05) | ns              | ns             | 36.149           | 23.568            | 0.78            | ns                |

**Mulch material x**

| Variety   | Seed wt/cob (g) | Per cob wt (g) | No. of seeds/cob | Seed wt/plant (g) | Cob length (cm) | Cob diameter (cm) |
|-----------|-----------------|----------------|------------------|-------------------|-----------------|-------------------|
| V1        | 139.61          | 242.37         | 462.96 b         | 188.13b           | 18.23b          | 4.72              |
| V2        | 148.17          | 258.16         | 510.37 a         | 218.80a           | 20.70a          | 4.84              |
| LSD(0.05) | ns              | ns             | 36.149           | 23.568            | 0.78            | ns                |

V1=Shuvra, V2=KS-510, T1=Control, T2=Water hyacinth, T3=Rice straw, T4=Rice husk, T5=Ash. In a column means having similar letter(s) are statistically similar and those having a dissimilar letter(s) differ significantly by LSD at 0.05 level of probability.

Table 2. Interaction effect of varieties and different natural mulches on seed wt. /cob, per cob wt., no. of seeds/cob, seed wt/plant, cob length, and cob diameter

| Variety x Mulch material | Seed wt/cob (g) | Per cob wt (g) | No. of seeds/cob | Seed wt/plant (g) | Cob length (cm) | Cob diameter (cm) |
|--------------------------|-----------------|----------------|------------------|-------------------|-----------------|-------------------|
| V1T1                     | 111.73d         | 185.27f        | 408.60 d         | 92.43 d           | 16.46e          | 4.36 c            |
| V1T2                     | 154.93a-c       | 271.20a-d      | 493.87 a-c       | 247.07b           | 20.15bc         | 4.84 ab           |
| V1T3                     | 160.07a-c       | 288.67a-c      | 522.93ab         | 278.03ab          | 20.23bc         | 5.07 a            |
| V1T4                     | 141.80b-d       | 244.20b-e      | 470.73bd         | 181.13c           | 17.34de         | 4.74 a-c          |
| V1T5                     | 129.53cd        | 222.53d-f      | 418.67cd         | 142.00cd          | 16.97e          | 4.57 bc           |
| V2T1                     | 116.40d         | 193.07ef       | 425.47cd         | 98.28d            | 19.76c          | 4.67 a-c          |
| V2T2                     | 164.13ab        | 297.13ab       | 521.20ab         | 287.20ab          | 21.58ab         | 5.06 a            |
| V2T3                     | 176.87a         | 310.87a        | 572.13 a         | 330.67a           | 23.02a          | 5.09 a            |
| V2T4                     | 152.13a-c       | 252.47b-d      | 517.47ab         | 236.07b           | 20.12bc         | 4.81 a-c          |
| V2T5                     | 131.33b-d       | 237.23c-f      | 515.60ab         | 141.80cd          | 19.00cd         | 4.55 bc           |
| LSD(0.05)                | 34.54           | 53.72          | 80.83            | 52.7              | 1.74            | 0.46              |

V1=Shuvra, V2=KS-510, T1=Control, T2=Water hyacinth, T3=Rice straw, T4=Rice husk, T5=Ash In a column means having a similar letter(s) are statistically similar and those having a dissimilar letter(s) differ significantly by LSD at 0.05 level of probability.
materials. The highest no. of seeds/row (37.87) was recorded from T$_3$, whereas the lowest (28.63) was obtained from the control treatment Table 3. Interaction effect of different mulches materials and maize varieties showed a significant variation on no. of seeds/row. The highest no. of seeds/row (39.80) was recorded from the combination of V$_2$T$_3$, which was statistically similar to T$_2$ (36.60), V$_1$T$_2$ (35.93) and V$_1$T$_3$ (35.93), while the lowest (27.40) was found from the combination of V$_1$T$_1$, which was statistically similar to V$_2$T$_1$ (29.87) Table 4.

### 3.10 Seed Weight

Mulches application had a significant (P≤0.01) effect on thousand seed weight. The main effect of varieties and the mulches materials and interaction effect of the two factors influenced thousand seed weight of maize. When the mulches changes from control to water hyacinth to rice straw the thousand seed weight was increased. On the whole, plants grown at the rice straw mulches supply had seed weight highest than the seed weights of plants in the control treatment Table 3. Increased kernel weight in rice straw mulches might be due to the formation of more leaf area which might have intercepted more light and produced more carbohydrates in the source which was probably translocated into the sink (the grain) and resulted in more increased kernel weight than the control. Also, rice straw increases the enzyme activity in maize which may result in higher seed weight. Quayyum and Ahmed, [11] the highest weight of 1000 grains in maize with rice straw mulches significantly increased grain yield of maize conventionally tilled plots.

### 3.11 Harvest Index (%)

The main effect of varieties significantly (P≤0.01) affected the harvest index of the crop. The highest harvest index was recorded for V$_1$ (0.53) Table 3. This indicates significantly higher biomass partitioning to grain production by this variety. The lower mean HI values in this experiment might indicate the need for the enhancement of biomass partitioning through genetic improvement. Significant differences in HI due to mulches materials were observed. Mulches treatment T$_2$ & T$_4$ both showed higher HI (0.58) Table 3. The lowest HI was observed by the treatment T$_5$ (0.44).

In developed countries in Europe and America, soil and water loss caused by forest fires and orchard management has attracted much attention [13-16]. Climate change has been showing important effects on crop production [17] and problems such as seasonal water shortages [18] and excessive evaporation [19] have become more serious. The key factor restricting the efficient utilization of cultivable land and limiting agricultural production is the scarcity of water resources in arid and semi-arid areas [20]. The NCP occupies 39% of the cultivated area of China but has only 8% of the nation’s water resources [21]. Biodegradable mulch is increasingly being used as a substitute for plastic to avoid the negative effects of residual plastic mulch [22-24]. Costa et al. [25] assessed the performance of five biodegradable mulch films in strawberry production and compared these to conventional polyethylene (PE). They found that the biodegradable mulch had similar benefits in terms of productivity and quality when compared with PE. Gu et al. [23] tested PE film, biodegradable film, and non-film mulching of winter oilseed rape, and found that the yield, water-use efficiency, and grain quality did not differ significantly between biodegradable and PE films. Many researchers have reported that
covering the soil with transparent film mulch can improve soil temperatures, compared with not using mulch [26]. As a crop cultivation practice, mulching has been shown to significantly increase the yields of various crops and yield components: strawberry [27]; peach [28]; oilseed rape [23]; maize [29]; spring and autumn potato [30,31]; wheat [32]. Most studies of the mulching film on maize in China used transparent plastic film [33]. Khan and Parvej,[34] showed that by a field trial which was conducted on the four indigenous mulches viz. water hyacinth, rice straw, rice husk, and ash were used for this study under tillage and zero tillage condition. Mulching practices enhanced the number of cob plant–1, cob height, a number of seed rows cob–1 and seeds row–1. 1000–grains weight, the weight of rachis cob–1, grain yield, and higher harvest index (HI) in maize. The grain yield of mulched plants notably rice straw and water hyacinth was nearly double (8.73 t ha–1) than unmulched plants (4.93 t ha–1) under non–tilth condition. Sharma et al. [35] also reported that mulching increases corn productivity.

### Table 3. Effect of varieties and different natural mulches on no. of row/cob, no. of seeds/row, 1000 seed wt., seed wt./ha and harvest index

| Variety | No. of row/cob | No. of seeds/row | 1000-seed weight (g) | Seed wt (t/ha) | Harvest Index (%) |
|---------|----------------|------------------|----------------------|----------------|------------------|
| V1      | 14.11          | 33.17 b          | 283.53               | 11.105b        | 0.53             |
| V2      | 14.49          | 34.96 a          | 308.67               | 12.96a         | 0.52             |
| LSD(0.05) | ns             | 1.77             | ns                   | 1.34           | ns               |

| Mulch material× Variety | No. of row/cob | No. of seeds/row | 1000-seed weight (g) | Seed wt (t/ha) | Harvest Index (%) |
|------------------------|----------------|------------------|----------------------|----------------|------------------|
| T1                     | 13.07 d        | 28.63 c          | 257.33c              | 5.73d          | 0.46 bc          |
| T2                     | 14.70 b        | 36.27 a          | 311.33ab             | 16.02a         | 0.58 a           |
| T3                     | 15.57 a        | 37.87 a          | 336.50a              | 17.41a         | 0.56 ab          |
| T4                     | 14.40bc        | 35.13 ab         | 297.83ab             | 12.52b         | 0.58 a           |
| T5                     | 13.77 c        | 32.43 b          | 277.50bc             | 8.50c          | 0.44 c           |
| LSD(0.05)              | 0.64           | 2.80             | 39.87                | 2.12           | 0.11             |
| CV(%)                  | 3.67           | 6.78             | 11.10                | 14.54          | 16.69            |

V1=Shuvra, V2=KS-510, T1=Control, T2=Water hyacinth, T3=Rice straw, T4=Rice husk, T5=Ash. In a column means having a similar letter(s) are statistically similar and those having a dissimilar letter(s) differ significantly by LSD at 0.05 level of probability

### Table 4. Interaction effect of varieties and different natural mulches on no. of row/cob, no. of seeds/row, 1000 seed wt., seed wt./ha and harvest index

| Variety × Mulch material | No. of row/cob | No. of seeds/row | 1000-seed weight (g) | Seed wt (t/ha) | Harvest Index (%) |
|--------------------------|----------------|------------------|----------------------|----------------|------------------|
| V1T1                     | 12.93 d        | 27.40 e          | 249.33c              | 5.54e          | 0.46 ab          |
| V1T2                     | 14.47 b        | 35.93 ab         | 298.33bc             | 14.82bc        | 0.56 a           |
| V1T3                     | 15.40 a        | 35.93 ab         | 305.00bc             | 15.77bc        | 0.54 a           |
| V1T4                     | 14.40 b        | 34.80 bc         | 297.33bc             | 10.88d         | 0.56 a           |
| V1T5                     | 13.33cd        | 31.80 cd         | 267.67c              | 8.52de         | 0.51 ab          |
| V2T1                     | 13.20 d        | 29.87 de         | 265.33c              | 5.91e          | 0.46 ab          |
| V2T2                     | 14.93ab        | 36.60 ab         | 324.33ab             | 17.22ab        | 0.60 a           |
| V2T3                     | 15.73 a        | 39.80 a          | 368a                 | 19.04a         | 0.58 a           |
| V2T4                     | 14.40 b        | 35.47 bc         | 298.33bc             | 14.15c         | 0.60 a           |
| V2T5                     | 14.20bc        | 33.07 b-d        | 287.33bc             | 8.49de         | 0.38 b           |
| LSD(0.05)                | 0.9            | 3.96             | 56.38                | 3.002          | 0.150            |
| CV (%)                   | 3.67           | 6.78             | 11.10                | 14.54          | 16.69            |

V1=Shuvra, V2=KS-510, T1=Control, T2=Water hyacinth, T3=Rice straw, T4=Rice husk, T5=Ash. In a column means having similar letter(s) are statistically similar and those having a dissimilar letter(s) differ significantly by LSD at 0.05 level of probability
Rahman, [10] showed the highest grain yield of 8.73 t ha⁻¹ and the lowest of 4.93 t ha⁻¹ with rice straw mulch and control treatments, respectively in a maize field. The highest (Harvest Index) HI from the rice straw mulch treated plot (0.60) and the lowest from the control plot (0.49) in maize.

4. CONCLUDING REMARKS

In terms of growth, yield contributing characteristics, and yield of white maize, the rice straw mulching, and variety KS-510 performed superior in the combination of different mulch materials and maize varieties. In the case of the Shuvra variety, which was next to KS-510 and was remarkable, a similar pattern of results was noticed. In the case of both varieties, the improved yield from the use of water hyacinth mulch was also noticed. The highest yield was given by straw mulch and the best yield and fair quantity were provided by water hyacinth mulch. Both the hyacinth mulches from straw and water performed better than the other mulches. To better yield and save irrigation costs, the use of mulch is recommended.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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