Investigating Eco-physiological Characteristics of Sorghum Grain in Combined Cultivation of 2 Paradigms related to Single Cross 704 Corn

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ABSTRACT

In order to eco-physiological aspects of (Sorghum bicolor L.Moench) intercropping in two planting pattern of single cross corn 704 (Zea mays L.) in Och-Tappe village of Miandoab from 2004 to 2005. The experiment design was factorial in RCBD arrangement with three replications. The treatments were: a combination of three levels of Sorghum densities (4, 8 and 16 plants per meter of corn row) and two planting patterns (common and two zigzag rows) of corn. The treatments lacking corn weed in two planting pattern was considered as control. Seeds of Sorghum were planted on the sides and end of corn rows in zigzag between corn plants. Results showed that the effect of different planting pattern of corn on dry weight of single plant, height and number of Sorghum tiller in the 5% level was signification. The effect of Sorghum densities on studied qualities in the 1% level was significant. In a way the effect of density was more than the effect of different planting pattern. The effect of Sorghum densities rose with its density increase.

INTRODUCTION

Nowadays, human is confronting multitude problems such as population growth, natural source destruct, food shortage and environment pollution which bother him the most. Therefore, human is searching for modern methods of optimized and efficient methods of utilizing resources despite all technological and scientific improvements. One important and permanent instance of agriculture is multi-cultivation system. Combined cultivation which is a main form of multi-cultivation increases agricultural performance in the case that it is managed right and regularly. This increase will be caused by optimized utilizing of environmental resources, decrease of pests and other plant diseases, controlling weeds, existing suitable microclimate which decreases wind speed and some other reasons. Combined cultivation is of high significance in agriculture and stockbreeding. Investigation of 334 experiments showed that the performance of combined cultivation (60.2) is more efficiency than the mean performance of single cultivations [1].

Corn is the third mostly cultivated grain with 138.5 million hectares cultivation and 589.4 million tones production in the world after wheat and rice [2]. Corn cultivation is about 500000 hectares in Iran which supplies 43% of internal demand [3]. Tulnar [4] believes that 20 tones grain is produced in a hectare from present hybrids according to performance records. Increase of corn performance potential does not seem a suitable genetic strategy [5]. Modern hybrids of corn show more resistance to high cultivation densities and improvement of tension resistances such as weed interference, low nitrogen of soil and moisture seem necessary [4]. Spatial arrangement means horizontal plan of plant accumulation and distribution which affect reciprocal relations among peripheral plants. Fisher and Miles [6] represented that plant arrangements (cultivation paradigm) is a significant factor in interference in a way that the least benefit is gained by weeds in plant cultivations of square and triangular. 2-lined zigzag cultivation paradigm increases light absorption, chlorophyll of leaves, performance, performance elements and other characteristics of plant. Nilsonand Thoreson [7] declared that the speed of soya leaf appearance increases in the first interference level and high densities. Banman[8] reported that the main reason of different light absorption of canopy is different structural elements, morphological characteristics and primary speed of each species. Bazrafshan et al. [9] concluded that cultivation paradigm affected dry material, green corn performance, grain performance and plant height which were the most in 2-lined cultivation.

MATERIALS AND METHODS

This study was performed in a farm in OochTapekurd village located in 5km north western of Miandoab of West Azerbaijan province. Average annual rainfall of experiment site is 312mm and the soil was sand-loam. The experiment was done every 2 years in factorial form on the basis of accidental blocks in 3 replicates. Kurt dimension was 4×5m² containing 6 cultivation rows. Single cross corn 704 with equal density in 2 levels of common and 2-lined zigzag cultivation and grained sorghum in 3 levels containing 4, 8 and 12 plants

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in a meter were studied. Also a control treatment of pure sorghum was supposed as control. Every 2-year experiment's information was variance analyzed separately. Then, 2-year variances were tested equally for each characteristic and characteristics of equal variances were tested combined along 2-year experiment. Variance analysis of data was done in factorial form and accidental blocks through SAS system. The means were compared on the basis of Dunkan's multiple range test and the graphs were drawn through Excel system.

RESULTS AND DISCUSSION

The effect of various cultivation paradigms of corn on dry weight of single plant, height and the number of tillers was significant (5%) (table 1). The effect of sorghum density on investigated characteristics was more than the effect of various cultivation paradigms. The more the density, the more the effect will be (1%).

Saberali et al. [10] investigated the effect of cultivation density and arrangement on growth and performance of corn in a condition along with weeds and concluded that cultivation density and arrangement are basic factors in changing spatial arrangements and part which will decrease weed interference finally. Significant decrease of leaf surface, dry material accumulation, plant growth speed and grain performance in presence and lack of weed increase above mentioned factors in comparison to low density. 2-lined cultivation increase leaf surface, dry material accumulation and plant growth in comparison to 1-lined cultivation. It should be considered that the effect of line number was not as efficient as density factor.

Beheshti et al. [11] concluded that a change in cultivation arrangement (from rectangular to square) of corn will increase productive biomass. This increase is caused by more absorption of photosynthetic active radiation and light efficiency in this experiment in comparison to diamond and rectangular one. Fathi [12] reported that the priority of grain elements of sweet corn in square paradigm caused a better performance of grains in this paradigm. Also it was declared that utilizing 2-lined cultivation leads to increase of grass performance in high densities.

Yadavi et al. [13] studied the effect of density and spatial arrangements of corn canopy on growth factors related to red root pigweed grass and concluded that 2-lined cultivation of corn will decrease leaf surface, dry material accumulation and growth of red root pigweed grass in comparison to 1-lined cultivation.

<table>
<thead>
<tr>
<th>Change resources</th>
<th>Freedom degree</th>
<th>Dry weight of plant</th>
<th>Plant height</th>
<th>Tiller number</th>
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<tr>
<td>Year</td>
<td>1</td>
<td>9458.12</td>
<td>37873.12</td>
<td>6424.30</td>
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<tr>
<td>Year/replica</td>
<td>4</td>
<td>2028.70</td>
<td>24669.96</td>
<td>1681.14</td>
</tr>
<tr>
<td>Treatment (corn)</td>
<td>1</td>
<td>13500.61*</td>
<td>21382.02*</td>
<td>2325.42*</td>
</tr>
<tr>
<td>Treatment (sorghum)</td>
<td>2</td>
<td>4047.28**</td>
<td>10244.17**</td>
<td>2269.57**</td>
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<tr>
<td>year x treatment a</td>
<td>1</td>
<td>2692.78</td>
<td>3806.36</td>
<td>7221.81</td>
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<tr>
<td>year x treatment b</td>
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<td>9723.64</td>
<td>5545.51</td>
<td>6738.96</td>
</tr>
<tr>
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<tr>
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<td>3861.30</td>
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<td>C.V</td>
<td>8.73</td>
<td>9.03</td>
<td>5.42</td>
<td></td>
</tr>
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</table>

* and ** respectively represent significance of 1 and 5 percentages

REFERENCES


