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Examining the Effects of Spike Density and Weed Control on Yield and Yield Components of Corn Cultivars

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Abstract: This research was undertaken to explore the effects of spike density and weed control management on the yield and yield components of corn cultivars using a factorial design with three replications and a completely randomized block design. The experimental treatments included four degrees of weeding (1W, 2W, 3W, and 4W), two levels of density (1D and 2D), and cultivars (1V and 2V). Yield components and morphological features were assessed and studied in this yield study. Analysis of variance and comparison of means revealed that lack of weeding throughout the growth season (4W) caused a significant decrease in the examined attributes, whereas weeding during the growing season (1W), three phases of weeding (2W), and two weeding treatments (3W) did not. The weeding stage (3W) did not differ much. Therefore, based on the test conditions, it appears that weeding in only two stages during the growing season is sufficient. Grain yield and leaf area index increased with increasing density (2D), while yield components, morphological features, and dry weight of weeds dropped. Therefore, increasing spike density enhanced grain yield and lowered the competitive effect of weeds. The grain yield of the Maxima cultivar (2V) was greater than that of the Single Cross 704 cultivar (1V); although this difference was not statistically significant, the Maxima cultivar responded more favorably to an increase in density.

Keyword: Weed, Corn, Spike Density, Plant Population, Productivity.

Introduction

Cereals are the most important plants on earth, providing 70% of human food and serving as the primary source of nourishment and sustenance for humans (Imam, 2013). Of the 350,000 living plant species, only 150 species are used as food, and only 15 species are economically produced and make up the majority of the food supply on the global market; more than half of these 15 species. The most common cultivar is cereals (Kuchaki Vinayan, 2015). According to agricultural production specialists, boosting food production is the only answer to the problem of hunger, and greater investment should be made in food production, particularly in developing countries. If the food supply continues in its current form, these nations will need to boost their agricultural productivity by at least 60 percent over the next 30 years, and their food production will need to double over the following 20 years. After wheat and rice, corn is regarded as the most essential food item in the world, according to Imam (2016). (Kochaki and Sarmadoniya, 2014) In light of the country's increasing demand for food and production of animal products, as well as the proportion of corn in the diet of poultry, the examination of the factors that boost the production of this critical product is warranted. It has become really crucial. Presently, almost all of the high-quality and suitable lands have been utilized for agriculture, and the lands that are not cultivated are frequently poor and unskilled lands with significant obstacles to production; as a result, the production on these lands is unprofitable; consequently, it is essential to adopt strategies to increase the production per unit area (Yazdi and Imam, 2019).

Selection of high-yielding cultivars that are compatible with the climatic conditions of each region, control of weeds in the fields, and selection of the appropriate spike density per unit area are important factors in achieving maximum production efficiency in corn farming; and it is possible to achieve maximum production efficiency by increasing the number of plants per hectare and the spike density in crops and crops (Farhadi Afshar et al., 2018). Corn plants turn wild. In arid regions, the presence of weeds in the fields causes drought stress at corn plants, and this stress in the corn's sensitive stages of life, such as two weeks before and two weeks after blooming, results in a significant reduction in grain yield (Imam, 2016). On the other hand, weed control accounts for a major portion of crop production costs, so weeds must be handled in a manner that minimizes expenses and does not lead to problems such as herbicide resistance and environmental contamination (Hall and Swanton, 2022) Environmental concerns and economic pressure have restricted the use of pesticides in conventional agricultural systems, and one way to compensate is to boost crop competitiveness through denser cropping (Bayat et al., 2018). Corn is one of the natural plants of Central and South America, and the history of its planting in countries with good conditions for its growth and development, particularly in some European, Asian, African, and Oceanic nations, is not very long. In 1492, a party of American explorers arrived on this continent. Corn was a common crop in this region, which was mostly grown by the South American Indian group (Mahis). Therefore, Christopher Columbus, who was the chief of this tribe, named this plant Mays, an adaptation of the tribe's name. Years later, Linnaeus officially confirmed this name and dubbed the corn species Mays, so the exact history of its origin, even in the countries of origin, is unknown, but it is certain that humans, animals, and birds have been consuming its various parts, especially its seeds, for thousands of years. has been applied (Khodabandeh, 2017).

Prior to a few years ago, cultivation of this plant was uncommon in Iran, but due to a cultivar of uses, the area under cultivation has increased from 14,000 hectares to over 100,000 hectares in the last five years. Currently, around 45,000 hectares of grain corn and about 90,000 hectares of silage fodder corn are cultivated in suitable and suitable areas of the country. The specific arrival timing of corn in Iran is uncertain. But when the Orangemen reached Iran through the southern ports and remained in these areas for a time, they most likely took corn seeds with them, and the initial center of growing this plant in Iran was in the vulnerable areas of the south of the country. Some accounts date the introduction of corn to Iran to the reign of Shah Ismail Safavid.

Additionally, a little amount was introduced to the country by Iranian pilgrims via Saudi Arabia, which is unquestionably the reason why this plant was referred to as Mecca wheat in some sections of the country in the past. In recent years, cultivars from various nations that are appropriate for planting in various regions of Iran and have produced substantial harvests have been imported (Khodabandeh, 2017).

Today's farmed corn is a heterozygous plant that is biologically distinct from its wild forebears and therefore cannot be found in the wild. Corn is an annual plant belonging to the gramine family of the Maydeae family, the genus Zea, and the Mays species, having 20 to 28 chromosomes. Corn is a single-stemmed plant, yet the male flowers at the end of the stem and the female flowers that comprise the corn fruit grow from the stem's nodes and at the leaf-stem junction. They are arranged in straight rows.

Each spikelet contains two flowers, but only the uppermost one is fertilized and develops into a seed. The entire corn structure is covered with a sheath known as the spot, also known as the cob skin. This plant's pollination is typically indirect and carried out by the breeze. The stigma is situated on long, slender axes known as cream or corn cob. The embryo of the corn seed is around 12 to 14% of the overall weight of the seed. In general, the weight of 1000 seeds ranges from 100 to 400 grams, with an average of 250 grams. The seeds on the fruit are evenly distributed and arranged in concentric circles (Tajbakhsh and Pourmirza, 2012).

The fundamental component of grain corn is starch, and nearly all industrial applications of corn are dependent on the starch it contains. In addition, the corn germ contains 30 to 37% oil, which is extracted and utilized as corn oil. The weight of corn seeds is composed of 83% endosperm, 11% embryo, and 6% pericarp (Imam, 2016).

A weed is a plant that has developed in an unintended location. Generally speaking, barley growing in an oat field is considered a weed (Kochaki and Khabani, 2015). From the perspective of a farmer, a weed is any undesirable or dangerous plant found in the field or with the potential to invade the field. Although some plants, such as desert ivy, wild cockscomb, and soruf, are always regarded as weeds in the field, alfalfa in the sugar beet field and barley in the wheat field are regarded as weeds (Khajepour, 2016).

The manner and difficulties of weed control are determined by the weed's method of propagation and growth. Because of this, it is vital to understand how and to what extent weeds might spread. Under conventional and semi-conventional agricultural situations, seed imperfections of agricultural plants are regarded as a major contributor in the proliferation of weeds. Some weed seeds contain appendages that let them to adhere to the weeds of animals and spread over great distances. Weed seeds are termed weeds due to the fact that the presence of extraneous substance on the grass seeds and their lightness allow them to be moved by the wind. As a result, the seeds are dispersed for kilometers away from their point of origin. The presence of waxy substances on the seed coat of certain weeds allows them to be dispersed by moving water. Additionally, reproductive vegetative organs are conveyed via water. In addition to soil, agricultural machinery can deliver root fragments and grass seeds. Some perennial weeds with creeping roots and stems can spread up to several meters from the mother plant.

Weeds are only found in areas where the natural order has been disturbed. Prior to the emergence of humans, natural selection served to preserve plants that had adapted to harsh and unpredictable environmental conditions, such as water erosion, debris, volcanism, and fire. Last but not least, the plants have also made their way into human-touched surroundings, likely initially in residential areas and then in gardens and fields, similar to domesticated plants. Those weeds that were simple to control were eliminated first, but those weeds that were more difficult to control were removed afterwards. Agricultural plant cultivation ecosystems have adapted and evolved, and they continue to exist today. Rashid (Mohsal et al., 2015). (Mohsal et al., 2015).

The objective of weed control is to reduce weed density and growth to the biological threshold (biological threshold refers to the highest weed density that does not result in an economically significant drop in crop yield). It depends, and as a result, the elimination of the economic losses caused by weeds to agriculture or people. The method of effective weed control is determined by variables such as the duration of the growth season and the weed's life cycle, the crop to be planted, the operation of preparing the substrate, the available weed control facilities, and the climate. The desired region is identified (Khajepour, 2016).

A scientific approach to weed control consists mostly of the following elements

1 Comprehensive knowledge of weed management

2- A methodical investigation into the problem of weeds

3- A thorough assessment of the constraints, facilities, and available weed control technologies

The objectives of weed management programs include weed prevention, management, and eradication. Prevention entails preventing the introduction of a weed into a non-contaminated region; to this end, we must maintain clean equipment, prevent the formation of weeds, and lastly prevent the spread of weed seeds and other reproducing organs.

Weed control is the process of reducing the problems associated with weeds in order to lessen the damage they produce. This strategy is used once a weed has become entrenched. The control methods cannot prevent the reproduction of all plants in a given region, and the majority of the plant's reserve organs remain, therefore the control operation must be repeated every three years. Eradication is the total elimination of all plants and living elements of a weed from a region, including the removal of weed seeds and vegetative organs such rhizomes, creeping roots, and tubers (Rashed Mozal et al., 2015).

Weeds are recognized as a significant threat to agricultural output, but environmental and economic concerns increase when weed control involves a large consumption of herbicides, which has a negative impact on the ecosystem. Resources such as light, water, and food compete with one another, so a weed control approach should attempt to increase the competitive power of crops to prevent weed growth. The faster growth of vigor or vegetative base, greater leaf spread, and rapid production of a dense canopy with a high height boost the capacity of crops to compete and decrease the amount of herbicides used (Isaac and colleagues, 2020). During the first fifty years of this century, rotary hoeing and cultivating in narrow rows were the most prevalent weed control strategies. Abdin et al. (2020) have demonstrated that utilizing narrower planting rows effectively inhibits the growth of weeds.

In corn fields, weeds grow amid the corn bushes, especially in the beginning of the plant's life when it has not yet reached maturity and its height is low. If not combated in a timely manner, they will spread throughout the field and weaken the crop. Wild oat cockroach, salma tere (salmak), chicory, chicken, Obar Salam Surov, and Mandab are major weeds of corn fields. If mechanical devices are employed to combat weeds, the first stage should begin after the corn has reached a height of 10 to 15 centimeters, and sometimes 20 centimeters, and 30 days have elapsed. When the corn reaches a height between 30 and 45 centimeters, it enters the second stage. When the height of the corn plant reaches 50 centimeters, the shade cast by the plant on the weeds causes the weeds' growth to slow and their eradication (Khodabandeh, 2017).

Agricultural experiments are typically used to discover the plant density that leads to the maximum feasible yield of a certain commodity under specific production conditions. Occasionally, however, such information is unavailable or the experimental circumstances do not correspond to the farmer's actual conditions. In addition, the appropriate density limitations must be determined before to initiating such investigations. Therefore, it is vital to understand the plant and environmental elements that influence the optimal density of the plant and to make a decision based on the integration of these aspects or to adjust the density to the current conditions. Corn spike density is influenced by soil conditions, production capacity, environment, plant volume, space restoration power, plant habit, production purpose, and weed competition (Khajepour, 2016), all of which play a significant part in determining the number of seed to plant. There are numerous factors, the most significant of which are the type of product consumption (seed or silage hybrid), soil moisture, soil fertility, and climatic conditions of the region. In general, for planting silage corn, a higher density (15-25 percent) is considered than for planting grain corn (Noor Mohammadi et al., 2016).

Due to increased competition for available moisture, nutrients, light, and carbon dioxide, the stress level of plants increases as their population density rises. When there are more plants per unit density, there are more stresses, such as nutrition deficiency and pests. The seed yield, seed quality, and sterility of the plant. The ideal density of corn plants varies based on early, medium, and late varieties as well as geographic location. As the late variations produce the greatest amount of dry matter by increasing the number and durability of the leaf surface and absorbing more radiation, the maximum amount of dry matter in the early varieties can be offset by their high densities. Late cultivars have a greater potential to transmit photosynthetic materials; hence, late cultivars had a greater number of ears per plant (1.3) and seeds per ear (502) than the mid-clay hybrid, thereby boosting density and, subsequently, absorption and nutrient uptake. Radiation has a direct effect on the growth and production of various hybrids, so that due to leaf formation and a smaller leaf area index, early hybrids are more compressible than mid clay and late hybrids (Rashad Mozal et al., 1400).

The seed-to-stalk ratio is a factor in determining the density of certain cultivars. In cultivars where this ratio is close to one, maximum yield is achieved at far higher densities than in cultivars where this ratio is smaller. The ideal density is determined by the height of the plant, the number of leaves, the width of the leaf, the placement and angle of the leaf on the stem, and the plant's weed resistance. The effect of soil moisture on spike density per hectare is significant. During the growing stage, it will be able to enhance plant density per hectare if soil moisture levels are optimal. Soil fertility is also one of the factors that influence the yield of corn at various densities. Increasing density on fertile areas has a more favorable response than on poor lands (Noor Mohammadi et al., 2016).

The density of the plant influences the yield, the length of the stem, the height of the production site, the number of cobs on the plant, the weight of the cob, and the relative humidity of the seed. Short distance limits the stem's longitudinal growth, elevating the cobs to a height that facilitates mechanical harvesting. High plant density produces stem thinning, a reduction in the number of claws, the number of cobs and their weight, and a reduction in leaf area. While the green yield grows, the weight of 1000 seeds, the proportion of ripening seeds, and the sterility of the flowers increase substantially (Irannejad and Shahbazian, 2014). Monteit (1972) stated that in normal densities of corn plants, the lower leaves are greatly affected by the shading of the upper leaves, and that the premature aging of these leaves is likely due to the decrease in the intensity of the photosynthetic radiation flow, the decrease in element absorption and production. At a higher density, approximately one-third of the upper portion of the canopy absorbs the maximum solar radiation received by the corn plant, while the lower leaves are in the shade; therefore, if sufficient nutrients and radiation are available for the lower leaves, they will, like the upper leaves, participate in photosynthesis and age later.

Research has demonstrated that when an agricultural system is dependent on herbicides, it is not very stable. As a result, the use of a number of herbicides is prohibited or restricted in some nations; therefore, it is necessary to develop long-term methods of weed management and the integration of a number of herbicides. Control mechanisms should be given more consideration. One of the ways to increase crop yields and reduce weed pressure is to observe the proper density of crop plants and the proper planting pattern. Depending on the type of plant and its characteristics, the distance between the bushes can be chosen so that the crop plant has no difficulty absorbing light. not have Crops and weeds compete for space, so the more crop area that is taken, the less room there is for weeds to grow. When there is a high likelihood that weeds will develop, the plant density is increased so that the product occupies more space and can compete effectively with weeds. Khajepour (2016) (2016) The biomass of weeds is mostly affected by physical damage caused by agricultural plants capable of forming a dense canopy, such as corn. In order to increase the proportion of agricultural plants in total resources, increasing the density of agricultural plants is seen as an effective factor. Density and a proper planting pattern are two means by which light penetrates deeply into the plant community and has a significant influence in boosting yield (Bayat et al., 2018).

In the ecosystem of weeds, competition for light is a crucial activity that depends on the amount and proportion of light absorbed by a species as well as its ability to transform radiant energy into dry matter. Light absorption by a species in a mixed canopy is affected by various factors, including plant height, leaf area index, leaf angle, and vertical distribution of leaf area in different layers of the canopy, and all of these characteristics are related to crop planting pattern and crop density. The faster a crop closes its canopy, the less light is available for the growth of weeds, and the crop becomes more competitive with weeds; thus, the change in row spacing and planting density can be attributed to the effect on the light situation in the plant canopy. Can be an important component of the integrated weed control system (Rajgan and Swanton, 2001). Lesnick (2003) observed that when herbicides were administered at low corn densities, their efficiency decreased dramatically and corn yield loss increased. In this trial, corn exhibited high competitive capacity at densities greater than eight plants per square meter, and when the density of weeds was fewer than ten plants per square meter, a 10–25% reduction in pesticides was suggested.

In this study, we investigated the effects of weeding treatments on the yield of two different densities of corn cultivars.

Research Technique

Geological features of the testing location

In order to analyze the soil at the project site, samples were taken from a depth of 0 to 50 cm, and the following chemical and physical parameters were measured:

The experiment consisted of three replications of a factorial, completely randomized, block design. The weed treatment consisted of four levels, whereas the density and cultivar treatments each included two levels that were randomly assigned to experimental units.

Weeding Weed weeding treatment was examined at four levels, the time and number of weeding stages based on the investigations conducted in the form and full fold of weeds during the growing season, weeding in three stages (2, 4, and 8 weeks after planting), Weeding was considered in two stages (4) and 8 weeks after planting and not weeding was considered and it was done manually at the specified times.

Weeding was considered and performed manually at predetermined intervals.

Density

Two values of the compression factor were investigated. Seventy and ninety thousand plants per acre were examined. At a density of 70,000, the spacing between plants was 20 centimeters, and at a density of 90,000, it was 15 centimeters.

Land acquisition operations

Before conducting the experiment, the land was semi-deeply plowed and a disk was struck in two perpendicular directions to create a uniform field surface; the ground was then leveled with a leveler. According to the size of the land, 4.5 kg of triple superphosphate fertilizer was sprayed and then blended with the soil using a disc. 46% urea was employed as a source of nitrogen. Conventionally, urea fertilizer is applied at a rate of 350 kg per hectare, and 5 kilogram of urea fertilizer was considered based on the land area. In order to complete the preparation process, 75 cm-distanced atmospheric soil and stacks were generated. Each plot consisted of five lines measuring 3.75 by 1.5 meters. Random assignment of treatments to experimental plots (48) (plots and different repetitions).

After planting, the field was irrigated with leakage for the first time, and thereafter at 8-day intervals till field maturity and harvest. At a density of 70,000, the gap between plants on the lines was 20 cm; at a density of 9,000, the distance between plants was 20 cm (the distance between plants was 15 cm). In the comprehensive weeding treatment, weeds were removed every two weeks (7) during the growing season. 2 weeks after planting, when the corn was at the stage of 4-5 leaves, 4 weeks after planting, when the corn was at the stage of 8-10 leaves, and 8 weeks after planting, when it was at this stage, were the three stages of weeding treatment. The corn in the field had 13 to 15 leaves and was beginning to blossom. In the treatment, weeding was performed twice, four and eight weeks after planting. Datura Stramonium, Amaranthus Retroflexus, Chenopodium Album, Comodulus Arvenesis, and Alhagi Camalorm L. were the major weed species. The weight of the weeds when dried was

Sampling and measuring characteristics

In this study, the number of cobs per plant, the number of seeds per cob, the number of rows per cob, the number of seeds per row, the weight of 1000 seeds, grain yield, length, cob, diameter, cob wood diameter, cob dry weight, cob dry weight, cob dry weight, Plant height, the number of leaves per plant, the stem diameter, the leaf surface index, the leaf dry weight, the stem dry weight, the plant dry weight, and the weed dry weight were

Separate counts were conducted for the number of ears per plant, the number of rows per ear, the number of seeds per row, and the number of seeds per ear.

Using calipers, cob length, cob diameter, and cob wood diameter were also measured in cm.

A digital scale was used to calculate the weight of 1000 seeds, the dry weight of the cob, the dry weight of the cob sheath, and the dry weight of the cob wood.

Utilized statistical methodologies and software

In accordance with the plan, statistical analyses including variance analysis, correlation analysis, and regression analysis were conducted, and all data were evaluated using SAS software. The averages were compared using Duncan's multi-range test, and graphs were created using Excel.

Findings

Table 1. Trait variance analysis number of seeds per ear, number of rows per ear, number of ears per plant

Sources of changes	Dof	Number of corns per plant	The number of seeds in the corn	Number of rows	Number	Thousand seed weight	Yield
Block	2	0/0433 ns	2202/6387 ns	2/2637 ns	47/2475 ns	1379/7394 ns	4/2310 ns
Weeding weeds	3	0/0466 *	29438/3194 **	13/0096 **	980/4248 **	4428/8397 **	51/4638 **
cultivar	1	0/0833 *	29028/987 **	74/2021 **	108/12 ns	4443/8629 *	12/1706 ns
Density	1	0/0533 ns	91465/9563 **	43/8154 **	5535/396 **	550/4688 ns	11/7909 ns
error	30	0/0133	3772/6655*	1/7334	117/6692	750/5819	5/9505
Coefficient of variation		10/347	11/1151	6/5883	17/3455	9/5583	20/205

The number of seeds in each row, the weight of one thousand seeds, and the seed yield.

Seed harvest: At the 1% probability level, the effects of weed weeding treatment on seed yield were significant (Table 1). The treatment of no weed weeding during the growing season is associated with the lowest average seed yield (9.18 tons/ha) (4W). Correlated with the stress brought on by weed competition. Complete weeding treatment during the growth season resulted in the highest average seed yield (13.62 tons/ha) (1W). The difference between the complete weeding treatment, the three-stage weeding treatment (3W), and the two-stage weeding treatment (73), with averages of (11.95 tons/ha) and (11.95 tons/ha), respectively, was not statistically significant. During the growth season, weed competition significantly decreased grain yield as a result of a loss in yield components. These findings concurred with those of Uvah and Ivo (2021) and Cassini et al (2014). Being tall and the role of stem height in enhancing the competitive power of corn prevents it from losing to weeds, and so there is a substantial difference between the levels. The treatments of weed interference on crop yield were not observed. Shahi et al. (2016) reported comparable findings. According to the findings of Yadavi et al. (2016), the presence of Taj Khoros weed reduces the yield of corn regardless of the density of the corn, but increases the yield of corn seeds at a density of 1.5 times the density of the corn. As expected, the corn seed yield was greater at the greatest density than at the typical density, and the weed contamination rate was the lowest.

The findings of correlation correlations

Examining the correlation coefficients of various traits with grain yield revealed that the weight of 1000 seeds (r=0.77241), number of leaves (r=0.65237), plant height (r=0.64244), ear dry weight (r=0.60304), and index Leaf area (r=0.59553) had a positive and statistically significant correlation with seed yield. The positive correlation between grain yield and other characteristics was not significant. The correlation between seed yield and 1000-seed weight was the strongest. According to certain reports, the weight of 100 seeds has a favorable and statistically significant correlation with seed yield (Goldani et al., 2018). According to Ramezani et al. (2017), the correlation between seed yield and cob weight without pods was the strongest, followed by the correlation between seed number attributes. The row and total number of leaves per plant had a substantial and positive correlation with seed yield.

Tiwari and Verma (1999) found a positive correlation between seed yield and ear yield and pod and ear diameter, but a negative correlation between plant height and ear length.

Sharma and Kumar (1987) found a negative correlation between plant height, leaf area, ear diameter, and seed number and plant height.

Positive and significant correlation was stated by Sharma and Kumar (1987) between plant height, leaf area, ear diameter, number of seeds in a row, and number of rows of seeds in an ear. The variation in results can be attributed to both the influence of environmental factors and the variance between the cultivars investigated. The strongest correlation existed between the dry weight trait of the entire corn plant and the dry weight of the stem. There was thereafter a positive and statistically significant correlation between leaf dry weight, pod dry weight, cob diameter, stem diameter, wood diameter, total number of seeds, number of rows in the cob, dry weight, cob number of seeds in the row, plant height, and cob dry weight.

Wood

The correlation between the 1000 seed weight characteristic and the number of leaves was the strongest. There was thereafter a positive and substantial correlation between cob length, grain yield, dry weight, cob height, dry weight of cob sheath, stem diameter, total number of seeds, and cob diameter.

The number of seeds in a cob had the highest correlation with the number of seeds in a row, followed by dry weight of cob, dry weight of cob wood, diameter of wood, cob, dry weight of cob sheath, number of rows in cob, cob diameter, stem diameter, plant height, dry weight of stem, and total dry weight, all of which exhibited a positive and significant correlation.

The outcome of a regression analysis

Stepwise regression was utilized to eliminate inefficient or low-effect traits from the seed yield regression model.

$$Y=-40.14+7.64\ X4+8.09\ X7+0.78\ X9-0.18\ X13+0.75\ X16-0.028\ X19$$

According to the results of step-by-step regression analysis for grain yield trait as dependent variable and other traits as independent variables, it was determined that the number of ears per plant was the first trait entered into the model, which increased grain yield by one unit to 7.64 tons per hectare. The number of ears per plant is one of the primary yield components, which has a significant effect on seed yield. The second attribute included in the model was cob diameter, which boosts grain yield by 8,098 tons per hectare if it increases by one unit. With an increase in the diameter of the cob, the number of rows within the cob will also rise, as will the number of seeds within the cob. The third attribute used into the model was cob length; if it grows by one unit, grain yield will rise to 0.78 tons per hectare.

The cob wood's dry weight was the fourth characteristic included in the model. The dry weight of cob wood had a negative effect on grain yield, such that an increase of one unit of dry weight of cob wood decreased grain yield by 0.185 tons per hectare. The index of leaf area was the fifth attribute incorporated into the model. The correlation between leaf area index and grain yield was positive and significant. Adding one unit to the leaf area index will enhance grain yield by 0.754% per hectare. The dry weight of the entire plant was the final attribute entered into the model and had a negative effect on grain yield. A one-unit increase in the dry weight of the entire plant will reduce grain yield by 0.028% per hectare.

Concluding Remarks

According to the results of this experiment, the treatment of not weeding weeds during the season caused a significant decrease in all investigated traits, resulting in a grain yield of 9.18 tons per hectare in the treatment of not weeding weeds and 13.62 tons per hectare in the treatment of Weeding during the growing season. However, the yield of the yield components and morphological traits in the treatment of not weeding weeds was superior. did not Due to the fact that corn is capable of forming a dense catopium and primarily affects the biomass of weeds through physical damage, it can be concluded that, under the prevailing weather conditions, weeding in two stages is sufficient to achieve the desired results, and additional weeding stages are not economically viable.

Density has a substantial effect on the examined characteristics. Increased plant density was related with a drop in yield and yield components per individual plant, whereas yield per unit area increased. With the exception of the leaf area index, morphological characteristics dropped as density rose. At the end of the season, a measurement of the dry weight of weeds at a density of 90,000 plants revealed that the dry weight of weeds had reduced. In addition to boosting grain yield, increasing the density of corn plants can lessen the competitive effect of weeds.

No significant differences were observed between cultivars in the examined traits, but considering that Single-Cross 704 is one of the cultivars that has a longer history of cultivation in the region and is grown in more regions of the province than the Maxima cultivar, the Maxima cultivar had higher yield in both densities and a better response to the higher density level, and is therefore recommended for cultivation in the region.

Due to the positive and significant correlation between the leaf area index and the seed yield of the Maxima cultivar, the treatment of no weeding resulted in a higher seed yield for the Maxima cultivar (9.56 tons/ha) than for the Singlecross (8.8704 tons/ha). The leaf area index was greater for all weed treatments, genes, and spike density levels compared to single cross 704. The dry weight of the cob, the number of leaves, the height of the plant, and the weight of 1000 seeds all had a positive and significant correlation with seed yield. With the exception of the dry weight of the cob, all other attributes were greater in the Maxima cultivar than in the single cross 704.

According to the regression study, the number of cobs per plant, cob diameter, cob length, cob dry weight, leaf area index, and dry weight of the entire corn plant had the largest effect on grain yield. The number of cobs per plant, cob diameter, cob length, and leaf area index had a favorable effect on grain yield, and Maxima had a better value for these qualities than Singlecross 704. The effect of dry weight of cob wood and dry weight of whole corn on grain yield was negative; the amount of these qualities was greater in Single Cross 705 than in Maxima. The shorter growth time of the Maxima cultivar relative to Singlecross 704 may account for its superior responsiveness to higher spike density and weed competition during the growing season.

Suggestions

1- Examining the effects of various periods of weed competition on the yield and yield components of corn cultivars

2- Determining the key period for corn weed control. 3- Examining the effects of plant densities on yield and yield components of corn cultivars.

4-Evaluating the effects of spike density on decreasing the competitive effects of weeds

5- Examining the effect of cultivars' development period length under situations of increasing spike density and weed competition

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