

Short Communication

Studies into the Effect of Plant Placing on Quality and Yield of Maize Crop

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ABSTRACT

Field studies were conducted to evaluate the effect of plant spacing on quality and yield of maize crop. Plant spacings consisted of S1- (60 x 15 cm), S2- (60 x 25 cm) and S3- (60 x 35 cm). Maize grain yield was significantly higher (3.53 t ha⁻¹) at narrow plant spacings i.e., S1- (60 x 15 cm) due to more plant population per unit area and hence more number of cobs and number of grains per cob. While the best quality of grains in terms of its starch (69.77%), oil (3.63%) and protein (7.84%) was noted in widely spaced plants i.e. S3- (60 x 35 cm). Enhancement in quality of maize grains was probably due to proper utilization of light, moisture and nutrition. A decrease in plant spacings resulted in a decrease in the grain starch, oil and protein of maize crop and vice versa.

Key Words: Plant placing; Quality; Maize

INTRODUCTION

Under the prevailing agro-technology of maize crop, the low plant population is generally not only responsible for its low yield but for quality as well. Hagemam and Gitter (1961) has reported that the dense population more than optimum level cause decrease in protein contents of maize grain through inactivation of enzyme responsible for nitrogen metabolism. Actually maize being a C4 plant can make the best use of growth resources i.e. light, moisture, nutrition etc. Therefore the maize crop has more scope to enhance its yield and quality on widely spaced conditions. Similarly, other studies have shown a tremendous response of maize crop to varying plant spacing not only on its yield but on quality as well. Where as the quality of maize grain in terms of protein, oil and carbohydrate is very important in human nutrition. Keeping this all in view, the present study was initiated to evaluate the effect of plant spacings on quality and yield of maize crop.

MATERIAL AND METHODS

This field study was conducted at the University of Agriculture, Faisalabad on a sandy loam soil during 2003. Different plant spacing i.e., S1- (60 x 15 cm), S2- (60 x 25 cm) and S3- (60 x 35 cm) were maintained in Randomized Complete Block Design (RCBD) with four replications. Maize variety "Akbar" was sown on 7th August with the help of a dibbler. The plant spacing per treatment were maintained through fixing Row to Row (R x R) distance at 60 cm and Plant to Plant (P x P) distance at 15, 25 and 35 cm. All the cultural practices were kept normal and

uniform for all the treatments.

Observations on yield and its quality parameters were recorded using the standard procedures. The quality in terms of grain starch, oil and protein contents were determined following the standard methods of Juliano (1971), Low (1990) and Anonymous (1980), respectively. All the data collected were analysed by using "MSTATC" statistical package (Anonymous, 1986) and differences among the treatment means were compared by the Least Significant Difference (LSD) Test (Steel & Torrie, 1984).

RESULTS AND DISCUSSION

Maize crop grown on S1- (60 x 15 cm) produced significantly higher yield of 3.53 t ha⁻¹ as against the 3.15 t ha⁻¹ in case of S3- (60 x 35 cm). However, this yield was statistically at par with that of 3.46 t ha⁻¹ produced in plots grown at S2- (60 x 25 cm) plant spacing. These results are in line with those of Anjum *et al.* (1992), who reported higher yields at narrow plant spacings of maize due to more number of plants and hence more number of cobs per plant and more number of grains per cob. Quality of maize grain in terms of grain starch, protein and oil in response to different plant spacings was significantly influenced (Table I). Maximum grain starch content (69.77%) was recorded in crop grown in wide plant spacings i.e., S3- (60 x 35 cm). Similarly S2- (60 x 25 cm) plant spacing produced significantly higher grain starch (67.75%) than that of narrowest plant spacings i.e., S1- (60 x 15 cm). Probably the maize crop grown on wider spacing made the adequate use of growth resources, which resulted in more photosynthetic harvest and hence higher grain starch contents. While the oil

Table I. Studies into the effect of plant spacing on quality and yield of maize crop

Plant spacing	Grain yield (t ha ⁻¹)	Grain starch content (%)	Grain oil content (%)	Protein content (%)
S1(60x15cm)	3.53a	66.11c	3.62 NS	6.64c
S2(60x25cm)	3.46a	67.75b	3.63 NS	7.28b
S3(60x35cm)	3.15b	69.77a	3.63 NS	7.84a

contents remained almost similar at all plant spacing. The 3.63% oil contents were recorded in case of S3 and S2 and 3.62% in S1 plant spacing, which is highly non-significant.

These findings are in contradiction with the previous findings of Khan (1992), who reported that maize crop grown at wider spacing produced higher oil contents (%) than grown on narrow spacings. The contradiction of these results is difficult to explain. However one possible reason could be the different agro-climatic conditions under, which the experiments were conducted. Significantly higher grain protein content (7.84%) were obtained in plots, where crop was grown at S3- (60 x 35 cm) compared to S2 and S1 with protein content i.e., 7.28 and 6.64%, respectively. The significant improvement in grain protein contents of maize in widely spaced plants might be attributed to better light,

moisture and nutrient utilization. An increase in protein content of maize grain with an increase in plant spacing has also been reported by Early *et al.* (1966).

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