INFLUENCE OF PLANTING DATE ON CORN GROWN IN AN AQUIC EUTROPEPT

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ABSTRACT

Date of planting significantly influenced growth and development of corn. Corn first planted on the last week of April and those planted 3 and 5 weeks later (May 16 and May 29) exhibited superior growth and ear yields over those planted 7 and 9 weeks later (June 12 and June 27). Relative to the highest total ear yield obtained (3.65 tons/ha), the mean reduction in ear yield of plants in the latter treatments was 60.55% representing a three-fifth decrease in this parameter. This was due to the very wet conditions during the early growth stages which affected crop establishment and consequently, yield performance.

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KEY WORDS: Corn. Aquic Eutropept. Date of planting. Growth. Yield.

INTRODUCTION

Precipitation among other climatological variables, plays a very important role in rainfed agriculture. The kind of crops grown and the cropping patterns followed by farmers are practically adapted to the seasonal water availability which is determined by precipitation trends. Rainfall distribution varies among localities due to differences in topographical characteristics and geographical position. It then follows that the growing period of a crop like corn is location-specific. Thus, identifying the best time to plant corn in a certain locality will surely and greatly benefit the local corn farmers. This will help them maximize their yields and at the same time minimize the risk of crop failure due to unfavorable climatic conditions that might prevail during the growing period of the crop. Conducting this type of study in ViSCA where the soil is an Aquic Eutropept will also guide researchers working on corn since this soil is dominant in the locality and is largely used in the conduct of field

experiments on corn, sorghum, vegetables, root crops and other upland crops.

This study aimed to assess the effect of date of planting on corn performance, and to document the growth and yield performance of corn when growing conditions, principally the climatic environment, are far from being optimum or desirable.

MATERIALS AND METHODS

Field Preparation and Experimental Design

The experimental area was disk-plowed, then harrowed a week later, and furrows spaced at 0.75 m were constructed. Experimental plots replicated 3 times were then laid out in a randomized complete block design with each block occupying an area of 120 m^2 including alleyways of 1 m between plots. The plots measuring 4 x 5 m in each block were subjected to the following treatments:

Date of Planting

First planting of corn (April 23)
Corn planted 3 weeks later (May 16)
Corn planted 5 weeks later (May 29)
Corn planted 7 weeks later (June 12)
Corn planted 9 weeks later (June 27)

Planting

Corn (Improved Tiniguib variety) seeds were drilled in the furrows at the rate of three seeds per hill at a planting distance of 0.25 m between hills and 0.75 m between rows. The first planting of corn was done on the last week of April to coincide with the start of an apparently dry season.

Cultural Management

Fertilizer was applied at a uniform rate of 90-60-60 kg N, P_2O_5, and K_20 per hectare using urea (45% N) and complete fertilizer (14-14-14) as fertilizer sources. One-half of the fertilizer was applied at planting in bands along the rows and then covered with a thin layer of soil before sowing the seeds. The remaining amount was sidedressed a month after seedling emergence.

Thinning to one plant per hill was done 2 weeks after emergence. All plots were weeded whenever necessary to suppress weed growth during the experimental period.

Furadan granules were applied to the whorl of the corn plants at one month after emergence to control stemborers while Azodrin was sprayed to the plants at the rate of 3 tbsp/16 liters of water to control foliage-feeding insects.

Harvesting

Harvesting was done about 3 months from seedling emergence when the corn ears were already physiologically mature. Only the four inner rows of each plot excluding the first and last two plants in each row were harvested. The ears were dehusked, sorted and weighed.

Data Collection

Plant height at maturity and leaf area index during kernel formation of 10 sample plants per plot were observed. Stover yield, number and weight of marketable and non-marketable ears, and total ear yield were also determined. The daily relative humidity, minimum and maximum air temperatures, wind speed at 2 m above the ground, sunshine duration, vapor pressure and rainfall were obtained from the ViSCA Agrometeorological Station. These parameters except rainfall were used in calculating the daily potential evapotranspiration using Penman's equation.

RESULTS AND DISCUSSION

Characterization of the Experimental Site

Site Description. The field experiment was conducted at the experimental station of the Visayas State College of Agriculture, Baybay, Leyte, Philippines with geographical coordinates of 10° 44'N and 124° 48'E. The area is 9 meters above sea level and is located on an alluvial landscape. The taxonomic classification of the soil at the family level is fine, mixed, isohyperthermic Aquic Eutropept (Tomenio, 1980). Because of its relatively poor internal drainage, occasional flooding may occur during high rainfall conditions.

Climatic Environment. The diurnal variations of some climatological elements throughout the experimental period are shown in Figure 1 while rainfall distribution is reflected in Figure 2. Solar radiation values estimated from extraterrestrial radiation and sunshine duration, ranged from 240 to 590 langleys/day. Greater solar radiation values were obtained during the early part of the experimental period when rainfall was scanty and the sky was dominantly clear. Nevertheless, high solar radiation was not exclusive to this period because bright days interrupting a succession of rainy days in the later part of the experiment gave similarly high values. Wind speed was generally fair except during the last week of August when the fastest wind speed due to a tropical weather disturbance was recorded. The mean air temperature fluctuated from 26° to 31°C during the months of April to August but dipped in September indicating cooler conditions for the last quarter of the year.

The potential evapotranspiration (PET) which was calculated using Penman's equation is also shown in Figure 1. Since PET is directly influenced by the climatic elements described previously; high values of solar radiation, wind speed and air temperature were also generally associated with high PET rates. The highest computed PET was 6 mm/day.

Rainfall was scanty during the early part of the experiment and became more frequent by late June or early July although breaks in the series of rainy days were evident. High rainfall levels were recorded

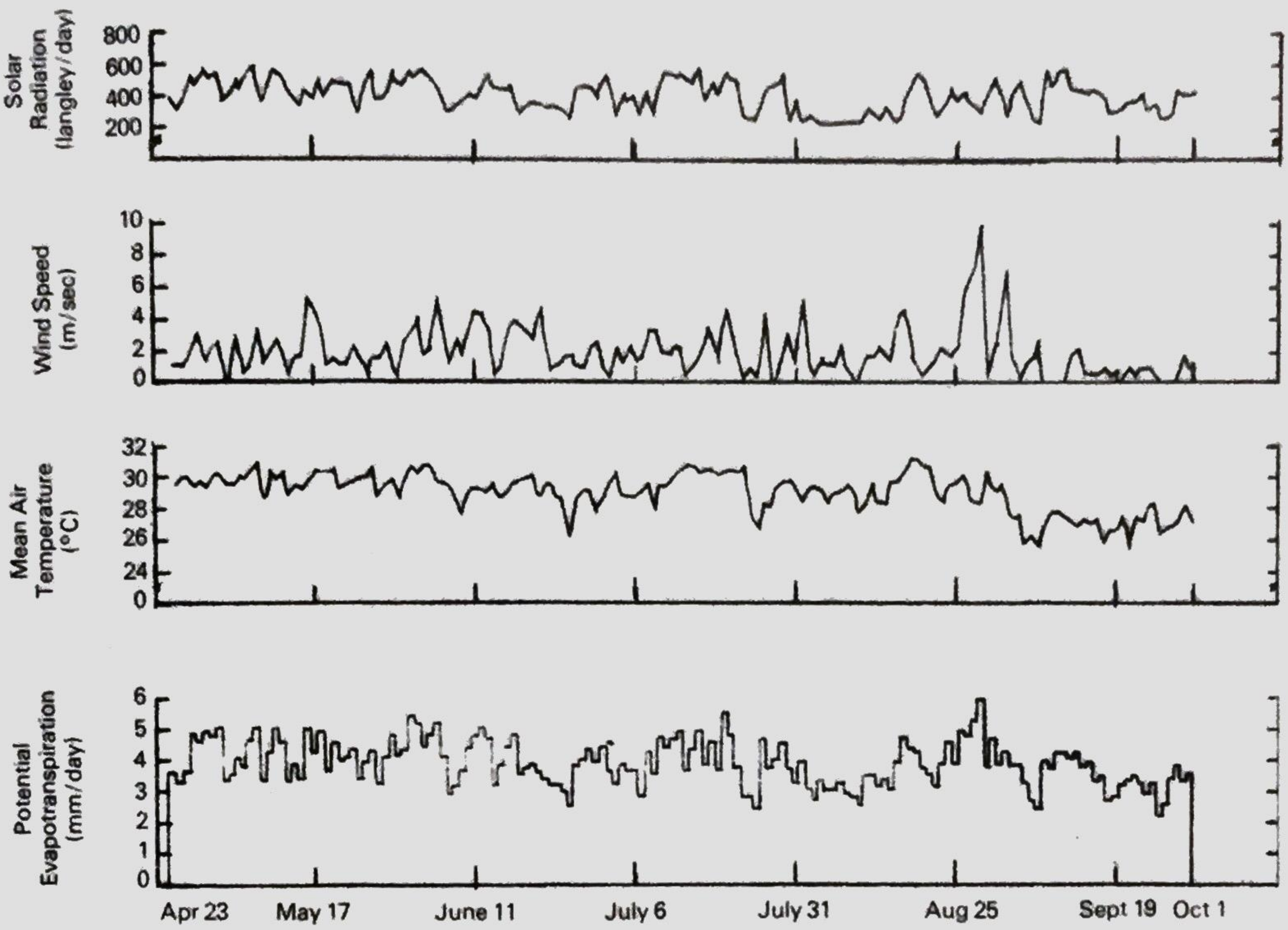

Figure 1. Diurnal variations of some climatic elements throughout the experimental period.

during the last week of July up to the second week of August. The highest rainfall level of 45.6 mm was recorded during the first day of September. In general, the first half of the experimental period could be considered as relatively dry while the second half, as relatively wet.

Effect of Planting Date on Corn Performance

The dates of planting, emergence and harvest of corn in the different treatments are given in Table 1. In spite of differences in growing conditions principally in terms of rainfall and solar radiation levels, the maturity period of corn did not differ much among treatments.

Table 2 summarizes the data on growth and yield parameters of corn as influenced by date of planting. Plant height, leaf area index and dry stover yield were significantly affected by date of planting. Corn that was planted 5 weeks later (May 29) were significantly the tallest

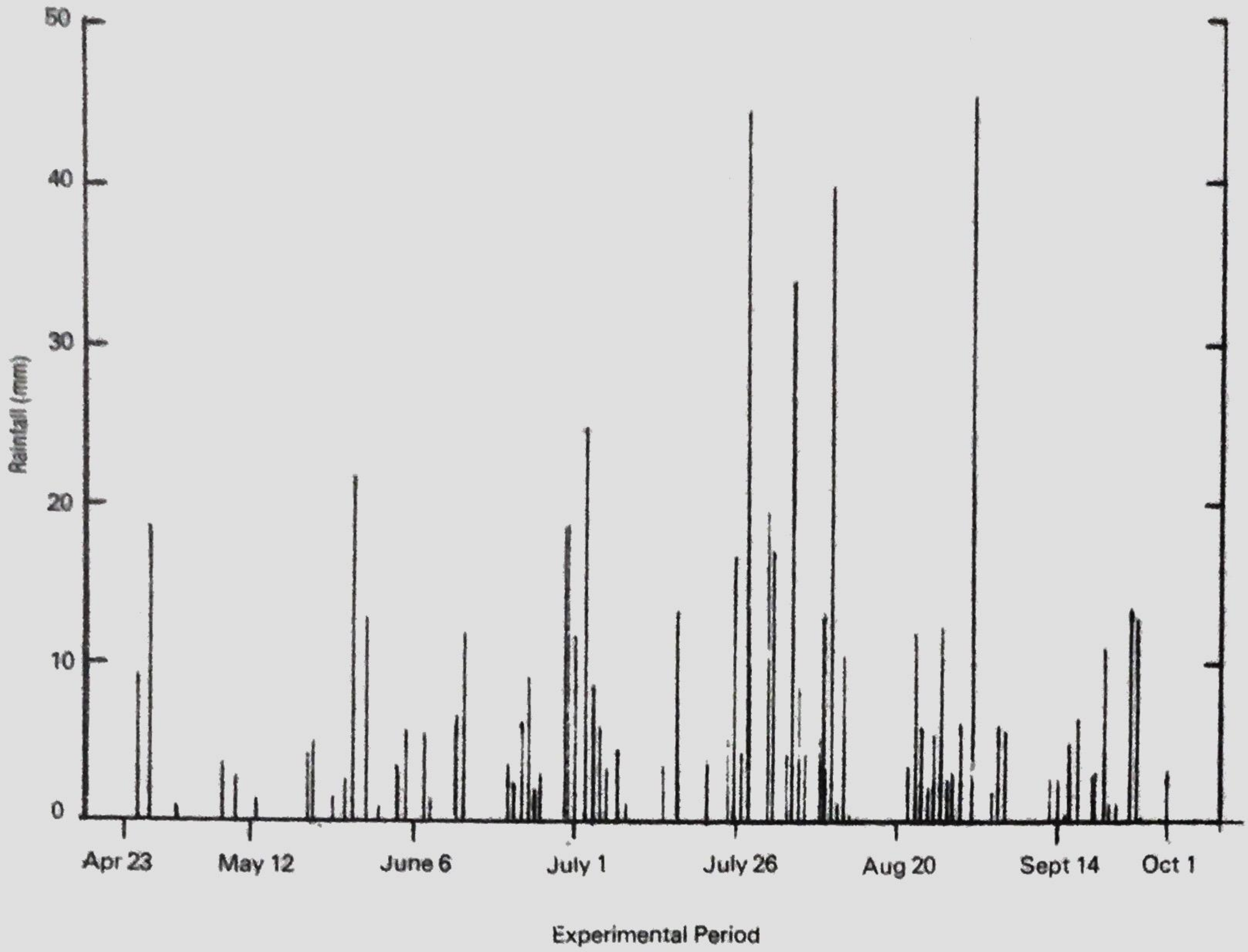

Figure 2. Rainfall distribution throughout the experimental period.

Table 1. Emergence and harvest of corn as affected by different planting dates.

Planting Date	Emergence	Harvest
First planting (April 23)	April 28	August 6
Planted 3 weeks later (May 16)	May 21	August 21
Planted 5 weeks later (May 29)	June 2	Sept. 3
Planted 7 weeks later (June 12)	June 17	Sept. 20
Planted 9 weeks later (June 27)	July 2	Oct. 1

Table 2. Summary data on the growth and yield parameters of corn as influenced by date of planting. [1]

Planting Date	Plant Height (cm)	Leaf Area Index	Dry Stover Yield (t/ha)	No. of Ears/Plant		Ear Weight (t/ha)		Total Ear Yield (t/ha)
				Market-able	Non-Market-able	Market-able	Non-Market-able	
First planting (April 23)	209.82b	2.93b	4.44ab	39.00ab	38.33	2.24a	1.26	3.50a
Planted 3 weeks later (May 16)	225.02b	3.30b	5.41a	49.67a	29.33	2.85a	0.81	3.65a
Planted 5 weeks later (May 29)	253.97a	4.12a	5.65a	34.33b	48.33	1.83b	1.37	3.20a
Planted 7 weeks later (June 12)	220.97b	3.36b	3.40b	13.67c	41.67	0.56c	0.82	1.39b
Planted 9 weeks later (June 27)	220.43b	2.86b	3.32b	10.33c	54.67	0.42c	1.07	1.49b
C.V. (%)	6.21	9.88	16.32	25.29	24.08	30.94	33.35	14.02

[1] Treatment means within a column followed by the same letter or without letters are not significantly different at 5% level, DMRT.

(253.97 cm) and had the highest leaf area index (4.12). The growth of plants in this treatment may have been favored by a combination of relatively abundant sunshine and moderate rainfall during the plants' vegetative stage. This probably enhanced photosynthate production as compared to the relatively high solar radiation but lower rainfall levels during the first planting (April 23) and planting 3 weeks later (May 16). The low solar radiation levels and high rainfall conditions associated with plantings done 7 and 9 weeks later (June 12 and June 27) may have been less favorable for maximum growth. The first planting and planting at 3 weeks later produced dry stover yield that is comparable to the highest value (5.65 tons/ha) obtained with planting at 5 weeks later. On the other hand, corn planted 7 and 9 weeks later gave lower stover yields although not significantly different from those obtained from the first planting.

Delay in planting time markedly affected both the number and weight of marketable corn ears as well as the total ear yield but not the number and weight of non-marketable ears. The effect is most evident in total ear yield where significantly higher yields were obtained with the first planting and planting up to 5 weeks later. Planting beyond this period resulted in low ear yields. Relative to the highest total ear yield (3.65 tons/ha) produced with planting at 3 weeks later, the reductions in ear yields of corn planted 7 and 9 weeks later were 61.92 and 59.18%, respectively, or a mean reduction of 60.55% based on the maximum yield.

These results suggest that in ViSCA and nearby localities, planting corn during the period from late April to the last week of May could still be favorable for optimum growth. Corn planted during this period could benefit from abundant solar radiation and moderate rainfall for a good crop establishment during the early vegetative stages. Planting beyond this period may subject the plants to heavy rainfall which usually starts by mid-June or early July and coincides with the early growth stages. This could result in stunted growth of most plants due to occasional flooding. This corroborates the findings of Sarmiento (1981) that excessive soil moisture is detrimental to corn performance during the period from emergence to tasseling. The recommended planting period for corn in this locality would also be valuable to researchers in planning and implementing field exeriments on corn so as to obtain optimum corn growth.

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