Field Plot Technique Studies with Chick Pea

Summary

Chickpea is one of the oldest crop as it was known to the ancient Egyptian. Nowadays, it is one of the most important winter leguminous crop on Egypt. Its importance as a source of vegetable protein has increased due to the shortage of animal protein. Its seed also provide a food of high calorific and nutritive value. The area under chickpea, in Egypt, is about 13264 feddan which is mainly concentrated in Assiut and EL- Behera provinces. Its annual production is nearly 70299 ardabs with an average yield of 5.30 ardabs per feddan, (one ardab = 150 kg).

The present study was designed to find out the optimum plot size, shape and suitable number of replications for chickpea field trials.

For this purpose two uniformity trials were conducted at the Experimental farm, faculty Agriculture, Cairo University, at Fayoum in two successive growing seasons of 1991/1992 and 1992/1993.Giza 88 variety was used.

The actual area of each field trial was divided into12 strips. Each strip was consists of 72 rows of*Means of 2 years from 1990 - 1991. Ministry of Agriculture, Department of Agricultural Economics.2.Om long and 0.6m apart. Each row was considered as basic unit i.e. 1, 20 m^2) consequently, a total of 864 basic experimental units was utilized in each season,. Distance between hills within the row was 10 cm.

Data for each trial in both seasons were analyzed separately to determine the soil heterogeneity index (b), the effect of plot size and shape on the variance per basic unit area (V), coefficient of variability (C.v.9) and number of replications.

Two main methods were used to estimate optimum Dot Size plot size. The first method was developed by Smith (1938) and was modified by Hathaway (1961) dependedout the relationship between plot size logarithmic and plot variance logarithmic. The second method was that of maximum curvature which is based on the exponential relationship between plot size and coefficient of variability.

Bartlett's test for homogeneity of variances, as published by Steel and Torrie (1960), was used to study beteetae coecient the effect of changing plot shape. The number required replications to achieve a certain degree of precision was determined by the formula given by Federer (1955) based on the coefficient of variation for different plot size.

The general findings might be summarized as follows:

1- The variance per basic unit area declined gradually PLOT. SZA W FORit with each increase in plot size, from one basic unit to a certain increased size, in the two seasons, but 2 the rate of decreasing in variance varied accordingseason and basic to season and the field used. However, the rate of07Sizeödag e second season decrease was not proportional with the increase Plot size
2- The index of soil variability (b) averaged 0.4057 and 0.4291 in 1991/1992 and 1992/1993, respectively, itdecreased de variance per for chick pea trials.
3- The coefficient of variability (C.V. %) values tended plot Size to decrease as plot size increased from the smallest number basic unit area (one basic unit) to the largest plot size (432 basic units) in both seasons.
4- The relationship between the coefficients of son, respectively. In the second variability (C.V.) and plot size (x) were mathematically expressed by the following equations: -0.33959 C.V, = 35.755% in the first season (1991/1992) -0.38118 C.V. = 14.2391% in the second season (1992/1993).
5- The optimum plot size was one basic unit (1.2 m or 1/3500 feddan) in the two seasons by using Smith's method and it was 6 basic units 17.2m or 1/583.33 feddan) in the first season and 4 basic. Units (4.8 or 1/875 feddan) in the second season by using maximum curvature method.
6- Plot shape had no obvious effect in most cases in this study, whereas, long and narrow plot were more efficient as it decreased the variance per. basic unit and coefficient of variability.
7- Negative relationship was evident between plot size and number of replications in both seasons.
8- The optimum number of replications to detect 15% and 20% differences of the mean was 13 and 7 replicates in the first season, respectively. In the second season the number of replications was 2 and 1, respectively.