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Research Paper :

Optimum plot size for tomato by using S-PLUS and R-software's in the soils of Kashmir

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ABSTRACT

Optimum plot shape and size of plot has been worked out from uniformity trial on S-II variety of tomato. Maximum curvature method, Fair-field Smith's variance law was used for the purpose. A plot of 8 m^2 (4m x 2 m) was found to be optimum for S-II variety of tomato grown at RRS and FOA Wadura Campus, SKUAST-K. The trial indicated that coefficient of variation decreased with increase in plot size in either direction, but decrease was more in north-south direction than east-west direction. The shape of plot has been found to have very little influence on variability within the range of plot size considered.

Key words : Tomato, Trial, Variety

Investigations on optimum plot sizes and shapes of plots are important for the efficient planning of field experiments. This requires knowledge of variability presented with the experimental units and that with the crop. Uniformity trials with various crops have served a definite purpose in determining the most effective plot arrangement and experimental design for particular area involved, where growing conditions are subject to variations of similar magnitude. The idea of magnitude of variability can be obtained from data on uniformity trials conducted with the crop or from trials in which number of agronomic treatments on the crop are under study. Such studies have been made by Abraham and Vachhani (1964) for transplanted rice, Sreenath (1973) for sorghum, Upadhyay *et al.* (1994) for summer paddy, Shamasundaram and Singh (2004) for standard carnation.

MATERIALS AND METHODS

The trial was conducted in May, 2006 to October, 2006. The experiment was conducted at Regional Research Station and Faculty of Agriculture, SKUAST-K Wadura Campus. The S-II variety of tomato was sown in a field over an experimental plot of 40 m × 20m. The plant to plant and row to row distance was 60cm × 45cm. The basic unit of 1m × 1m was selected, and each basic unit ($1m^2$) comprised of 2 to 3 plants. Therefore, 800 basic units were formed f rom an experimental plot of size 40m × 20m. Harvesting of tomato started from, last week of July to last week of October, 2006. All the recommended package and practices of SKUAST-K were adopted and then yield of all basic units was recorded. The data from basic units was used to obtain further different sizes and shapes of plots and coefficient of variation of every data set was obtained to estimate soil heterogeneity index in this uniformity trial on tomato. The coefficient of variation thus calculated for each arrangement was used to obtain optimum shape and size of plots and blocks.

RESULTS AND DISCUSSION

The Table 1 shows the coefficient of variation for different sizes and shapes of plots. Some of the combinations of the plot sizes like 1m x 3m, 3m x 1m, 6m x 1m, 3m x 3m, 7m x 1m etc. were not possible if all the 800 units would have been taken. It is obvious from the Table 1 that the coefficient of variation for individual units was 34% indicating high degree of soil heterogeneity. The coefficient of variation in general decreased with increase

Table 1 : Coefficient of variation of different plot sizes and shapes

No. of units	Number of units along E.W.				
N-S	1	2	4	5	10
1	34.1	30.6	27.0	26.2	19.8
2	30.7	27.1	23.8	23.0	16.1
4	32.8	23.0	19.3	16.9	7.7
5	26.0	21.1	17.8	11.2	9.7
8	20.3	17.4	11.0	10.5	9.6
10	18.4	15.3	10.0	9.4	9.1
20	11.7	9.7	9.4	9.4	8.8
40	9.5	9.7	9.0	8.0	7.7