CONFIDENCE LIMITS FOR THE CV DATA OF FIELD EXPERIMENTS ON MUSTARD CROP

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ABSTRACT

The coefficient of variation (CV) of field experiments on mustard crop showed positive skewed distribution. The best fitted distribution to the data was Lognormal distribution. The 95% confidence limits showed that the CV should be between 13 to 15 percent difference of the estimator.

Key words: Coefficient of variation, Mean, Variance, Confidence interval, Maximum likelihood estimators, Lognormal distribution, Mustard crop.

Any agricultural experiment requires allocation of treatments to the experimental units so that the variation between two experimental units having same treatment is minimum. In order to study the homogeneity of the heterogeneous units one needs to study the distribution of CV. The CV indicates the degree of precision with which the treatments are compared and is a good index of the reliability of the experiment. The CV varies greatly with the type of the experiment, the crop grown and the specific character measured.

In this article the distribution of CV for the experiments conducted on the mustard crop at different research stations of the then Gujarat Agricultural University (GAU) was studied and the confidence interval for the best fitted distribution (Lognormal) decided with the help of SPSS 15 software.

The yield secondary data [Ago (AGRESCO Repor, 1996)] of 371 experiments conducted on mustard crop during the year 1984-85 to 1995-96 at ten different research stations of GAU have been considered and the calculated value of CV of these experiments were taken as observation in this study. With the help of the SPSS 15[5] software, a histogram with superimpose normal curve (Figure 1) was obtained for log of CV of mustard data. The shape of the curve showed log of CV of mustard data comes from the symmetric population. For more clarity of distribution we have obtained the Normal probability plot (Figure 2) of log CV. Also data of log of CV values were statistically analyzed to know the best fitted distribution. Further 95% confidence interval for the mean of Lognormal distribution was worked out.

The maximum likelihood estimators of parameters of Lognormal distribution and its properties have been studied (Aitchison and Brown, 1963 ; Agarwal, www.wikps.)2003 it is found that a positive continuous random variable X is said to follow Lognormal distribution if the variable logeX has Normal distribution with mean m and variance $\sigma^2$.

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From Figure 1 of histogram it is seen that the log of CV of mustard data is symmetrically distributed and by superimposing normal curve we found that data is approximately normally distributed (Shanubhogue, 2004). Same result is obtained from the Normal Probability Plot of log of CV of mustard data. (See Figure 2)

To assess the normality assumption of the log of CV of mustard data we have used nonparametric test namely one sample Kolmogorov-Smirnov goodness of fit test. In Table 1, p-value of One Sample Kolmogorov-Smirnov test is 0.413 which is greater than the significant level 0.05; it indicates that the assumed distribution (Normal distribution) fits well to the data of log of CV of the experiment conducted on mustard crop.

Mean and Variance of CV of Lognormal distribution are given in Table 2 and its 95% confidence limits are given in Table 3. The Lognormal distribution is well fitted to the CV data of the experiments conducted on mustard crop. Also the 95% confidence limits indicate that CV value should lie between 13 % to 15%.

REFERENCES