ABSTRACT

REGRESSION AND CLUSTER ANALYSIS ON YIELDING STABILITY AND AGRONOMIC CHARACTERISTICS OF 26 HYBRID CORN GENOTYPES IN 9 ENVIRONMENTS

BY

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The study on the regression and cluster analysis on yielding stability and agronomic characteristics of 26 hybrid corn genotypes in 9 environments, was conducted at the research field of Maejo University, Mae Sa Mai Royal Project, Chiang Mai University, Monsanto (Thailand) Co. Ltd., Novartis (Thailand) Co. Ltd., Pacific Seeds Co. Ltd., Charoen Seed Co. Ltd., Nakorn Sawan Field Crop Research Center and National Corn and Sorghum Research Center. The varieties were grown in 1999 rainy season using a Randomized Complete Block Design (RCBD) with three replications in order to group the uniformity of variances using the Bartlett's test of homogeneity.

As a result, the nine environments were uniform according to their homogeneity tests of variances. Therefore, the combined analysis of variance was employed to analyze grain yield, 50% silking date, plant and ear height, husk cover percentage and grain moisture percentage with economically important character like grain yields were considered as first priority in this study. The varieties; C5218003, C5219041, 30A33, PAC972 and KSX4255, were selected in terms of high grain yields of 9873, 9835, 9668, 9568 and 9472 kg/ha which were significantly higher than the control variety of Suwan 3601. Moreover, the genotype x environment interactions were also greater and significant, hence the stability parameters (Eberhart and Russell, 1966), were applied for selecting a stable variety in grain yields. Similar results were obtained among

hybrid varieties of C5218003, C5219041, 30A33, PAC972 and KSX4255 which were classified as stable varieties with non-significant coefficient of regression (b) of 1.2393, 1.0508, 1.086, 0.9802 and 0.9861, as well as non-significant mean square deviation (S^2d_i) at 0.191, 0.255, 0.216, 0.272 and 0.501.

It is implied that smaller G x E interactions made no different result between the combined analysis of variance and stability parameters analysis. The smaller G x E interaction of the grain yield of 13.3 % was generated by cluster analysis with 10 genotype groups and 7 environment groups were classified. The best genotypes of group 13 consisting of C5218003, C5219041 and 30A33 varietys, produced an average yield of 9873, 9835 and 9668 kg/ha. The other 2 varieties, PAC972 and KSX4255, were separated due to different pattern of response to the environments. When the husk cover percentage from cluster analysis was reconsidered in the selection process, only one variety, 30A33, proved to be the best.

In conclusion, the phenotypic expression for varietal selection depended on the size of genotype x environment interaction. The smaller G x E interaction needed a simply combined analysis of variance to the less complicated stability parameters analysis in contrast, to the large G x E interaction, which cluster analysis was useful and more effective for selection process. For the environment groups, Chiang Mai University and Maejo University are in the same provincial boundary but cluster analysis proved that the two environments were completely different in terms of grain yield response.