

عنوان مقاله:

Determination of plant traits that affect genotype \times location (G \times L) interaction in peanut using the CSM-CROPGRO-Peanut model

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خلاصه مقاله:

Genotype \times environment (G \times E) interaction complicates the identification of superior genotypes. An understanding its causes is needed for a more effective breeding strategy. The objective of this study was to determine the plant traits that cause genotype \times location (G \times L) interaction for pod yield in peanut using a modeling approach. The CSM-CROPGRO-Peanut model was used to simulate pod yield for 17 peanut genotypes for 14 locations representative of all peanut production areas in Thailand using 30 years of historical weather data. Sensitivity analysis was used to determine the effects of individual and combinations of plant traits on pod yield and yield response to environments by varying the value of one or more cultivar coefficients and then evaluating their effects. The results showed that the cultivar coefficients that showed major effects were the duration from first seed to physiological maturity (SDPM), maximum leaf photosynthesis rate (LFMAX), the maximum fraction of daily growth that is partitioned to seed and shell (XFRT), single seed filling duration (SFDUR) and the duration of pod addition (PODUR). Those having minor effects were the duration from emergence to first flower (EMFL), maximum leaf size (SIZLF) and maximum seed weight (WTPSD). The cultivar coefficients that caused the differences in both mean yield and yield response to locations between peanut genotypes in different pairs included LFMAX, XFRT, SDPM, SFDUR and PODUR, but the causal characters differed among pairs of genotypes. It was concluded that changing the degree of genotypic response to environments is possible through selection for a combination of some of these traits, and that model simulation could be used to identify those traits.

کلمات کلیدی:

G \times E interaction, Cultivar adaptation, Yield stability, Crop model, Sensitivity analysis

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