

Determining Efficacy of Herbicides Applied in Mixtures Using the NLMIXED

Procedure of SAS

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Application of herbicides in mixtures is a method employed in an attempt to further reduce infestation of crop fields by unwanted vegetation (i.e., weeds). A study to test efficacy of several such herbicide mixtures was conducted at the Louisiana State University AgCenter Northeast Research Station. Analyses of the herbicide mixtures were performed to test for synergistic, antagonistic or additive effects using Colby's method. This method compares observed and expected mean weed infestation in response to the herbicide mixture. The expression is as follows:

$$I_{ij} = O - E = \mu_{ij} - (\mu_{ib} \mu_{aj}/100),$$

where subscripts i and j refer to the level of each herbicide in the mixture and subscripts a and b refer to the control level of each herbicide. Since each effect is a nonlinear function of means, the NLMIXED procedure of SAS was initially used to obtain estimates of effects and variances. Additionally, least squares means estimates were obtained via the MIXED procedure of SAS and used for manual calculations to demonstrate the methods used by PROC NLMIXED.