COMPENSATION IN SOYBEANS DUE TO ARTIFICIAL POD REMOVAL, A PREDICTOR OF COMPENSATION DUE TO INSECT DAMAGE

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Davis soybeans compensated completely for total depodding during late pod elongation. However, the degree of compensation in response to pod removal, declined rapidly as pod fill progressed. The relevance of the results to crop susceptibility to insect damage is discussed.

MATERIALS AND METHODS

Caged field-grown Davis soybeans (90 cm rows) were totally depodded at 6 weekly-intervals from late pod elongation (24/3/94) to post physiological maturity (28/4). Pods were removed from 5 randomly selected plants (different plants each week) from each of 4 caged plots (2 rows x 1.5 m long). Plants at each sampling date were tagged for future reference. Tagged plants, including controls (no pods removed), were grown through to harvest maturity. Pods were hand-harvested and harvest date, pod and seed numbers and seed weight recorded.

RESULTS AND DISCUSSION

Depodded plants compensated by setting additional pods which developed from *pod initials*. In the controls, *pod initials* remained dormant and were shed at physiological maturity. Plants depodded during late pod elongation and early pod fill, (24/3 & 31/3 respectively), set as many pods as did control plants (no pods removed). As pod fill progressed, the number of pods set per depodded plant decreased significantly. No pods were set on plants depodded at post physiological maturity (28/4). Similar trends were observed for the number and weight of seeds per plant as well as for mean seed weight. Harvest maturity was delayed significantly for plants depodded after mid pod fill. Depodding on 14/4 delayed harvest maturity by 14 days.

Clearly, soybeans have the ability to totally compensate for pod loss during late pod elongation and at the start of pod fill. As pod fill progresses, the compensatory ability of soybeans declines rapidly until by physiological maturity it is zero. The implications of these results when predicting plant responses to insect damage must be tempered by an understanding of the pest's feeding behaviour. For heliothis, pod damage during late pod fill would cause greater yield loss because soybeans would be less able to compensate for damage (2). However, for pod sucking bugs which only reduce yield during early pod fill (1), reduced compensation during late pod fill would be of no consequence. In a concurrent experiment, soybeans compensated for bug damage during early pod fill by increasing the size of undamaged seeds. There was a significant and positive correlation (R = 0.87) between this compensation type and the pod-replacement compensation reported above, both being greatest at the start of pod fill.

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