

Response of soybeans to simulated insect attack

R. Rowden^a, R.J. Lawn^b and J.P. Evenson^a

Department of Agriculture, University of Queensland, St. Lucia 4067
Division of Tropical Crops and Pastures, CSIRO, Cunningham Laboratory Mill Road, St. Lucia 4067.

Many crop plants can respond to the effects of insect damage by showing tolerance of or active compensation for loss of leaf area or fruiting parts (1). The work reported here has been designed to examine the response of soybeans to simulated destruction of leaves and pods by insects.

Methods

Soybean cultivar Fitzroy was sown in the field at Lawes in January 1981 and subjected to a range of defoliation and depodding intensities at five stages of growth (Table 1). Grain yield and many growth parameters were measured. Only grain yield is presented here.

Results and Discussion

Table 1: The effect of leaf and pod removal at different intensities and stages of growth on seed yield plant⁻¹(g) in soybean (cv. Fitzroy).

(a) Leaf Removal		Damage Intensity (%)				
Stage No.	Days from Planting	0	30	50	70	100
1	22	24.04	25.79	29.65	30.39	26.68
2	48	30.87	30.61	23.92	24.16	20.95
3	57	28.38	26.07	22.74	21.83	13.00
4	70	25.08	22.10	20.84	17.26	6.17
5	85	27.68	23.87	20.98	22.00	17.27
		LSD 1%: 5.65		5%: 4.87		
(b) Pod Removal						
1	55	24.66	29.62	25.97	31.22	26.83
2	62	25.74	29.01	22.25	29.42	25.44
3	69	24.60	26.23	24.96	23.15	23.05
4	76	23.17	21.80	17.32	16.14	11.48
5	83	26.14	15.93	13.15	9.07	0.77
		LSD 1%: 5.40		5%: 4.65		

Yield reduction as a result of defoliation increased with the lateness of stage and intensity until natural leaf senescence became marked. The threshold of damage at which yield was significantly reduced was between 40 and 60% defoliation at stages 2-5. Damage thresholds for pod removal were 40% at stage 4 and 15% at stage 5 when a large proportion of seeds were fully-formed.

This first experiment shows the relative insensitivity of yield to early leaf and pod damage, while at later stages pod damage in particular results in severe yield reductions. A range of cultivars and sowing dates must be evaluated, but the results clearly demonstrate the need to fully document the plant's response to damage if effective pest management programmes are to be established.

1. Evenson, J.P. 1981 in Byth D.E. and Mungomery V.E. (eds.) Interpretation of plant response and adaptation to agricultural environments. Australian Institute of Agricultural Science (Queensland Branch)169-180.