

Changing agricultural systems and insect pests in South Australia

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The main purpose of this paper is to demonstrate that changes in agronomic practices can increase pest problems, and that the benefits of such changes will not be fully realized unless those problems are identified and the pests are controlled before economic loss.

This increase in either the number of pests or the incidence of known pests is not usually anticipated, partly because changes in practice have been mainly directed by only one or two disciplines and the agricultural system has not been considered as a whole. There could be a broader awareness of any secondary changes that may occur and the impact these may have on yields or some other economic consideration. Early detection of problems may offer the opportunity either to circumvent the problem or to offer reasonable methods of control at an early stage in the adoption of the practice.

In South Australia, both technological changes and the introduction of new crops have caused an increase in the number and incidence of agronomic insect pests in relatively recent times. There is no evidence to suggest that this trend will not continue with future changes in production.

Changes in Technology

The marked reduction in the use of spring-prepared fellows before sowing wheat from 1940 to 1960 caused the first appearance of a native weevil, cereal curculio (*Desiantha caudata*), as a pest; the soil-dwelling larvae damage germinating cereals (1). In 1973, Allen predicted that the current trend towards reduced tillage before sowing cereals would increase the incidence of a number of pests of germinating cereals, including cereal curculio, in South Australia (2).

This prediction was based on an understanding of the ecology of these pests. Already, cereal curculio has caused severe damage in experiments studying reduced tillage at the Turretfield Research Centre (3), and red-legged earthmite (*Halotydeus destructor*) and lucerne flea (*Sminthurus viridis*) have caused severe damage following commercial use of reduced tillage (unpublished). In addition, reduced tillage is expected to increase the incidence of blackheaded pasture cockchafer (*Iphodius tasmaniae*) and pasture webworm (*Hednota* spp.). Other changes in the culture of cereals, e.g. shorter rotations or stubble retention, could also stimulate the emergence of new pest species.

New Crops and Cultivars

The introduction of sunflowers into the South-East of South Australia caused a native species of false wireworm (*Gonocephalum missellum*) to become a pest for the first time.

The increased area of grain legumes, mainly field peas and lupins, and oilseed crops have increased the incidence of known pests, e.g., native budworm (*Heliothis punctiger*) and Rutherglen bug (*Nysius vinitor*), together with any problems associated with the control of these pests. This is especially evident with the increased use of DDT to control native budworm and the concomitant problems with DDT residues in agricultural produce. Alternatives to DDT are considerably more expensive. This has demanded a better understanding of economic thresholds and timing of control measures for native budworm.

1. Allen, P.G. 1973. J. Aust. Ent. Soc. 12: 201-206.
2. Allen, P.G. 1973. Regional Conference, Jamestown. Dept. Agric., S. Aust.
3. Grierson, I.T., and Allen, P.G., 1977. Aust. J. Expt. Agric. Anim. Husb. 17: 466-468.

