

Weeds management in organic systems

Background.

Weed management in organic systems is frequently appears towards the top of research priorities identified by organic farmers and growers. To address these concerns EFRC has undertaken research into weed management over a number of years primarily focussing on arable system.

Objectives.

The objectives of this work are to assess and develop appropriate methods of weed control in organic systems.

Results.

Cultivation and drilling in darkness can reduce the density of weeds that emerge with the crop although the effect does not last long enough to benefit the crop in terms of yield. The periodicity of weed emergence can indicate the likelihood of a particular species of weed emerging at any one time, but it is difficult to relate this information to a weed control strategy.

It is clear with winter wheat, as with most other crops, that there is a critical weed free period (see figure 1). An understanding of this critical period enables farmers to rationalise their decisions on timing of weed control and consequently it is likely to save time, energy and money mechanically weeding. Inter-row hoeing can remove weeds just prior to or during the critical weed free period, whilst spring-tine weeding is ineffective at this time because it is less able to control larger weeds.

These results highlight the limitations of current farmer practice with regard to mechanical weed control, but also serve to develop improved strategies that can be adopted to more effectively control weeds.

Further work, through a detailed review of literature, was undertaken to establish the “state of the art” for inter-row hoeing and its associated agronomic practices in organic cereal and pulse crops. The conclusions were that for inter-row cultivation in cereal and pulse crops, some adjustment of row spacing might be required, which will have both yield and economic impacts. This can be minimised by reducing the seed rate (which can help to minimise excessive intra-specific competition), band sowing the crop in wide rows or using a twin-row arrangement which can completely overcome the yield penalty. Weeding on two occasions (shortly after crop emergence and later) can provide better levels of weed control than weeding once, but weeding more frequently offered little additional benefit. Overall, inter-row hoeing can control a broad range of annual broad-leaved and grass weed species at a wide range of weed growth stages and under a wide range of soil conditions.

Additional benefits. There is also some evidence to suggest that mechanical weeding can mineralise soil bound nitrogen, but this may only equate to approximately 5 kg N ha⁻¹. Nevertheless, this small quantity of additional nitrogen could be beneficial to organic crops, where nitrogen can be limiting.

Environmental impacts. The impact of inter-row hoeing on ground nesting birds is uncertain. Early indications suggest that skylarks prefer to nest directly adjacent to or in the crop row rather than between rows. If this is confirmed then inter-row hoeing is unlikely to significantly disrupt nesting. For autumn sown crops, weeding should have been completed before the nesting season, for spring-sown crops, optimum weeding and nesting times

coincide. The practice of sowing cereal crops in wide rows may be beneficial to skylarks, as they prefer an open crop canopy.

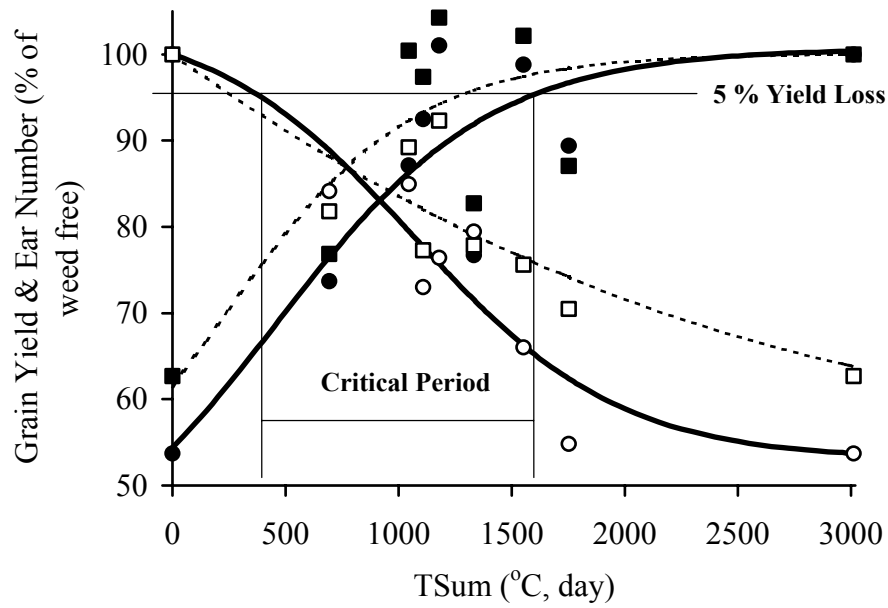


Fig. 1. Observed and fitted wheat grain yield and ear number (% of weed free control) as affected by the duration of the weed infested period (○, —; □, -----) and the duration of the weed free period (●, —; ■, -----) in 1995/96.