

THE ROLE OF NON-RESIDUAL HERBICIDES IN CROP ESTABLISHMENT SYSTEMS

D.L. Rowell and W.C. Stonebridge
IZIANZ 'Merrindale' Research Station, Victoria

This paper deals with a modification of the present conventional approach to cereal establishment by complementing or replacing cultivations with the bipyridyl herbicides for weed control.

Two basic systems are proposed:

- (1) to spray the annual weed growth first before any cultivation, and
- (2) to cultivate first, and then apply a bipyridyl spray to the resulting weed germination prior to sowing.

These two systems will be referred to as spray/cultivate/seed and cultivate/spray/seed respectively.

In any farm system weed control plays an integral part, and it is on this basis that the trial work reported here was conducted on red-brown earths in the Wagga district during 1968 and 1969. The advantages in these two systems are already apparent. Both crop establishment systems involving spraying do not depend on weather for weed control, and by reducing the number of cultivations needed for weed control crop establishment is more rapid and destruction of soil structure is reduced. Because of a reduced work load a more optimum time of sowing is possible.

In practical terms, how do these two systems affect farming practices? Normally, the ground is cultivated following the opening rains and subsequent cultivations are primarily aimed at weed control, although the seedbed is still a consideration. The later cultivations take place at a time of the year when soil moisture levels are high and hence timing is critical (during a period when time is very limited) or the cultivations are of no value. The proposed system of cultivate/spray/seed relieves the timing pressure, so the situation turns from one of time-consuming cultivation with doubtful weed control to one of rapid establishment into a clean seedbed. This is reflected in yield (production per acre). The LSD values given in Table 2 show that, while the yield differences are not significant at 5%, there are differences at the probabilities shown in the Table.

TABLE 1

Yield in bushels per acre (kg per hectare)

| Trial No. | Trial 1 (Wagga Wagga 1969) | | |
|----------------------|--|---|---|
| Establishment Method | Fertilizer or fallow treatment | | |
| | 0 lb Nitrogen | 20 lb (9.1 kg) Nitrogen | 40 lb (18.2 kg) Nitrogen |
| Cultivate x 3/seed | 37.4 (2517) | 45.4 (3055) | 46.5 (3129) |
| Cultivate/spray/seed | 43.5 (2927) | 48.6 (3270) | 51.6 (3472) |
| LSD 5% | | 6.9 (463.6) | |
| Confidence level % | 91 | 65 | 86 |
| Weed Problem | Wimmera ryegrass and cape-weed | | |
| Trial No. | Trial 2 (Tootal 1969) | | |
| Establishment Method | Conven- tional fallow | Fallow- sprayed previous winter, unworked | Fallow- sprayed previous spring, unworked |
| | | | |
| Cultivate x 3/seed | 25.6 (1722) | 29.1 (1958) | 31.3 (2106) |
| Cultivate/spray/seed | 34.9 (2348) | 39.5 (2658) | 38.6 (2597) |
| LSD 5% | | 12.3 (827.7) | |
| Confidence level % | 90 | 92 | 83 |
| Weed Problem | Wimmera ryegrass, wild oats, and fumitory | | |

Where a pasture has been left undisturbed for deferred autumn grazing and the initial working is later in the cropping season, seedbed preparation is more rapid and cleaner if the pasture is desiccated prior to cultivating. Trials have also shown that if the spray/cultivate/seed system is modified further to just spray/seed, yields equivalent to conventional ones can be obtained. One must remember that this form of crop establishment can take place when conventional sowing is impossible, e.g. in wet conditions or when time is very limited.

TABLE 2

Yield in bushels per acre (kg per hectare)

| Year | 1967 | 1968 | 1969 |
|--------------------|-----------------|------------------|------------------|
| Treatment | | | |
| Conventional | 12.9 (868.2) | 56.2 (3782.3) | 43.2 (2907.4) |
| Spray/seed | 13.7 (452.9) | 59.2 (3984.1) | 39.9 (2685.2) |
| LSD 5% level | 1.1 (74.0) | 4.7 (316.3) | 4.0 (269.2) |
| Confidence level % | 85 | 80 | 90 |

These two modifications, i.e. cultivate/spray/seed and spray/cultivate/seed (or simply spray/seed), to existing crop establishment systems have a great deal to offer in terms of whole farm productivity. They are applicable to any stock and crop farm and can materially help to minimize the conflict of interest between the two enterprises.