

improved wild oat control but gave no further increase in yield.

No treatment eliminated seeding though B5710 at 6.0 lb per ac (6.7 kg per hectare) and WL 17,731 at 4.0 lb per ac (4.48 kg per hectare) came very close to this objective.

With control measures available for field crops, other than ryegrass seed, it seems unnecessary to treat populations unlikely to affect yield or to penalize produce from infested fields unless this offers definite prospect of preventing spread to clean land or of eradication. The implication is that our future work should be directed to determining the feasibility of eradication within acceptable cropping systems and to delimiting the variables associated with yield response from wild oat control (vide Paterson 1969). However, if cost of treatment could be reduced such decision oriented data would not be wanted since the farmer would adopt routine 'crop insurance' weed control. Broad spectrum single application treatments (and, in New Zealand, subsidies) are a step in this direction.

WIMMERA RYEGRASS AS A WEED IN CEREALS

G.A. Pearce

Department of Agriculture, Western Australia

Wimmera ryegrass (*Lolium rigidum*) has been recommended and has flourished as a pasture species throughout the cereal-growing areas for many years in Western Australia. Its ability to survive under a wide range of conditions has demonstrated that it possesses many of the characteristics that enable weeds to persist and compete strongly with pasture species and cereals. Under conditions of moisture stress, Wimmera ryegrass loses some of its ability to reduce cereal yields, and this is probably due to the wheat plants' drought resistance.

In 1969 at Merredin, where only 520 points of rain fell during the growing season, 26 plants of Wimmera ryegrass per sq yard reduced the crop yield from 20.6 to 15.5 bus. per acre. Under normal conditions the reduction would have been greater. Because of the variation that occurs it is undesirable to try and relate the reduction in yield likely to occur with the presence of a certain number of ryegrass plants. Variation occurs not only from year to year, but also from one site to another.

The development of the seed, its maturation, and germination pattern, play an important part in the persistence of Wimmera ryegrass as a weed. Immediately after seed formation, the

percentage dormancy is very high, but this steadily declines during the summer period. By late autumn, dormancy is very low and a germination of over 90% can be expected under favourable conditions.

The prevention of seed formation in the previous spring or the burning of the seed in the autumn will give a very high degree of control of this weed. It is apparent that major infestations are caused by seed formed in the previous year rather than by seed which has remained dormant for a year or more.

In Western Australia, there is a strong tendency for farmers to commence ploughing within a few days of the opening rains, which means that much of the ryegrass is buried before it has a chance to germinate. The depth of the seed in the soil has a significant effect on the germination, even when soil temperature may be favourable.

At Chapman Research Station in May 1969, seed planted at various depths gave the germination results shown in the following table:

TABLE

The Effect of Depth of Planting and Soil Compaction
on Wimmera ryegrass seed planted at Chapman Research
Station - May, 1969

Depth of Planting	Percentage Germination	
	Soil Compacted	Soil Loosened
1/8 inch	95	93
1 inch	82	90
2 inches	55	86
3 inches	38	84
4 inches	13	58

Another effect of burial is to slow down the speed of germination, particularly under low temperature.

The lesson to be learnt here is that farmers should delay the initial cultivation as long as possible to allow a maximum germination of ryegrass seed. This delay, however, should not be extended to the stage where crop yields may be reduced because the growing season is shortened. Another difficulty is where farmers run a strong risk of boggy conditions during the early part of winter.

Although tri-allate has been used to advantage for a number of years, there is a great need for a more effective, and less costly herbicide. Trifluralin and alachlor have given promising results and it is anticipated that they will be fully commercial by 1971.

COMPARISON OF DI-ALLATE AND TRI-ALLATE FOR CONTROL OF WIMMERA RYEGRASS IN WHEAT

T.G. Reeves and C.L. Tuohey
Department of Agriculture, Victoria

Wimmera ryegrass can be a strong competitor in wheat crops and Lumb and McPherson (1964) have reported preliminary work on its selective chemical control with di-allate. A closely related herbicide, tri-allate, is also available, and in a number of countries has replaced di-allate. Experiments in the Wimmera and northern districts of Victoria in which di-allate and tri-allate were compared for ryegrass control in wheat are reported here.

Ten experiments on a range of soil types were conducted at three centres from 1962 to 1968. The treatments compared against a no-spray control were di-allate and triallate applied at 8 and 16 oz per acre (0.56 and 1.12 kg a.i. per hectare) either immediately prior to sowing or within a day after sowing. All experiments were of a randomized block design with 4 to 6 replications. Wimmera ryegrass counts were taken in the crop after the wheat had tillered, and plots were harvested for grain yield.

RESULTS

(a) Ryegrass Populations

Di-allate was significantly better than tri-allate for reducing ryegrass populations in six of the ten experiments, and there were no significant differences in the other four. Presowing application of both materials was significantly better than the post-sowing treatment in six experiments.

The higher rate of 16 oz a.i. per acre (1.12 kg a.i. per hectare) of material was more effective than the lower rate in reducing populations in seven experiments, and this trend was also evident in the remaining three.

(b) Wheat Yields

The effect of di-allate and tri-allate on yield was significantly different in only two experiments, and in both cases di-allate was superior.