Control of wild oats

J G. Paterson
CONTROL OF WILD OATS

Two chemicals are now available for the control of wild oats in wheat. This article compares their relative merits and gives recommendations for their use.

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WILD OATS are widespread throughout the world. Their importance can be gauged from the fact that in the wheat growing areas of Canada and the U.S.A. some 60 million acres are infested.

During the past few years many reports have been received indicating that wild oats are becoming a serious problem to wheat farmers throughout Western Australia.

It has been estimated that, of the 97 million bushels of wheat received by Cooperative Bulk Handling Ltd. in Western Australia this season, some 2½ million bushels were subject to dockage for wild oat content. Calculated on the basis of eight cents per bushel this could represent some $200,000 to wheat growers. There is a further loss due to reduced yields because of competition.

One of the most important features of the wild oat is its ability to set large numbers of viable seeds—about 250 to 500 per plant. A medium infestation of some 50 plants per square yards would yield a potential plant population for the next year of some six million per acre. This is at least ten times the number of wheat plants in an average crop.

Trials carried out in recent years have indicated that chemicals, although not giving complete control of wild oats, would raise wheat yields sufficiently to warrant their use under ideal conditions.

Chemicals available

The two chemicals available are:

Tri-allate*—marketed as Avadex BW and distributed by Monsanto Chemicals (Aust.).

Barban*—marketed as Carbyne and distributed by Lanes (W.A.) Pty. Ltd.

In practice, the essential difference between the two products is in their method of application, which is related to their effect on the plant.

Avadex BW is a pre-emergence material which must be applied at seeding time, before the wild oats have germinated. After this it will not affect wild oats even in the seedling stage.

Carbyne is a post emergence material which should be applied after seeding, when the wild oats are in the 1 to 2½-leaf stage.

It has been estimated that some 20,000 to 25,000 acres of wheat were treated with

* These materials are only available under the trade names indicated and all future references in this article are under these names.
these chemicals in 1966 and there is little doubt that this area will increase in the future.

**Application techniques**

**AVADEX-BW:**

As it is a pre-emergent material, acting on the germinating seed, Avadex BW must be placed as close to the seed as possible. This necessitates incorporation into the soil immediately after application. Where this is not carried out the chemical rapidly disperses into the atmosphere and is lost.

The active material should be sprayed onto the soil surface in 7 to 10 gallons of water per acre and immediately incorporated with five or six-row covering harrows. If these are not available, two sets of three-row harrows should be used.

Where soil conditions do not allow complete incorporation, less effective results can be expected. For this reason the seed bed should not be cloddy, nor too wet or dry.

A useful technique is to apply the chemical by means of a boom spray attached to the front of a drill and to use the seeding operation to incorporate the Avadex BW into the soil.

Department of Agriculture trials have shown that Avadex BW applied either two days before or two days after seeding is equally effective and no toxic effects on the wheat can be expected.

Avadex BW cannot be applied effectively from aircraft.

**CARBYNE:**

Carbyne is a post-emergent material and must be applied when the wild oats have between 1 and 2½ leaves. This stage is illustrated in Figure 1. Where the majority of the oats are either younger or older, Carbyne treatment cannot be recommended.

This stage is generally reached some three or four weeks after seeding. The material should be applied in 7 to 10 gallons of water per acre where a boom spray is used. Satisfactory results can be obtained from aircraft application; however it is essential to apply at least 3 gallons of water per acre.

**IN BRIEF . . .**

Both Avadex BW and Carbyne can give economic increases in the yield of wheat in a heavily wild oat-infested wheat crop.

Neither chemical will give complete control of oats and even a minor infestation is capable of greatly reducing wheat yields. For this reason Avadex BW and Carbyne should not be used where the infestation is light, as the resulting yield increase is not likely to be economical.

Observations over a number of Department of Agriculture trials have shown that Avadex BW is more effective on Wimmera ryegrass than it is on wild oats. Where this weed is a problem in wheat crops the use of Avadex BW should be considered.

Some important points should be remembered:

- Wild oat plants may only be retarded and a healthy, vigorous wheat crop will provide the competition required to reduce the effect of plants which survive.
- Neither chemical will give adequate control if conditions at the time of treatment are not ideal.
- Neither Avadex BW nor Carbyne is capable of sufficient control of wild oats to raise wheat yields to their full potential.

**Crop tolerance**

Both chemicals are designed to selectively control oats in wheat and barley. For this reason it is important to know whether the chemical may have any detrimental effect on the crop.

Tolerance trials have indicated that both Avadex BW and Carbyne are safe to apply to the four varieties of wheat tested, namely Falcon, Gabo, Gamenya and Wagin, even if some slight error in application techniques occurs.

Similarly the barley varieties Beecher and Dampier can be treated with safety.
While damage can result with Prior and Atlas 57 varieties if the application techniques are not correct.

**AVADEX BW:**

To test the importance of soil incorporation Avadex BW at two pints of product per acre was applied with various degrees of harrowing. One set of three-row covering harrows was considered light incorporation, two sets were considered heavy while the third treatment was not harrowed at all.

Where the chemical was applied to Prior barley and heavily incorporated, the yield was reduced by some 15 per cent. This may have been a seasonal effect but warrants further investigation.

**CARBYNE:**

To test the importance of time of application, Carbyne, at 2 pints of product per acre was applied with various degrees of harrowing. One set of three-row covering harrows was considered light incorporation, two sets were considered heavy while the third treatment was not harrowed at all.

Where the chemical was applied to Prior barley and heavily incorporated, the yield was reduced by some 15 per cent. This may have been a seasonal effect but warrants further investigation.
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acre, was applied three, four and five weeks after sowing.

The four week treatment was the ideal time and the three and five week stages were too early and too late respectively. No reduction in yield was obtained with any of the wheat varieties tested. A reduction of 20 per cent. resulted when Prior barley was treated at a stage later than the optimum. A similar reduction occurred when Atlas 57 barley was treated too early.

Avadex BW or Carbyne?

Trials were carried out to compare the relative effectiveness of each chemical. It was found that both products gave an increase in yield when applied under ideal conditions but neither was capable of complete control of wild oats. For this reason the actual yield increase was far below that obtained when no oats were present.

Experimental details

In the trials discussed five treatments were used with four replications at three sites. At each site treatments were applied with ground equipment to an infested and an oat free wheat crop. Cultivated oats were sown to simulate the effects of wild oats. In previous trials it had been shown that, where cultivated oats are evenly distributed through the top few inches of the soil, they respond similarly to wild oats in both reaction to the chemicals and competitive effect.

The conditions at the time of each treatment were apparently ideal.

Results and discussion

Figure 2 illustrates the effect of the various treatments. The highest yield on the infested plots was obtained with Carbyne at 2 pints per acre. An extra bushel of wheat was obtained when Avadex BW was heavily, rather than lightly, incorporated and this illustrates the need for thorough mixing of the chemical with the soil. Where no incorporation was used the yields were no better than without Avadex BW.

The control of oats with Avadex BW over all three sites was only half that obtained with Carbyne; however there was a marked difference between sites in the

![Graph showing yield comparison](image-url)
Table 1.—The yield of wheat obtained following treatment with Avadex BW and Carbyne. Untreated and potential yields are shown for comparison.

<table>
<thead>
<tr>
<th>Site</th>
<th>Avadex BW</th>
<th>Carbyne</th>
<th>No chemical treatment</th>
<th>No oat competition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yield</td>
<td>Control of oats</td>
<td>Yield</td>
<td>Control of oats</td>
</tr>
<tr>
<td>Merredin</td>
<td>30.9</td>
<td>70%</td>
<td>31.6</td>
<td>80%</td>
</tr>
<tr>
<td>Wongan Hills</td>
<td>13.0</td>
<td>30%</td>
<td>17.3</td>
<td>75%</td>
</tr>
<tr>
<td>Beverley</td>
<td>19.2</td>
<td>15%</td>
<td>26.5</td>
<td>60%</td>
</tr>
<tr>
<td>Average</td>
<td>21.0</td>
<td>38%</td>
<td>25.1</td>
<td>72%</td>
</tr>
</tbody>
</table>

Avadex BW plots. This variability emphasises the strict control over application times and techniques which both Avadex BW and Carbyne demand.

Even with 80 per cent control of oats the yield was 10 bushels per acre below the plots which had no oats present.

**RECOMMENDATIONS AND COSTS**

For the control of wild oats either Avadex BW or Carbyne can be used.

Being a pre-emergence chemical Avadex BW should be used only where a heavy stand of wild oats will occur.

At current retail prices, treatment at $1.50 per acre would cost about $4.50 for chemical plus application.

Where the degree of infestation is unknown, Carbyne should be considered. This must be after germination but only when the wild oats are within the 1 to 2½ leaf stage.

Treatment at 2 pints per acre would cost about $4.25 for chemical plus application. Based on information supplied to this Department aerial application of this product at the recommended rate would cost about $4.50 an acre where several hundred acres are involved.

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