Trifluralin tolerance of three cereal varieties

SUMMARY
An unusual result with Silverstar out-yielding both Frame and Schooner. Previous trial work showed that Silverstar is especially sensitive to trifluralin even at recommended rates.

Frame seedling establishment was significantly lower at the 2.4L/ha rate than at the registered rate of 0.8L/ha (Triflur 480). Establishment levels decreased as the rate of trifluralin increased for both Silverstar and Schooner.

Trifluralin in not registered on wheat at rates higher than 1.0L/ha.

With herbicide resistance becoming a widespread problem, trifluralin safety at higher than registered rates in various cereal varieties has become an issue, as has application techniques. Research in 1997 and 1998 has shown that crop damage and poor weed control can occur if the application technique is wrong. An even seedbed has less risk of damage than cloddy soils. Applying trifluralin immediately prior to and incorporating by sowing was safer than a post-sowing pre-emergent application. Too much incorporation after sowing can move the trifluralin down into the sowing band, causing damage. Other results indicated that Frame is more tolerant to high rates of trifluralin than Goldmark and Silverstar. The shorter coleoptile length of Silverstar makes it especially sensitive to trifluralin even at one litre per hectare incorporated by sowing.

METHOD
Frame and Silverstar wheat 80kg/ha, and Schooner barley 70kg/ha was sown on 22 Jun. The wheat was pickled with Vincit and the barley with Armour. Urea was predrilled at 50kg/ha and MM1 at 80kg/ha was sown with the seed. Emergence counts taken three weeks after sowing.
The following treatments were randomised in a replicated nearest neighbour plot design.

- Control (no trifluralin)
- Triflur 480 at 0.8L/ha, seven days prior to sowing and harrowed
- Triflur 480 at 0.8L/ha, IBS (incorporated by sowing) (not registered)
- Triflur 480 at 1.6L/ha, IBS (not registered)
- Triflur 480 at 2.4L/ha, IBS (not registered)
- Triflur 480 at 1.25L/ha, PSPE (post-sowing pre-emergent) and harrowed (not registered)

RESULTS
Early visual observations showed much slower and poorer emergence of Silverstar compared to Frame and Schooner. Counts taken three weeks after sowing, show that plant establishment was significantly lower only for Frame at the highest rate (2.4L/ha) incorporated by sowing when compared to the recommended label use of 0.8L/ha seven days prior to sowing. Although not significant, due to the level of variability within the treatments, it must be noted that the number of Silverstar plants at the highest rate (2.4L/ha IBS) was 45% lower than recommended application. Plant establishment improved for the PSPE treatment indicating that the emergence is affected at higher rates of trifluralin (Figure 2.1).

Silverstar was the best yielding variety (2.66, 2.26 and 2.16t/ha for Silverstar, Frame and Schooner respectively). There were no significant yield differences from the application of trifluralin regardless of rate or timing compared to the control (Figure 2.2).

In the nearest neighbour analysis (where treatment plots are compared to the adjacent control) there was also no evidence that a particular variety was more or less sensitive to high rates of trifluralin compared to another variety.

It was unusual for Silverstar yield not to be affected especially with the very low plant number. Crab holes across the paddock affected the variability of results. The 1998 results clearly show that Silverstar suffered a yield loss even at 1L/ha of trifluralin (old formulation), whilst Frame and Goldmark were more tolerant. Goldmark and Silverstar were less tolerant than Frame at the higher rates as well.

Figure 2.1 The effect of various rates and application methods of Triflur 480 on Frame, Silverstar and Schooner establishment (plants/m^2)
* Registered use

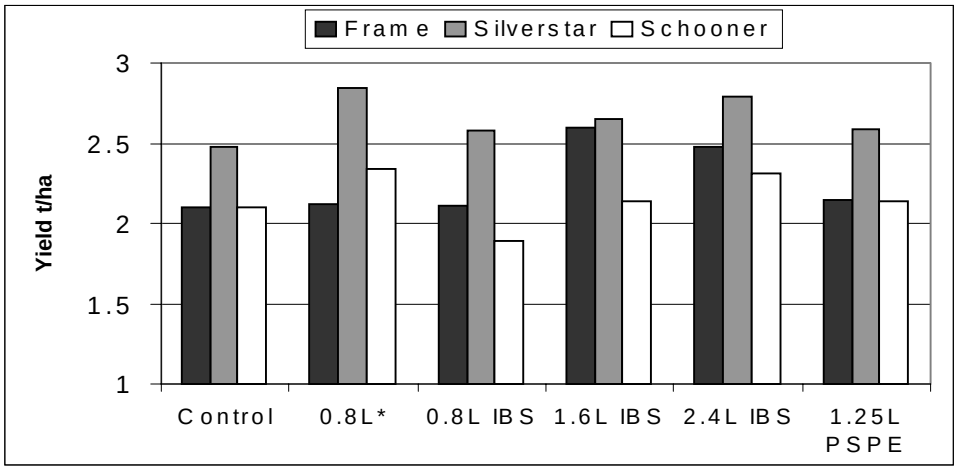
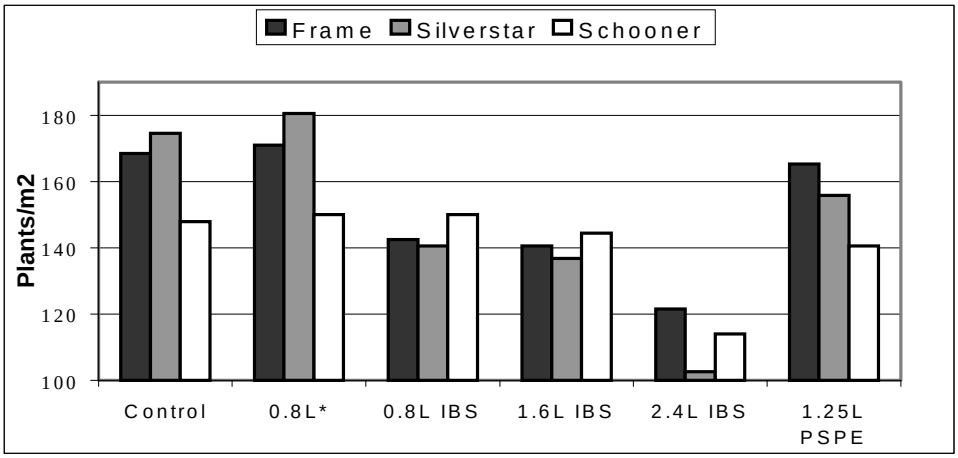


Figure 2.2: The effect of Triflur 480 on Frame, Silverstar and Schooner yield (t/ha) in 1999



COMMERCIAL PRACTICE

Triflur 480 is registered for use on cereals at 0.8L/ha applied seven days prior to sowing and harrowed in. Increasing resistance to Group A (fops and dims) chemicals has forced growers to test other methods of weed control. Higher rates of Triflur 480 ensure adequate weed control, but severe yield penalties can occur unless a more tolerant variety is used. A variety such as Frame, has a longer coleoptile (growing shoot) and is usually more tolerant to higher than recommended rates of trifluralin than those with shorter coleoptiles.

Proper incorporation is important even with a more tolerant variety. The trifluralin must not be incorporated into the seed band; otherwise severe crop damage can result.

Repetitive use of trifluralin can increase the likely hood of ryegrass developing resistance. Trifluralin should be used as only one of the tools for the long-term management of ryegrass populations.