



The case 4 4Furrow.

Stripe rust is probably the most important early onset leaf disease of wheat. It is active at temperatures much lower than those at which stem and leaf rusts prefer, and it can lead to yield reductions of 50-100%.

The tolerance of partly resistant varieties (ratings of 5-6) is an adult plant tolerance, so the seedlings are still susceptible. So if spores are present early in the season they will be able to infect the crop.

It is this type of infection that is responsible for most of the "hot spots" so characteristic of the disease. A few spores blow in and start a localised infection. The infection develops gradually up the plant, but the growing plants keep ahead of the disease, which remains a few leaves from the top. Eventually the disease reaches the top leaves and shows as a "hot spot". From there it can spread infection to the rest of the crop. Often however, the infection is already there. The first "hot spot" to show out is just a forerunner of a multitude of outbreaks from other early infections that were just a few days behind.

These early infections can be controlled by early foliar sprays, but such sprays will not provide any protection for leaves which emerge after the application. All the common fungicides will translocate within the plant, but only "acropetally" – towards the tip of a leaf. They cannot go back into the stem and then into newly emerging leaves. The moment a new leaf emerges after a foliar spray, it is vulnerable to infection.

Even when a foliar spray is applied after full flag leaf emergence (so that all leaves get a dose of chemical) its only provides protection for a month or so, and the disease will probably flare up again after that time.

In any case, if a foliar spray is applied in response to the appearance of rust stripes, the disease will have been in the plants for 1-2 weeks already, absorbing nutrients and reducing growth. It takes that long after the initial infection for rust pustules to develop. This also explains why the infection may appear to get worse for a week or so after the spraying. The infection that is already present continues to grow and sporulate before the fungicide can suppress it – the "crop bronzing" that gives the appearance that the fungicide has not worked.

A fertiliser treatment however, will give continued protection to all leaves until the fungicide runs out. The roots continue to absorb chemical and move it upwards through stems and leaves for around 14 weeks. The young plants are protected during their susceptible phase, and the crop does not need daily monitoring from emergence until flag leaf. Last season (2004) crops treated with Triadimefon 4Furrow did not show any rust stripes until early September, by which time the heads were out. Only 1 in 20 to 50 plants were infected, and with the environment getting hot and dry, and probably some triadimefon still in the plant, even in Calingiri wheat the disease did not seem particularly virulent.

In any season when the prognosis is favourable for a rust outbreak (lots of green bridges, infected green bridges etc) it is pretty certain that some rust control measures will be needed. It then makes sense to do that control as a fertiliser treatment for the most effective protection until flag leaf emergence.

And if a fertiliser treatment is done, Triadimefon at \$4.80/ha makes more sense than Flutriafol at \$14.20.

Note: while Flutriafol is registered at 200 to 400 ml/ha, work from Victoria (J.S. Brown, M. Hannah, & D.J. Ballinger (1990) The effect of triazole coated superphosphate, applied at sowing, on stripe rust and yield of wheat. Australasian Plant Pathology, 19, 79-81) showed that 400 ml/ha was required for maximum length of control, and that gram for gram flutriafol and triadimefon were equal. So to get full season control equivalent to 200 g/ha of Triadimefon 500, 400 ml/ha of Flutriafol 250 is needed.



Even in years when stripe rust does not appear, there may well be an economic response to a 4Furrow treatment.

Triadimefon controls Take-all:

[D.J. Ballinger & J.F. Kollmorgen, (1986) Glasshouse and field evaluation of benomyl and triadimefon applied at seeding to control take-all in wheat. *Plant Pathology*, 35, 61-66. (1986) Control of take-all of wheat in the field with benzimidazole and triazole fungicides applied at seeding. *Plant Pathology*, 35, 67-73.

D.J. Ballinger & J.F. Kollmorgen, (1988) Effect of triazole coated superphosphate, applied at sowing, on take-all and yield of wheat. *Aust. J. of Exp. Agric.*, 28, 635-8]

For anyone growing wheat after wheat, especially using no-till, there is a considerable risk of Take-all (and other root diseases). Take-all does not always manifest itself as the classical white-heads. Prof. Lex Parker of UWA called it "Take-some" – he maintained that it often reduced yield without obviously showing itself.

Even at current wheat prices, 4Furrow costs the equivalent of around 30 kg/ha of wheat. If it boosts your yield by as little as this, you have got your money back – and have had the added benefit of peace-of-mind.

Barley also.

Triadimefon 500 is now registered for in furrow use for control of barley powdery mildew, so it makes a lot of sense to treat that part of your cropping program as well. Powdery mildew has been widely reported infecting barley crops almost from emergence in wet years.

Varieties that have an early prostrate growth habit seem worst affected. Such early disease onset is the last thing you want in the middle of a busy seeding program.

In some cases the mildew infected the crop even before the fertiliser treatment could take effect. Seedlings appeared to get infected on the first two leaves, but subsequent leaves remained clean. It has been postulated that the seedlings cannot access the fungicide from the high salt regime around the fertiliser band. After a couple of weeks this has dissipated enough to allow fungicide uptake and disease control.

Fungicides on fertiliser do not control smuts, so a seed dressing should still be used if these might be a problem. The seed dressing would also control mildew during the lag period before the fertiliser fungicide kicks in.

In trials the 4Furrow treatment has also had some effect on barley scald, but control was not sufficient for the treatment to be registered.