

A quick guide to some FAQ's about fungicides.

What is the rainfast time for (Triadimefon, Tebuconazole, Propiconazole, Flutriafol)?

Labels are totally devoid of any information in this area.

The Bayer website claims 1 hr for Triadimefon 50 WP. The label says nothing except for lawns "do not water until treatment has dried". The label for this product sold in the USA states "rainfall or sprinkler irrigation within 30 minutes after application does not decrease effectiveness".

This suggests that Triadimefon should have a rainfast period of around 1 hour.

For tebuconazole "excellent rainfastness following 2 to 4 hours drying time" is stated on one website.

An article by Noegel at <http://www.wheatimprovement.org/Forum/1/Noegel.htm> states that "Greenhouse studies by Bayer show a significant uptake of tebuconazole within thirty to sixty minutes after application. However, Bayer has found that a period of two to four hours of drying time is required for consistent disease control." A Bayer info sheet from USA gives "1-2 hours rainfast". It also advises "Active-It at 1 pt/100 gal or AGSCO Spreader/Sticker at 8 oz/100 gal" as adjuvant.

This suggests that Tebuconazole should be given 4 hours before rain, but that you may get away with as little as two.

For Propiconazole, the Syngenta website states "rainfast within 1 hour" for both Tilt and Banner Maxx, which is a propiconazole based turf fungicide. The Syngenta USA info sheet also quotes 1 hour. It also notes that no adjuvant is necessary.

Propiconazole therefore should be OK after 1 hour.

Which fungicide should I choose to use?

For rust in wheat: Triadimefon is the cheapest, and probably equal to Tebuconazole in efficacy.

Given that in 2004 the 4Furrow treatment using Triadimefon protected crops at least until the flag leaf emerged, it should be the first choice.

Brown, Hannah, & Ballinger (1990) Australasian Plant Pathology, 19, 79-81 showed that Triadimefon and Flutriafol were about equivalent against stripe rust when coated onto superphosphate at equal grams active. At current costs, Triadimefon is considerably cheaper than Impact-in-furrow.

For Septoria, and/or Yellow leaf spot (as well as rusts): the paper by Noegel cited above showed Tebuconazole controlling these diseases equal to or better than Propiconazole. Cost would suggest you use Tebuconazole 430. Of course, he could be biased as he is a Bayer man.

Laird, a Novartis man, at <http://www.wheatimprovement.org/Forum/1/Laird.htm> claimed that Propiconazole was better than Tebuconazole on Septoria and Powdery Mildew. Interestingly he did not claim superiority on rusts and Yellow Spot, despite mentioning these diseases elsewhere.

Wayne Smith in his newsletter rated Tebuconazole better than Propiconazole on rusts and Septoria.

For Fusarium Head Blight: Tebuconazole is the only one that works even half well.

For Powdery Mildew in wheat: Propiconazole was slightly ahead of Tebuconazole. If you use Triadimefon for rust control you probably won't see it. Department of Agriculture trials in 2001 at Munglinup showed Triadimefon giving control equal to Propiconazole.

For Scald and Powdery Mildew in Barley: Triadimefon is the cheapest option. A side benefit will be control of any rusts. Department of Agriculture trials at Gibson in 2000 and 2001 showed Triadimefon giving control and yields increases equal to Propiconazole, with a much higher \$ return.

For Net Blotch in barley: This is the real strength of Propiconazole, and where it really should be used.

Does the fungicide actually kill or just suppress a rust infection?

According to Dr Rob Loughman, when the variety has some resistance, when the spray coverage is very good, when rates are high, when conditions are favourable (warm and dry), when.... then yes it can be killed. More likely it will just be suppressed. That is why the infection often flares up again after about 3 weeks.

It all points to prevention rather than cure. If rust is in the district, and you haven't used a 4Furrow treatment, or its about to run out (flag to ear emergence) top up with a Triadimefon spray. Use 500 ml/ha if a 4Furrow treatment was used, 1 L/ha if it wasn't.

If I use an in-furrow treatment do I still need to pickle my seed?

Probably! Ballinger & co who did the first trials on in-furrow fungicides found that fungicide on seed was about 7000 times more active against smuts and bunts than it was on an inert carrier (their first trials did not use fertiliser as the carrier). Perhaps fertiliser is a better carrier (roots are attracted to it) as a 4Farmers trial showed some activity of in-furrow fungicide against loose smut in barley. Tebuconazole gave the best control reducing smutted heads eightfold, followed by Triadimenol 250 and Impact which reduced smut three to four fold. Triadimefon 500 WP was not effective but an experimental 500 SC formulation reduced smutted heads by half.

All this suggests that unless you are confident that your seed is clean it should still be pickled. Of course it is not necessary to use the higher rates that also give seedling protection against rusts and mildew and this will reduce your costs.

Either Triadimenol 150 or Tebuconazole 25T, both at 1 L(kg)/tonne are OK. These work out around \$1.00-\$1.50 and \$1.50-\$1.80 /ha respectively depending on your seeding rate.

My Triadimefon 125 EC is blocking my sprayer. What can I do?

The initial diagnosis was that fine filters were the culprit. If the spray mix was forced through a filter finer than 80 mesh (180 micron, 0.18 mm) the formulation was liable to form an invert emulsion (water droplets within the oil based product rather than droplets of the product in water) which appeared as a "cream" on the filters.

There was also some correlation between water temperature and problems, with early morning tank-fulls being more likely to give trouble.

Some people have been improving the situation with the use of wetter. One reported that 0.2% of a 1000 g/L wetter gave good results, but changing to a 600 g/L wetter did not work until the rate was increased to 0.4%. 0.2% is 2L per 1000L of spray solution.

Now Binary (the formulators) have come up with an explanation and solution based on the formulation itself. The product has a number of components which help to keep the triadimefon solution as a stable emulsion in the tank. One may tend to come out into the water phase thus destabilising the emulsion droplets. This happens most strongly in soft water. A small amount of salt helps with stability. Binary suggested adding 10 ml of a 5 g/L solution to every litre of product, while Alan Nicholson has been using 10kg in his 4000L tank. Alan's experience is that adding the salt to the water in the tank is better than adding it to the product.

Binary's rate works out to around 2g/1000L while Alan's is 2.5kg/1000L. Somewhere in between may be optimal. It might also work if Ammonium or Potassium Sulphate was used instead. Spraying one of these would feel nicer than spraying salt over the paddock, even if 125 g/ha is nothing in the grand scheme of wheatbelt salinity.

There also seems to be a critical amount of water that needs to be present before the product will happily emulsify and remain stable (see also the next bit). One person who was sucking the product into the sprayer just after it started to fill with water experienced crystallization. This did not happen if he waited until the tank was half full before beginning to add the product.

What's with the strange mixing directions for Triadimefon 125 EC?

You mean you haven't read the label thoroughly?

"**Mixing:** Mix the required amount of product with a small quantity of clean, filtered water to make a creamy mix. Add this blend to the required quantity of water in the tank and mix thoroughly." is what it says.

This has obviously found its way onto the label in the dim past when someone developed the 125 EC label from the WP label, because that is just what one would do with a bulk WP. Its rubbish!

Half fill the tank, add any granulated herbicides, and salt (see above), then add Triadimefon 125 EC, any 2,4-D ester, and lastly any oils, wetters, or 2,4-D amine.

Sipcam Slingshot, Nufarm Turret, and Allfire are others with this goof, while Farmoz Triad and Bayleton have got right.

4Farmers Triadimefon 125 EC label has now been changed to give the correct mixing instructions.

Can I mix anything with my fungicide?

Labels are a bit better in this regard, but there are still a lot of combinations that are not covered. A major reason for this is undoubtedly apathy on the part of companies – it just gets put in the too hard basket. There is also a lack of expertise. Plenty of people are able to do herbicide X herbicide, or insecticide X insecticide combinations. To go across discipline boundaries and do (say) insecticide X herbicide combinations would require two experts to get together.

Most fungicides could probably be mixed together, although there is little data on this. Our current cereal fungicides came from different companies, and each seemed keen to claim that their's was the best of all.

Fungicides will probably mix with most insecticides without any loss of efficacy. There could be formulation incompatibilities when mixing any EC formulation with an SC, but a jar test would show this. Two EC's are likely to be fine, but could cause crop scorch if you are unlucky.

The same comments would apply to fungicide X herbicide combinations.

Listed compatibilities (these are from HerbiGuide – I haven't checked the actual labels, and I've only included those likely to be of interest to broadarea croppers) are:

Tebuconazole – with 2,4-D, alpha-cypermethrin, bifenthrin, bromoxynil, clopyralid, diclofop, dimethoate, Jaguar, Mataven, MCPA, metsulfuron, omethoate, Paragon, Puma, terbutryn, Tigrex, Topik, tralkoxydim, Tristar, Wildcat.

Propiconazole – with dimethoate and diazinon.

Triadimefon and flutriafol – non are listed, but triadimenol has Bulldock, Nitofol, and chlorpyrifos. This would suggest that triadimefon would also be OK with these as the two chemicals are very similar.

Fungicides would also be compatible with trace elements such as CuSO₄ and ZnSO₄. Don't forget that 2,4-D and MCPA amines DON'T mix with these sulphates.

Should I add a spraying oil to any mix?

Only if the herbicide or insecticide normally requires an oil, and the fungicide is a powder or SC formulation. It is not necessary if the fungicide is an EC (and at a rate of 500 ml/ha or more) as this will provide sufficient "oil" activity.

Thus Triasulfuron (Logran) requires an oil. If mixed with Triadimefon WP or Tebuconazole or Flutriafol SC's – add spraying oil at 1%. If mixed with Propiconazole EC at 250 ml/ha, add spraying oil at 0.5%. If mixing with Triadimefon 125 EC at 500 or 1000 ml/ha, don't add any oil as the Triadimefon should provide enough activity.

Why is the harvest WHP for Triadimefon WP so long?

An historical accident. The label would be an image of a previous Bayer product, which was probably derived in Victoria where harvest is usually in December or January. This would mean the required WHP would easily fit into the available time frame. The 125 EC product, which puts exactly the same amount of active triadimefon onto the crop at exactly the same timings, has a 28 day WHP.

There is unlikely to be any problems in practice, but it means that Triadimefon WP will not comply with QA programs in most districts for most seasons.

What about the grazing WHP?

Its not really stated as such. The label statement "Feed treated with this product must not be used for animal consumption, poultry feed or mixed with animal feed. DO NOT mix leaves treated with this product with feed intended for animal consumption" suggests that it can never be grazed, stubbles included. I doubt that this is the intention of the label.

The Bayer Bayleton label (the original triadimefon 125) does not mention either a grazing WHP or a caution against animal feeding. The Nufarm Turret label has a grazing WHP of 28 days ("Barley, Wheat: DO NOT GRAZE OR CUT FOR STOCKFOOD FOR 28 DAYS AFTER APPLICATION.") but then goes on to say "DO NOT feed treated leaf matter to wild or domestic birds or other animals." Totally contradictory!

I suspect that in the original drafting of the labels, people have taken snippets from the Bayfidan Seed Dressing label, which quite rightly specifically prohibits the use of treated seed as feed.

Interestingly, the Bayfidan label (which is Triadimenol rather than Triadimefon – but they are kissing cousins and about equally non-toxic) has a WHP of 7 days for cabbages for human consumption!