

The rapid evolution of strobilurin resistance in septoria tritici means that we in Ireland are left with little choice but to depend heavily on the use of triazoles for the foreseeable future. While individual triazoles exhibit slight differences in their mode of action, they all still belong to the same fungicide class and 'cross resistance' is inevitable when sensitivities occur. Speakers at the Farmers Journal Septoria conference stated clearly that a lowering of sensitivity to one active will also decrease the relative sensitivity to others. But, as well as slight differences in their mode of action, individual actives can show considerable differences in terms of their activity against individual diseases. Knowing this is important and an appreciation of the relative strengths and weaknesses of individual actives makes for better mixing decisions. In this article, Tom McCabe of UCD outlines his views on how triazoles should be used for septoria control.

# New challenges for triazoles

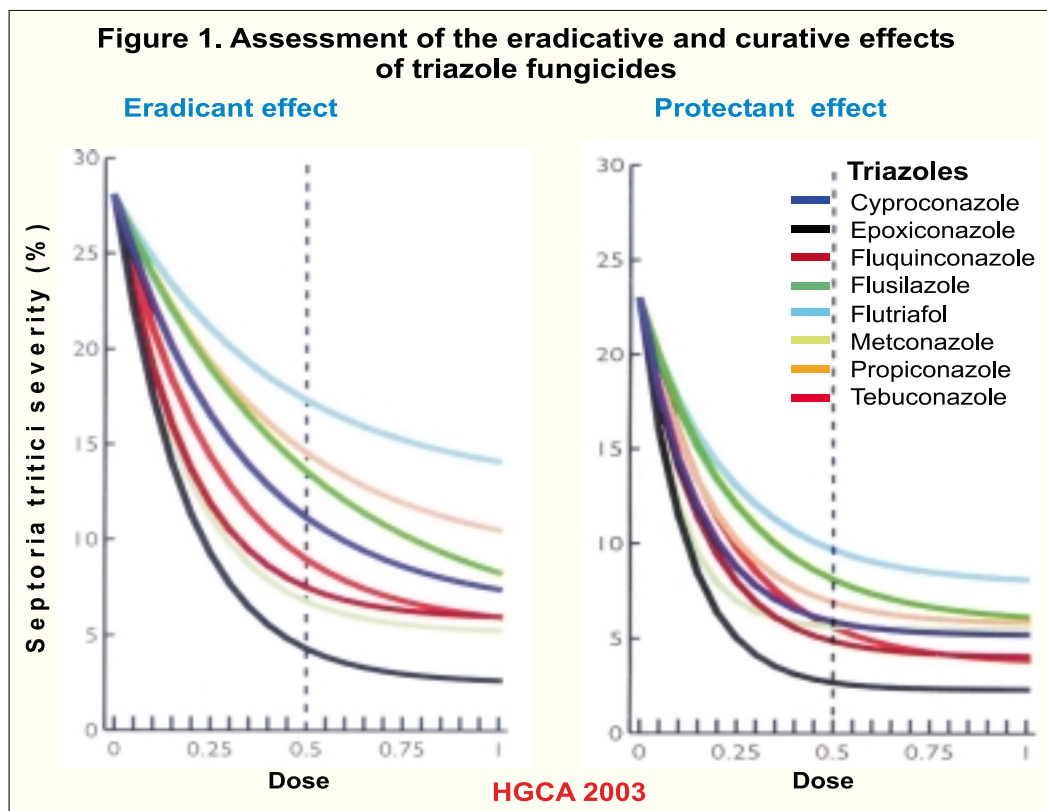
Triazole fungicides have delivered effective and reliable disease control in wheat for over two decades. During this period various triazole fungicides have been used for the control of a range of key diseases on wheat crops in Ireland, including Septoria tritici and Yellow Rust. Following the emergence of septoria resistance to the strobilurin fungicides in 2002, the triazoles will once again be used as the basis of fungicide programmes in wheat.

But everything is not as it used to be. Field research data presented this spring by the HGCA in the UK have shown that the performance of triazoles against Septoria tritici has been significantly poorer in recent years than in the early 1990s.

It is observed that this may be due to the changing sensitivity to triazoles in the septoria population. However, the HGCA study concludes that good septoria control can still be achieved with triazole fungicides, but the application rate is now more critical than it used to be.

## Triazole performance in 2003

The experience in field trials with key triazole fungicides in Ireland in 2003 was mixed. Key triazole fungicides, such as epoxiconazole (Opus), gave good levels of disease control and large yield responses at a range of fungicide timings. However, epoxiconazole did not show the rate flexibility that was observed in many previous studies.



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There were clear and consistent benefits from the inclusion of chlorothalonil in mixtures with Opus in many wheat fungicide trials in 2003.

Chlorothalonil was observed to reduce disease levels through increasing the persistence of disease control, thus leading to greater grain yield response effects.

The benefits from triazole plus chlorothalonil mixtures were very consistent in winter wheat trials across the country last year. This indicates that the inclusion of chlorothalonil is of greater benefit

to some triazole fungicides now than was the case in the past.

This would indicate that both the overall efficacy of disease control and the persistence of disease control (in days/weeks) have been reducing for individual triazole fungicide products over time.

This is not a new phenomenon and sensitivity shifts have been documented for various triazole fungicides over a considerable period of time. However, there are current and future issues with regard to triazole fungicides.



Serious concerns arise regarding the huge dependency on this fungicide group and there is evidence that the most effective triazole actives are showing signs of reduced performance against key diseases

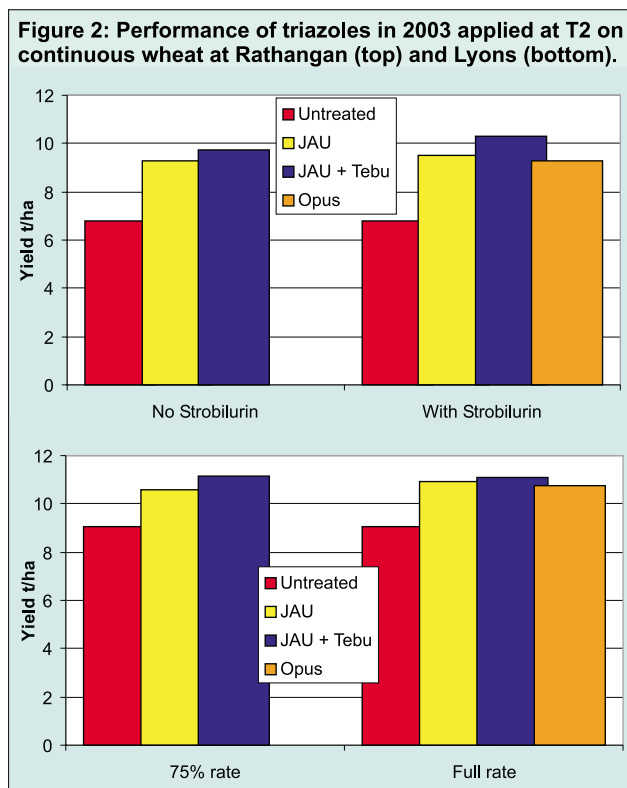
## Effective use of triazoles

The choice and dose of triazole active used on wheat crops are key to achieving good *Septoria tritici* control. The HGCA curves for the various triazole fungicides presented in *Figure 1* (see *previous page*) are useful and reliable guides to relative triazole performance. The graph indicates that epoxiconazole (Opus) offers the best eradicator and curative *septoria* control of all the triazole fungicides currently available. However, three other triazole fungicides — tebuconazole (Folicur), metconazole (Caramba) and fluquinconazole (Flamenco) — also offer good efficacy for control of *Septoria tritici*. Hence triazole fungicide programmes for winter and spring wheat can include various triazole fungicide options.

There are many other triazoles on the market today than the four listed above. Some of these are very keenly priced and appear to offer value to growers. However, it is important to remember that many of these actives are just not as good, even at high rates, as the preferred *septoria* actives listed earlier.

## Timing

Fungicide timing is very important here also. In situations of high disease pressure it is essential to get timing right for effective control of fungal diseases. A robust fungicide dose also is very important in a high disease pressure situation. However, numerous winter wheat fungicide studies have shown that a higher fungicide rate will not fully compensate for delayed fungicide timing. Fungicide timing must also be related to the intervals between



fungicide treatments. This is particularly important at the timing of the flag leaf emergence spray. Here, prompt application timing is required, relative to both the crop growth stage and length of time since the previous fungicide application. This requires careful timing of the previous (GS 31-32) fungicide application, which should form part of a planned approach to disease control.

## Can triazole mixtures offer increased benefits?

The recent HGCA studies on the relative triazole performance in the 1995-2003 period indicates that much higher fungicide rates are now required to achieve a satisfactory level of disease control than was the case eight years previously. This indicates that reduced-rate triazole treatments will not provide reliable control of *Septoria tritici*. This HGCA information also indicates that there may be situations in the future where the 'appropriate' triazole dose may, in reality, be above the label recommended rate.

Triazole mixtures gave excellent

performance in various winter wheat trials in 2002 and 2003 at both early and mid-season fungicide timings. The most impressive mix was a pre-formulated mixture of the two triazole fungicides, prothioconazole and tebuconazole (*Figure 2*). This mix gave higher levels of disease control and delivered increased grain yield responses than epoxiconazole. This may indicate the benefits of triazole loading for higher levels of disease control.

Triazole mixtures have proven very effective for disease control on winter wheat in the past, a good example being the use of Sportak Delta as an early-season product for stem and leaf diseases. In a triazole mixture, if there is complementary activity in terms of the curative and persistent activity of the individual components, then this benefit will be seen in the mixture.

For the future, the introduction of pre-formulated triazole mixtures offers a real opportunity for agrochemical manufacturers to provide 'value' products for farmers. Such mixes could contribute to reasonably priced fungicide programmes over the season which can deliver reliable and cost-effective disease control.

In brief

## Main points

- Triazole must now once again provide the mainstay of disease control in wheat.
- It appears that the efficacy of triazoles has slipped relative to a decade ago.
- Four triazoles — epoxiconazole, fluquinconazole, tebuconazole and metconazole — will form the basis of disease control in winter wheat.
- Certain triazole mixtures may show the dual advantage of better disease control and yield.
- Timing is more critical than ever to secure good fungicide activity.

*'Triazole must now once again provide the mainstay of disease control in wheat.'*