

Rust protection for

For almost 50 years, it was assumed that the stem rust pathogen had been vanquished, but this is no longer the case – in recent years it has been making a comeback in the form of a particularly aggressive variant strain, and it now presents a much-feared threat to wheat cultivation. While the search for resistant wheat varieties continues, a study has shown that Bayer CropScience’s well-proven fungicide Folicur can help in the meanwhile.

Puccinia – the name might evoke pleasant associations for lovers of classical music. But not for wheat farmers! The immediate association for them is “rust”. For a number of years now, they have been particularly worried about *Puccinia graminis f. sp. tritici* (stem rust). The rapid spread of this strain could soon present a serious threat to the global wheat supply, which, with annual production of more than 600 million tonnes, is certainly one of the most important basic food commodities for a growing world population.

Actually, for a long time, the stem rust pathogen was assumed to have been beaten. Although it occasionally caused serious harvest losses in wheat during the first half of the 20th century, resistant wheat varieties eventually became available. Among the scientists who developed them was Norman Ernest Borlaug, who went on to become known as the father of the “Green Revolution”, obtaining the Nobel Peace Prize in 1970 in recognition of his work.

At the end of the last century, stem rust suddenly reappeared in the form of a new

physiological strain – a particularly aggressive one. After first being characterized in Uganda in 1999 (and thus christened Ug99 by the specialists), this dangerous strain has since spread through North Africa as far as the Middle East. When the strain appeared in Yemen as an even more aggressive mutant in 2007, the world Food and Agriculture Organisation (FAO) sounded the alarm, warning that the pathogen could pose a serious threat to the global harvest should it eventually reach the major areas of wheat cultivation. The main concern at the moment is that the pathogen might continue its travels in the direction of major wheat producers such as Pakistan and India. North African countries are also under threat. The regions directly threatened by the spread of Ug99 are estimated to represent 37 percent of global wheat production.

On the other hand, Europe is relatively not under threat because of the historical removal of the alternate host barberry (*Berberis vulgaris*), the common European barberry. This has resulted in significant reduction not only of virulent strains but also reduction of the local production of spore inoculums. In addition, the wide



wheat

spread cultivation of early ripening wheat cultivars helped to escape the disease. The plants flowering and building of grains takes place during periods of temperatures, which are not suitable for the stem rust infection development.

Ug99 fungus as it develops impacts negatively to wheat plant metabolic processes resulting in stunting of plant growth and eventually reducing yield. The wheat grains that are harvested tend to be smaller and lighter, and are often shrivelled and of lower quality. Ninety percent of all commercial wheat varieties are susceptible to this aggressive strain of the pathogen.

Researchers are now working tirelessly to select suitable resistant wheat varieties that can be brought into cultivation. The first resistance genes have already been identified. But it will be a few years before robust wheat varieties will be available for widespread cultivation. So for the meanwhile, the priority is to counter the threat by other means, for example by controlling the pathogen directly.

In this context, there is good news from Kenya, a country with 150,000 hectares of wheat cultivation that has also been under threat from Ug99 for several years. The final report of a series of wheat field trials run by the Kenya Agricultural Research Institute (KARI) in 2005 and 2006 has now been published. "The research has shown that Ug99 can be controlled successfully with the appropriate fungicides", explains Francis Miano, Technical Manager for Bayer CropScience in Region East Africa. Over the two year period, the KARI researchers tested the efficacy of nine registered fungicides in three areas of wheat cultivation. Four weeks after treatment, they assessed the severity of stem rust infection, and later measured the wheat yield and grain quality. They then compared the results with those from untreated control plots.

The results showed that, depending on the season and the area of cultivation, the use of fungicides resulted in an economically significant yield increase.

Of the nine fungicides tested, the two most effective products were from Bayer CropScience's portfolio: Folicur® 250EC and Silvacur® 250EC. KARI has now offi-



Characteristic symptoms of black stem rust: orange to dark brown-coloured longitudinal pustules on stalks and leaf sheaths.

cially recommended both products for the control of Ug99 in Kenya.

The fact that Folicur and Silvacur gave similarly good results in the study is not surprising, given that they share the same essential active substance – tebuconazole. "Silvacur has an additional active substance, whereas Folicur is a solo product", explains Ingo Wetcholowsky, fungicide specialist in Bayer CropScience's Agonomic Development department. "We tend to recommend Silvacur and other combination products, such as Nativo® and Pro-saro®, if there are additional fungal pathogens that need controlling alongside stem rust, for instance mildew." For the control of stem rust alone, Folicur is perfectly adequate.

For many years, Folicur has maintained its position as one of the most effective rust-control products on the world market – and has been proving its worth in more than 60 countries, particularly in the fight to control yellow rust and leaf rust. In contrast, there had been no need to control stem rust for decades. But should Ug99 really spread further into Asia, as the FAO fears it might, then the good news is that Folicur is already registered in countries such as Pakistan and India, and is well-established there for use on wheat crops. ■

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The wheat-growing area in Kenya also faces the threat of infection by the new stem rust physiological strain Ug99. Recent research results show that this strain can be controlled with suitable fungicides, such as Folicur and Silvacur. The picture shows Kenyan wheat fields close to the equator.