Highest Sugar Beet Yields Ever in the UK Thanks to New Fungicides

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Sugar beet is an important crop of arable rotations throughout the major growing regions of the UK. The root of the beet has a sugar content of around 17% and in the UK provides over half the sugar used. The beet industry took off in the UK in the 1920s for two main reasons: first, to make Britain more self-sufficient in sugar production following severe shortages during World War I, and secondly to boost the depressed agricultural industry by giving farmers the opportunity to grow a valuable cash crop. Today some 8500 farmers grow the crop on about 170,000 hectares. The crop yields around 10 million tonnes of fresh beet that produces 1.7 million tonnes of sugar.

In 2011, the UK sugar industry achieved its highest ever national yield of 75.6 t/ha. A major contributor to this achievement was the widespread and appropriate use of fungicide spray regimes across the vast majority of the sugar beet crop [1]. These products control diseases and also provide physiological benefits such as green leaf retention and early frost protection [1]. Treatments with triazole-strobiluron fungicides are estimated to increase yield by 4 tonnes per hectare (5%) as a result of the direct physiological effects of these products in addition to the yield response from disease control [2]. 85-90% of UK sugar beet hectares have been treated with fungicides in recent years with 65% of the crop receiving two sprays and the remainder under a one-spray program [1]. Growers who apply a second application, particularly to those crops destined for harvest after Christmas have a secondary benefit of maintaining foliage which protects the root from frost damage [3].

Rust, powdery mildew, ramularia, and cercospora leaf spot are foliar diseases of sugar beet and all appear in the national crop annually with powdery mildew and rust being the major diseases. The triazole-strobilurian fungicides control all the foliar diseases. Until the triazole-strobilurian fungicides were introduced, sulfur was the main fungicide used by UK sugar beet growers. Although sulfur controls powdery mildew, it has no effect on the other diseases and has been replaced. Current fungicide applications are estimated to increase sugar beet yield a total of 20% when disease is present [4].

Rhizomania, a virus disease, is one of the most destructive of beet diseases and first appeared in the UK in 1987. The storage root is often rotted and losses of 100% can occur. The planting of sugar beet varieties resistant to rhizomania is standard practice in the UK. However, the rhizomania-resistant varieties are very susceptible to powdery mildew and rust [2]. Varieties vary in their susceptibility to rust and powdery mildew but, even where genetic resistance is strong, the risk of cercospora leaf spot and ramularia dictates that fungicides, rather than genotypes, are the best approach to the management of foliar diseases [5]. Powdery mildew is the main threat and is usually found in the crop from mid-July; yield losses of up to 20% can be experienced [5]. Rust tends to develop later in the season (August-September) and can result in a 10-14% yield loss. The greater the rust infection, the greater the defoliation caused by frost. Ramularia can appear in late autumn and can cause excessive leaf loss, resulting in re-growth which decreases the sugar concentration in the roots [5]. Cercospora leaf spot is the most important disease in continental Europe (yield losses of 50-70% if not controlled). Very low levels of cercospora have been noted in many UK fields in recent years. These could be a source of future problems if there are very hot periods with showers [6].

**References**