> *With bunt and loose smut, levels are able to multiply very quickly if not managed.*

Challenging the status quo

Technical Seeds

There's anecdotal evidence that growers are increasingly drilling untreated cereal seed. *CPM* explores why and asks whether the associated risks are worth taking.

By Rob Jones and Charlotte Cunningham

There's a shift in attitude towards certified seed and seed treatments, both from a cost perspective and as cereal growers look to reduce pesticide use and environmental impact.

While these are admirable aims for any farm business, experts believe there's a danger that some long-forgotten diseases could make a very damaging comeback.

Both seed merchants and mobile seed cleaning contractors report an increase in farms asking for a reclean only when purchasing certified seed or having their farm-saved seed processed at home.

The primary reason for this trend is economics according to mobile seed processing specialist Anglia Grain's regional business manager Rob Barrie.

At a time when the subsidy system is changing and direct payments reduced, growers are scrutinising costs and seed treatments seem to have been one of the first in the firing line when looking to trim inputs, he adds.

The seed treatments in question are single purpose dressings or SPDs, although the name is somewhat misleading, with some controlling a long list of pathogens and even promoting early seedling growth.

Age-old concept

Rob says the concept of SPD treatments has been around for decades and they have effectively eradicated or dramatically reduced incidence of the major seed-borne diseases in cereals (see box p42).

"Some of these diseases won't have been seen on some farms for many years because treatments have been so effective, meaning casting them aside is a very high-risk strategy."

He adds over for the past 15 years of his career, he's heard of isolated cases of bunt, where growers have been caught out when using untreated seed and these cases serve as a warning.

ADM Agricultures's James Barlow adds that if there was a wholesale shift away from SPDs, then damaging diseases such as bunt would become widespread again.

"You only need that small chink in the armour to let them to creep back into seed stocks. The problem with many of them, like and bunt and loose smut, is you don't know you've got a problem until the ears are out.

"By that time, you've invested all the money into the crop and it falls at the final hurdle. For the sake of about £2/ha, the insurance against seed-borne disease is well worth the additional cost," he believes.

James also points out that modern seed treatments are used at relatively low rates in comparison to the blanket foliar fungicide applications applied to cereal crops each year.

For example, for 2021, ADM's main SPD is Prepper (fludioxonil) which controls microdochium and fusarium seedling ▸

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Key diseases and how to manage them

Disease	Crops affected	Management
Loose smut (seed-borne)	Wheat, barley, oats	• Inspect seed crops for symptoms • Buy certified seed or test home-saved seed • Use a fungicidal seed treatment on infected seed • Azoles like tebuconazole provides best control
Bunt (seed- and soil-borne)	Wheat	• Good machinery and grain storage hygiene • Delay drilling of second wheat after harvest of infected crop or wait until after a wet spell • Use a fungicidal seed treatment on infected seed. • Difenconazole gives best control.
Fusarium and microdochium seedling blight (seed-, soil- and trash-borne)	Wheat, barley, oats, triticale, and rye.	• Removing straw from susceptible crops, inversion tillage and avoiding wheat after maize reduces risk. • Use a fungicidal seed treatment on infected seed. • Fludioxonil will give best control.
Leaf stripe (seed-borne)	Barley	• Use a fungicidal seed treatment on infected seed. • Azoles like tebuconazole give best control.

▸ blight, septoria seedling blight and seed- and soil-borne bunt.

It's applied at a rate of 2 litres/t and when that tonne of seed is spread over 5-6ha of land, the environmental exposure after drilling is negligible, he adds.

"It's the most targeted way of using fungicides."

While both James and Rob say that fungicide seed treatments are crucial in keeping seed-borne disease levels low, testing is equally important to help inform both chemical and non-chemical risk management options.

James says ADM make sure all non-fungicide treated seed lots are tested for seed-borne diseases, although this adds time to an already tight turnaround in the busy autumn season.

As Anglia Grain's mobile units are dealing with home-savers, Rob recommends that all seed lots are sampled and sent for a disease and germination test, particularly if not considering an SPD treatment.

What's more, there's increasing interest in biostimulant products, which some are seeing as a replacement for SPDs. However, Rob warns that they aren't

Endophytes could enable nitrogen reduction

As UK agriculture heads towards a net zero target a decade ahead of other industries, much of the progress will be made by farming 'smarter'. With fertiliser the main contributor to greenhouse gas emissions on farm, one of the technologies which has promised a theoretical possibility of helping reduce the amounts of mineral fertilisers applied to crops is the endophyte seed treatment Tiros.

Independent trials have been investigating whether Tiros treatment can facilitate a reduction in nitrogen fertiliser and have just reported the results, says Unium's John Haywood.

"The two endophyte strains in Tiros are particularly selected for their efficiency at fixing atmospheric nitrogen and solubilising phosphorus, not only in the soil to increase availability but also within the roots to ensure it can be transported within the plant to areas of need."

The trials investigated nutrient uptake where seed was treated with Tiros, or Tiros plus Vibrance Duo (sedaxane+ flufioxinil) compared with untreated. Different nitrogen rates were superimposed at the RB209 recommended rate (220kgN/ha) and a reduced rate of 80% (176kgN/ha).

"The independent conclusion was there was improved root structure and crop establishment where Tiros was used alone, which improved further with addition of Vibrance Duo. Tiros with 176kgN/ha outperformed the untreated seed with 220kgN/ha applied," says John.

"Plants will always aim to maintain nutrient balance, so as uptake of some of the elements increases (N and P targeted in this case), others also followed the same trend. These endophytes also play a role in the biological mediation of these other elements, e.g. K, and trace elements, to maintain this nutritional stoichiometry.

"The trials show the enhanced biomass is not coming at a cost of nutrient dilution as the respective element density is retained, so there are no weaknesses created," he says.

The yield results showed the highest increase (0.54 t/ha) where the 220kgN/ha rate was applied with Tiros seed treatment, but the 176kgN/ha with Tiros gave an uplift of 0.35 t/ha.

"From these results you could say that Tiros equates to around 45kg/ha of N," says John. "The results indicate that a Tiros treatment may be able to replace 20% of the applied fertiliser without compromising margins."

"The results clearly illustrate the reliability of the data behind the biological endophytes in Tiros and then the potential of how N regimes can be adjusted," he concludes.

registered for the control of seed-borne disease and testing needs to show grain is all clear if going down that route.

"A lot can be learnt from the organic sector in that regard, as they routinely test all seed before planting. There aren't many years that they don't find any disease and have to reject lots where thresholds are exceeded," he says.

James says ADM are also getting more enquires about biological products, which can be used alongside chemical seed treatments to improve establishment and early crop development.

He says the company invests in extensive trials each year to test its conventional and biological seed treatment product range to ensure it's offering the most effective options to growers.

Accurate application

In addition to the right products, application is also key and investment in the latest equipment has improved dramatically, with ADM recently investing in two new batch treaters and one continuous flow treater.

"Accurate application has been increasingly important, as product dose has reduced for many products. Along with our trials, this ensures that each treatment does exactly what we want it to do," he explains.

Tim Eaton, seed treatment specialist at manufacturer Certis, says this is an area where the company works closely with seed suppliers, maximising value from products like Prepper and Latitude (silthiofam).

"For several years we've been funding testing of seed by suppliers. It tests product loading and coverage on the seed and should give growers reassurance that treatments are being applied correctly before drilling."

Along with improvements to seed treatment application, seed suppliers are investing in up-to-date cleaning and sorting technology, to ensure that customers get the best seed sample possible.

At ADM's plant at Long Sutton, Lincolnshire, there has also been significant investment in a colour sorter to improve the performance and speed of its seed cleaning process.

Similarly, Anglia Grain replace three of their mobile plants each year, with the new units being fitted with the best gravity separators to achieve the boldest seed sample possible.

Rob says National Association of Agricultural Contractors (NAAC) trials have shown this to be one of the most important factors in achieving the best performance from home-saved seed.

It showed that germination, emergence, and vigour all increased with larger seed sizes, and there was also a positive relationship between leaf and root length and planting bolder seed.

Furthermore, Anglia Grain's owns trials have shown that gravity separated seed can improve the accuracy of germination rates by a factor of eight and the accuracy of thousand grain weight (TGW) by a factor of 11.

With TGW a part of seed rate calculations, this is claimed to reduce variability at drilling and along with better germination, to ensure more even crop establishment and a plant stand that is easier to manage.

"The Vanguard batch treaters used on our mobile units also benefit from a more even, bold sample, as it improves application accuracy and coverage and gets the most out of the products," concludes Rob. ■

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