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DEVELOPMENT INNOVATIONS



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Project Lamport: A new Development Approach to controlling Blackgrass

A brand new Initiative from Agrovista and Bayer CropScience.

Going forward, we have to look at different development approaches to help in the constant battle to control blackgrass. Growers expect and are looking for, new solutions from development organisations which they find acceptable.

The autumn cover crops were destroyed in early March with glyphosate and drilled on March 17th with spring wheat (KWS Willow).

This final glyphosate application was very successful and has helped in the overall blackgrass population management. High levels of activity were observed on the further "extra" flushes of blackgrass, which occurred in the autumn.

The soil below the cover crop and the fallow were also examined at the point of drilling, and the cover crop success can clearly be seen to the right.

As part of Project Lamport, soil moisture meters are installed in 7 of the rotational plots to understand the mechanics of moisture removal from each of the cover crops. Daily rainfall is measured and soil moisture measured, in real time, to provide an insight into the effect of each of the crops throughout the growing season. This will provide invaluable knowledge on how to implement profitable rotations on the most difficult of soils where blackgrass is the main weed.



Soil moisture probes



Fallow soil structure



Cover crop soil structure

“ This will provide invaluable knowledge on how to implement profitable rotations on the most difficult of soils ”

The use of autumn cover crops allows the drilling of spring wheat and gives extra blackgrass control as well as improvements in soil structure. This improved structure in turn improves drainage, which has a knock on effect on the populations and control of blackgrass.

Please look to future editions and register at the web site for more information. In season updates can also be followed on the twitter account @agrovistaselect.

If you are interested in a field visit please contact Agrovista or your local Agrovista Agronomist.

Fusarium Ear Blight control

A European perspective



Agrovista R&D have worked in partnership with several major agrochemical manufacturers to investigate techniques to increase Fusarium control.

Several species of Fusarium can infect wheat, barley, oats, rye and triticale causing bleaching of the spikelets, known as Ear Blight. *F. culmorum* and *F. graminearum* are the two principal species involved and in recent years, *F. graminearum* levels have increased - and this species is capable of producing more mycotoxins than *F. culmorum*. There are several well know factors that increase the risk of Fusarium Ear Blight (FEB)

- Warm wet weather at flowering
- Wheat after Maize where previous crop debris was not thoroughly cultivated to remove the source of infection
- Varietal resistance

There are legal limits in the EU for the mycotoxin content (DON / ZER) produced by these species in grain and against this backdrop, Agrovista trials were targeted across Europe to assess the level of control achieved by fungicides and techniques to enhance efficacy.

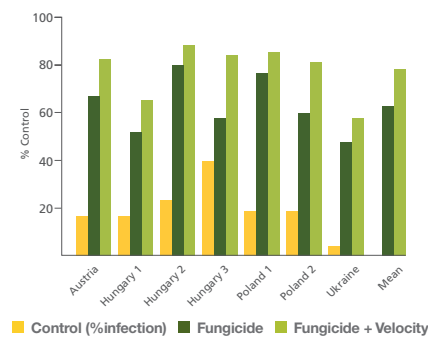
Improved Fusarium control

Seven replicated GEP trials were conducted in Austria, Hungary, Germany, Poland and Ukraine – these counties grow large areas of Maize and wet weather at flowering can result in higher levels of Fusarium Ear Blight than typically seen in the UK.

In each trial the recommended rate of fungicide (e.g. Tebuconazole, Tebuconazole + prochloraz, Tebuconazole + prothioconazole or metconazole) was applied at the start of flowering. The level of Fusarium infection ranged from 3 to 40%, and the fungicides achieved an average of 63% control. Several factors were investigated, the use of the Fungicide Application Aid Velocity, the impact of nozzle angle, spray water volume on control and yield in wheat.

Velocity improves the coverage and penetration of the cereal ear, and the combination of Fungicide + Velocity achieved 78% control (n=7) – an increase of 15% over the fungicide alone. (see Fig1)

Velocity increased Fusarium control by an average of +15%



Reduced mycotoxin content

The inclusion of Velocity further reduced the severity of FEB infection and resulted in a 22% reduction in mycotoxin (DON) contamination in comparison to full rate fungicide applied alone.

Winter wheat Treatment (1/6/12)	% Fusarium infection 27 days after application	Mycotoxin Level DON (ppb)
Untreated	17	1590
Prosaro 0.8 l/ha	6	401
Prosaro 0.8 l/ha + Velocity	3	314

Application Trials

Extensive trials conducted at realistic forward speeds (e.g. 14.4kph) over many seasons have shown the benefit of angling nozzles to increase the control of foliar diseases like Septoria and Yellow Rust, as well as Blackgrass. The cereal ear represents a small vertical target and it can be difficult to achieve good coverage. Trials have shown that angling a nozzle forward 30° or using a twin spray nozzle in combination with Velocity can increase the level of control by a massive 30%! Correct timing of fungicides is absolutely

fundamental in trying to control FEB – and they should be timed to coincide with the start of flowering. Reducing the water volume from 200 to 100 l/ha can increase sprayer efficiency (ha/hour) by one third – ensuring more hectares are treated at the correct growth stage.

In Europe, higher temperatures at application has caused concerns that rapid droplet drying results in the active ingredient remaining on the target surface rather than penetrating the waxy cuticles resulting in reduced efficacy. In addition to components that increase droplet spread and penetration, Velocity also contains humectants that reduce the rate of droplet drying. Studies in Hungary, Ukraine and Germany have demonstrated that reducing the water volume from 200 l/ha to 100 l/ha and using Velocity resulted in increased control. Thus the inclusion of the application aid Velocity offers the ideal combination of greater sprayer efficiency and increased fungicide efficacy.

Treatment	% Fusarium control
Fungicide	50.7
Fungicide + Velocity	64.6
Fungicide + Velocity + Twin spray nozzle	82

Yield

These seven trials across Europe have shown that by increasing the level of FEB control, we can increase yield by an average of 0.25 t/ha – together with better quality and reduced mycotoxin content. The interaction between fungicide, adjuvant and application technique is specific. During development trials several products notably stickers, reduced efficacy, and some increased mycotoxin content.

As ever – this shows you have to test all combinations - you cannot presume anything since you might actually delay fungicide uptake with some products.

The only way to check efficacy is to take the time to conduct replicated efficacy trials overall several seasons and locations to confirm activity.

Flag Leaf application

Make more from your fungicide

With several years of replicated application trials, Agrovista are uniquely able to advise on how best to apply Flag leaf fungicides in winter wheat.

Using bespoke application equipment we are able to mimic grower's application criteria but also:

- operate with small amounts of test material.
- operate at farm speeds up to 16 km/h and over.
- have the ability to change nozzle types.
- have the ability to change nozzle direction and configuration to examine drift and efficacy.
- be able to conduct replicated trials.

Some of the results have contradicted conclusions inferred from nozzle characteristics or formulation type of a fungicide – illustrating the importance of field testing.

Water volume

Between 2009 and 2011 the impact of water volume was investigated in 12 trials where yellow rust was the main pathogen. Reducing water volume from 200l/ha to 100l/ha resulted in improved disease control and on average an extra 0.24t/ha yield. In high disease situations the difference was up to 0.8 t/ha. In the higher septoria season of 2012, results suggested an advantage of applying T2 fungicides in 200l/ha.

Nozzle choice

Flat-fan nozzles (F110-03) have equalled or outperformed the performance of air inclusion nozzles (BBJ-03) in 42 out of 45 trials. The average benefit from using flat-fan nozzles was 0.35t/ha.

According to the HGCA nozzle selection guide, the Hypro Guardian Air 03 has a slightly finer spray quality than the BFS Billericay Bubblejet 03.

However in our trials, bubblejet nozzles have consistently performed better (average increase in yield + 0.16t/ha).

See graph 1 and graph 2

Nozzle angling

Angling of nozzles (30°) using nozzle caps has been investigated in 43 trials.

By placing water sensitive paper in the canopy we have seen that angling does not necessarily improve leaf coverage, but increases the number of droplets per cm². Angling also tends to get spray further down the canopy, which is important for Yellow Rust control.

With flat-fan nozzles there is a yield advantage from angling in high disease (Yellow Rust situations), with yield increases of around 0.5t/ha possible. There appears to be a benefit from angling bubblejets in high and lower disease situations (average + 0.24 t/ha). See graph 3

Where disease pressure is high there is a further yield advantage by angling flat-fan or bubblejet nozzles alternately down and forwards 30°. (this is the same configuration that works best with Atlantis-type treatments against blackgrass). See graph 4

By means of contrast however we have seen little improvement in yield with twin nozzles.

Despite an advantage with flat-fan nozzles, we do not always recommend their use. Fungicide timing trials have shown that application timing can have a massive influence on wheat yield with even the latest fungicide treatments. See table below

Sometimes use of an air inclusion nozzle will be necessary to help ensure correct timing.

How can we improve the performance of air inclusion nozzles?

In a number of trials we have seen that air inclusion nozzles perform better when used at 4 bar spray pressure (as opposed 3 bar used in most situations). Conversely they have performed poorly at low (2 bar) pressure.

In this country and in European registration trials, the adjuvant Velocity as an application aid has consistently improved disease control and yield with all nozzle types. Velocity contains organosilicone (to improve leaf coverage) and rapeseed fatty esters (which help improve uptake of fungicide into or through the leaf wax layer) From our extensive trials we would suggest the following for T2 application on winter wheat:

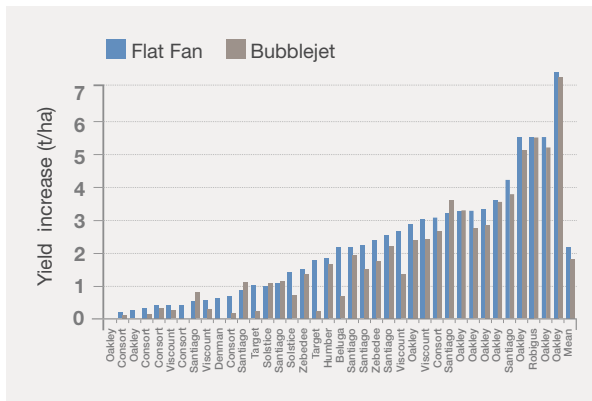
- 100l/ha water volume (check all the tank mix partners can be used in reduced water volume)
- Use of flat-fan nozzles – but consider Billericay Bubblejets if conditions are marginal
- Angle nozzles using nozzle caps (alternate down and forwards 30°)
 - In all cases with air inclusion nozzles
 - If high disease pressure with flat-fan nozzles
- Consider use of Velocity as an application aid, particularly if using air inclusion nozzles
 - In all cases with air inclusion nozzles
 - If high disease pressure with Flat Fan nozzles

Improving Flat Fan nozzles is being evaluated, using drift retardants and is considered in the next article.

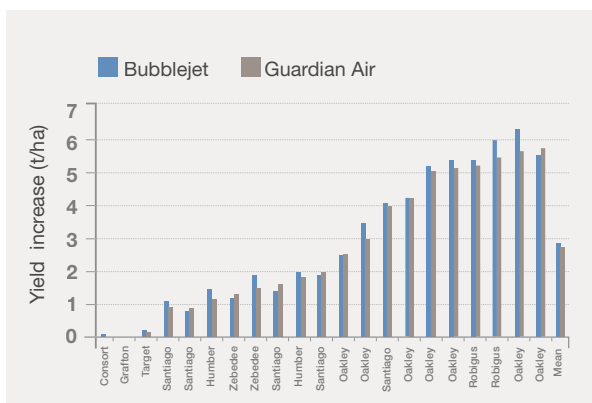
T/Ha yield increase

	GS 37 May 16th	GS 39 May 23rd	GS 45 May 30th	GS 59 June 12th
Librax 1.0 + Ennobe 0.5	4.4	5.5	5.4	4.0
Adexar 1.0	4.1	5.1	4.2	3.0
Aviator 1.0	3.9	5.2	4.3	3.5
Seguris 1.0	3.4	4.8	4.1	2.4
Ennobe 1.5 + CTL 1.0	3.6	3.9	3.6	2.7

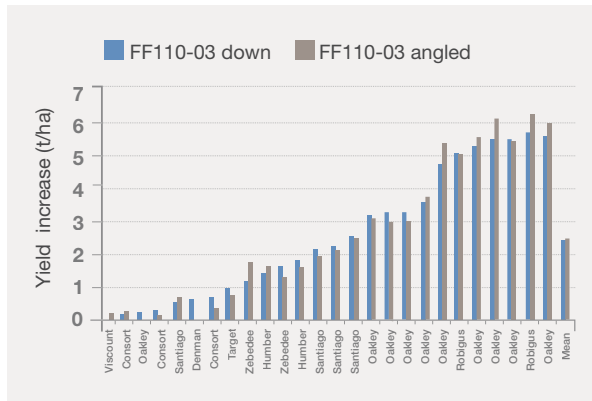
Stoughton 2012,
cv Santiago.
High Septoria
disease pressure



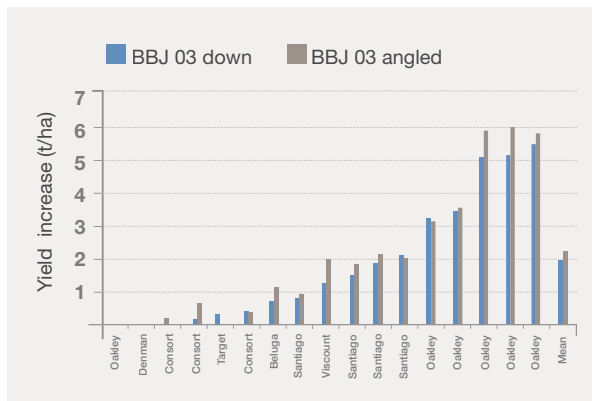
Graph 1



Graph 2



Graph 3



Graph 4



The Impact of Drift

What is the impact of drift or of drift reducing technologies on product performance?

This is one question being addressed in this year's trials at Agrovista's Stoughton and Maidwell sites which will be open for demonstration in June.

Whilst of academic interest, results from wind tunnels are not necessarily a reliable indication of how a nozzle will perform in the field; and comparisons in small plot trials bear little resemblance to how products are applied in the field. Nozzle choice, settings and boom height are being investigated in the fully replicated application trials, using bespoke application machinery.

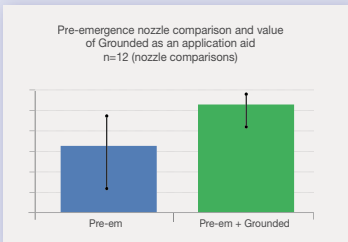
In addition we will be continuing to evaluate drift reducing technologies; as well as application aids which can improve the performance of products applied using drift reducing nozzles.

The work takes on increasing significance with the introduction of the use of drift reduction technology into the authorisation process for plant protection products (to protect surface water). This means that for some products the label will specify the use of three star drift reduction technology as a statutory condition of use; with additional buffer zone restrictions where products are applied close to surface water.

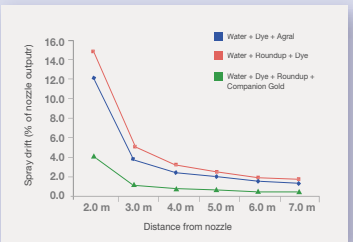
In our trials in previous years we have seen that drift can have a significant impact on the performance of herbicides for Blackgrass control and on the performance of fungicides in winter wheat. We have also seen that there can be a significant reduction in biological performance and yield when products are applied with air inclusion nozzles or with some products which claim to reduce drift.

A few examples of the importance of correct nozzle choice and value of application aids from previous years trials: In the trial below 12 nozzle / boom height combinations were tested with a flufenacet based pre-emergence herbicide (the trial was oversprayed with a mesosulfuron based herbicide. Final blackgrass control ranged from 75 to 94% showing the importance of correct nozzle choice and boom height. Adding Grounded as an application aid improved control by an average 10%.

Some drift reducing adjuvants are very effective at reducing drift - for instance Companion Gold (commonly used with glyphosate) gives equivalent drift reduction to a three-star rated nozzle - as proven in the Silsoe LERAP nozzle test:



Pre-emergence nozzle comparison without and with Grounded



Companion Gold gives similar drift reduction as a three star rated nozzle

A different type of "Cloud"

The future of agronomic advice



“The Agrovista team work constantly to deliver practical innovations and looking to the future, understanding when crop growth stages will be reached will be critical.”

An eye on the weather

Ultra accurate weather forecasts from weather stations on farms have been used for several years in high value crops such as orchards, vegetables and potatoes and are used for predicting spray opportunities through to disease forecasting for close to 50 diseases and automatic irrigation control. We believe it is necessary to extend this technology into arable crops in order to make sure we capture, analyse and share data to allow the most effective use of remaining chemistry. With the introduction of soil moisture stations to the Project Lampport site, the development team can now use real-time data from the site and couple with it data from the local Plantsystems® weather stations to look at growth effects and disease prediction. Utilising this knowledge and their knowledge of key pathogen development and the susceptibility of certain varieties to major diseases they can now start to create highly specialised and targeted programmes

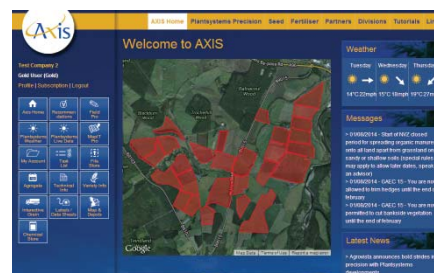
Clouds that bring rain can allow crops to flourish and other times hinder through fields being unfit to travel or creating ideal conditions for disease growth.

However, a different type of Cloud has been developed - the "technological cloud". This one brings only advantages in the transfer of information in "real-time" to any device that can connect to the internet. This technology is already utilised in aspects of our personal life, why not capitalise on it in our working lives?

for disease control. Using soil probes, temperature and moisture readings can also be used to try to predict weed germination and ideal conditions for control.

Septoria tritici and other diseases will always be major threats to wheat in the UK. As resistance develops and the amount of chemistry reduces in efficacy, timing of application will become more critical in the control of disease. The Agrovista team work constantly to deliver practical innovations and looking to the future, understanding when crop growth stages will be reached will be critical. Work has started at our Stoughton development site to link drilling dates with a prediction of when these growth stages will be reached using the ultra- accurate weather forecast from the on-farm weather station. We have shown in preliminary trials that we can predict the onset of GS 31 within a couple of days and more work is planned to refine this further. This, coupled with the disease modelling of the life cycle of the pathogens allows much more effective management of workload and planning.

This research will have no practical benefit if it cannot be delivered in a timely manner we are also developing a "Cloud-based" portal called Axis®, which will be available for Autumn 2014.



This system will seamlessly deliver this information and also combine all other agronomic information relating to the farm, giving the grower and the agronomist all the information they need - when they need it.

If you are interested in a field visit to see these systems in action please contact Agrovista or your local Agrovista Agronomist

New developments in annual meadow grass control

Traditionally a problem in winter cereals it is now an increasing issue in spring cereals. As well as reducing yield, AMG can persist right up to harvest and impact drying and moisture content of the crop. In addition AMG can harbour a range of pests and diseases which can infect the cereal crop.

There is likely to be a huge seed bank of Annual Meadowgrass in most fields. It is one of the most prolific producers of seed, bettered only by blackgrass and brome; one plant will produce about 500 seeds. It also has a short growing season allowing it to squeeze two life cycles into a single cropping year as well as the widest germination window of all grass weeds, and given the right conditions, can germinate all year round.

It may not reduce yield on the same scale as blackgrass or wild oats, but can hinder harvest and in extreme lodging cases it can drop yields by up to 25%. In the south and east of England, annual meadow-grass seldom features as a problem as it is incidentally controlled by robust grassweed herbicide strategies. In the north and Scotland AMG has become an increasing issue since the demise of certain herbicides such as relatively low doses of Isoproturon (IPU) or Chlortoluron (CTU) which gave the grower timing flexibility in the autumn - it now requires a more complex herbicide strategy.

To address these issues Agrovista have set up a specific AMG trials programme near Northallerton in North Yorkshire. The trial is looking at comparing activity from a wide range of existing and development chemistry at both pre-emergence and post-emergence timings in Kielder winter wheat. In addition to this they are evaluating the performance of a range of application aids to improve performance and crop safety.

The pre-emergence treatments generally have provided the best and most consistent control. Whilst pre-em may not be a popular option for some farmers due to work load, the benefits in control are dramatic and would more than justify a contractor if the farm was not geared up for early applications. In addition to providing the most effective control, the pre-em herbicide also acts as an insurance policy in case the weather prevents post-emergence applications, which appears to be an increasing concern - particularly in the northern half of the UK (an insecticidal seed treatment is also a vital tool for this scenario).

In the post-emergence trial, some of the development options look very promising at the traditional 2-3 leaf timing and will continue to be evaluated.

Growcrop Gold Oilseed Rape Development Sites

The Growcrop Gold summer meetings are taking place in June and early July.

This year they will focus on varieties for autumn 2014 together with thoughts on how best to establish OSR without neonicotinoid seed dressings.

Previous Growcrop Gold trials have shown various ways of establishing Oilseed Rape can enhance speed of establishment and crop vigor which, together with appropriate nutrition can help growers to overcome the loss of these valuable seed treatments. There will be an opportunity to discuss how growers can adapt their existing establishment systems to get the best possible start to their crops this autumn.

There will also be machinery manufacturers present to discuss the role their machines play and how to set them up to suit individual farms. Several sites also have plots of late foliar N applications as part of a TSB project looking at increasing yield and protein content of rapeseed to allow greater inclusion in animal feed. These meetings are a good opportunity to see the various establishment methods, including companion plants, nutrition and seed rate effects prior to harvest and for growers to discuss with the experts present which techniques will work for them on their farms.

To book into your local meeting please contact the site coordinator.

GROWCROP GOLD LOCATIONS

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OUR NEXT MEETING DATES ARE;

Cirencester	5th June
Croft	20th June
Stoughton	24th June
Harper Adams	25th June
Doncaster	1st July
Brechin	2nd July



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