# Guide for SRUC Cereals Open Day

## Cauldshiel Farm, East Lothian

## 29th June 2017

***Courtesy of Keith and Scott Maxwell, Cauldshiel Farm***
***Haddington EH41 4JR***

## Content

## Introduction (Prof Fiona Burnett)

Welcome to our trials open event at Cauldshiel for 2017, courtesy of our host farmers Keith and Scott Maxwell. Tonight we will be showing our winter wheat and spring barley trials as well as topical cover crop and bird and bee friendly plots that will aid biodiversity.

It has been yet another strange season with early disease which established in the winter wheat in the warm autumn and winter then drying up in the exceptionally dry spring. Yellow rust has lingered in some crops but at this site septoria levels are still low. We are discussing and showing integrated methods of growing crops and managing disease at this open event. It is evident that we cannot manage many of our current disease pressures like septoria or ramularia well with the pesticides we have, with resistance issues continuing to emerge. Tonight we will discuss the latest issues with septoria and ramularia resistance. Latest SRUC research shows that ramularia has shifted significantly in its sensitivity on the last two seasons.

Using more resistant varieties and tailoring treatments to the actual risk in the crop we can reduce our reliance on fungicides. Integrated Pest Management (IPM) offers potential win:wins in terms of business efficiency and sustainability and is not something that is alien to current grower practices. The use of resistant varieties with improved resistance ratings is already common practice as is walking fields and monitoring crops so that inputs can be tailored to actual risks. For more ideas about IPM then look around the site this evening and then consider filling out a Scottish IPM plan to assess what the specific risks are on your farm, what you do already and to get ideas on other measures you can take. The plan comprises 30 simple questions (and that includes things like your name and email), takes just a few minutes to complete and your plan will be emailed back to you. The data is of course anonymised so your identity is protected.

**Key Principles to consider today**

- Look at the best varietal recommendations for Scottish markets
- Look at the impact of variety and tailored pesticide programmes on disease pressure at the site
- New alternatives to pesticides that might be developed
- IPM has to be tailored to your site – what have you adopted and what might you do in the future?
- We are losing tools – hear the latest on pesticides at risk and resistance management

**Key Recommendations**

- Make an IPM plan for your farm at http://bit.ly/pestmanagementplan
- Make use of multisite fungicides like chlorothalonil in fungicide mixtures to minimise the risk of fungicide resistance
- Identify your key pest, weed and disease risks
- Where possible select varieties that reduce these risks
- Plan agronomy to minimise the main risks
- Monitor crops and tailor pesticides to the in-season issues

## Grain Market Drivers (Julian Bell)

### Key Principles to consider today

- **World grain market is more positive in 2017 but stocks still high**

  Grain stocks are expected to fall moderately for the first time in 5 years. Weather problems have been seen in the EU and US but forecasts are currently improving and only 3 to 5 weeks remain for a major Northern Hemisphere weather event to occur. Oilseeds prices falling on large expected; US and S American soya crops, EU rape crops.

- **UK likely to be a net wheat importer in 2017/18 and in the longer term**

  A static wheat crop (due to blackgrass, diversified rotation), strong demand (ethanol, poultry) and lower opening stocks mean the UK is likely to be a net importer of wheat in 2017/18. This trend is likely to become a permanent feature as the UK retreats from export markets. A large Scottish wheat crop is expected in 2017 and is likely to keep prices at parity with England unless grain distilling output recovers more quickly than forecast.

- **Distilling malting barley could be tight in Scotland this harvest**

  Rising whisky exports and falling spirit stocks indicate good demand for malting barley this harvest. A static or lower sown area of spring barley and a dry spring could limit yield and production in Scotland of distilling varieties.

- **The UK is expected to be out of the EU by the time some crops sown this autumn are marketed**

  - A transition period appears likely but not guaranteed after 2019.
  - Longer term almost any scenario is possible; from status quo to tariff and subsidy free. Most likely to be Free trade agreement / Tariff Rate

Quotas based on current EU trade and lower area payments focused on the environment.

## Key Recommendations

- **Crops in the ground this autumn likely to be marketed into a post Brexit market environment – good or bad**

  You can now sell grain forward post-Brexit for May 2019. Start limiting your exposure. Consider covering the cost of your inputs by selling 20-30% of your crops forward this autumn sowing time. Then work on protecting the rest.

- **Brexit uncertainty affects the whole supply chain – work with others to reduce the risks**

  - Speak to your local buyers; maltster, feed mill, livestock farmer and find out what they want and how you can supply it.
  - Longer term supply contracts will become more important to ensure that growing crops pays and that buyers receive the crops they need.

- **Understand your costs, increase your flexibility**

  Prepare to move to a position where you can say at sowing time if it doesn't pay I am growing something else / a break crop / fallow.

- **Use the next two years as a window of opportunity to;**

  - Understand your market and its potential exposure to any trade barriers
  - Trial new crops and develop new markets on a small-scale
  - Develop contract agreements with buyers

## Wheat varieties: (Dr Steve Hoad)

AHDB Cereals and Oilseeds Recommended List [AHDB funded]

- There are more than 50 varieties in the 2016/17 AHDB wheat recommended list trial.
- Soft wheat varieties in nabim Group 4 remain the most important choices for Scottish growers. The leading varieties for sowing this autumn are: Leeds, Myriad, Viscount and Revelation, supported by new varieties LG Motown, LG Sundance and Savello.
- In nabim Group 3 for biscuit-making variety, there is only one variety that suits distilling, this is Zulu. Note that the biscuit-making varieties KWS Barrel and KWS Basset are rated poor for distilling.
- For hard feed wheat varieties, there limited choices from current fully recommended. The best options include Grafton and Evolution. New varieties Freiston, Dunston and Shabras show promise as high yielding options.
- The requirement for Scottish-grown milling wheat is very small, but high yielding varieties in nabim Groups 1 and 2 can be considered for feed use. These include: Skyfall, KWS Trinity, KWS Siskin and KWS Lili.
- There are 9 candidates in the 2017/18 RL trial. Several of these are being evaluated for distilling use.

The full list of wheat varieties is available as a separate hand out.

## Winter Barley Varieties (Andy Baird)

### Six Row Hybrids

- Bazooka and Belfry are now taking area from Volume with their higher yield and lower screenings
- Sunningdale - new with very high yield, good on lighter soil

### Conventional Six Rows

- Funky – new high yielding without the higher hybrid seed cost. Slightly earlier with sceenings similar to Volume.

**Brewing / Distilling Two Row**

- Pearl remains biggest intake in Scotland
- Pearl and Cassata starting to become outperformed
- Craft offers a possible improvement on Pearl and Cassata but needs to develop more confidence with maltsters and brewers

**New Two Row Feed Varieties**

- KWS Creswell and Orwell have both done well in the North list trials
- Surge is worth a mention with good untreated yield and resistance against rynchosporium and net blotch but carries slightly higher lodging risk

## Spring barley varieties (Donald Dunbar)

## AHDB Recommended List [AHDB and Scottish Government funded]

- Concerto is the clear market leader for malting in Scotland, supported by Odyssey and Belgravia, with Laureate likely to become increasingly important in 2018.
- Octavia, Sienna and KWS Sassy also have Full Approval from the IBD, but their future market uptake is uncertain and will depend . Check seed supply and maltsters' requirements for 2018.
- Waggon and Scholar are preferred feed options, though Waggon is now longer in trials. Propino is also often grown as a high yielding feed variety. Likewise, new high-yielding malting varieties are good options.
- KWS Irina and RGT Planet are high yielding brewing varieties that make good choices for feed use.

The full list of spring (and winter) barley varieties is available as a separate hand out.

## Winter Wheat Fungicide Trials (Prof Fiona Burnett)

The wheat fungicide trials has established septoria in the autumn and like many crops this year have also had mildew and yellow rust threatening. Earlier sown plots had much higher levels of disease while late sown plots had much lower levels and therefore showed potential for reduced levels of fungicide inputs. The exceptionally dry spring in East Lothian however dramatically reduced septoria levels and these remain low at the site. Fungicide inputs can be tailored in an integrated way to suit the varietal ratings and disease pressure in individual crops but are essential to maintain wheat yield. The wheat trials we are showing this year are looking at combinations of fungicides which will test the best methods of stewarding fungicides, whilst maintain yields and margins. The site was tested for SDHI and azole septoria mutants in the spring so that we know what the base levels are. The programmes demonstrated will let us see if combinations of fungicides can manage the mutants that are there or whether some programmes increase their frequency. We will discuss what latest thinking is and show where alternations and combinations have best managed disease. Yields from these trials will be presented at winter meetings.

## Spring Barley Fungicide Trials (Dr Neil Havis)

Spring barley crops this season are at risk of ramularia and SRUC data shows that ramularia has declined in sensitivity to both SDHI and azole fungicides. The step change happened in 2016 and it is almost unprecedented to see such a shift in two fungicide groups in a single season and very concerning. We are continuing to work on alternative control measures and to develop more robust resistance ratings for varieties. It is essential both to crop yields and to the future efficacy of the SDHI and azole fungicides and so we recommend that the multisite fungicide chlorothalonil is included in programmes. The trials at the site this year look at fungicide options and discuss how useful these have been in such a dry early part to the season.

One of the major drivers of IPM is to investigate the use of alternatives to conventional seed treatments and foliar fungicide applications. At this site we have a trial comparing 5 seed treatments in combination with a conventional fungicide programme and an elicitor/reduced rate fungicide programme. SRUC are conducting RESAS funded trials aimed towards the development of a robust IPM disease control programme in spring barley.

## Cover Crops and EFA Greening (Jonathan Black)

There is an increasing interest in the establishment of cover crops post harvest. The roots of the sown plants help to trap nutrients limiting nitrate leaching and reduce erosion. The roots keep the soil structure open and active during the autumn and winter and the resulting biomass of roots and foliage release the trapped nutrient to the following crop and help to build soil organic matter. Several plots have been sown to demonstrate some of the plant species being used in mixtures. Cover crops can also be used to meet EFA greening requirements and SRDP agri-environment climate scheme options.

To comply with EFA greening requirements two or more species need to be sown before the 1st October and maintained until the 31st December (inclusive). Whilst EFA covers can be sown up until 1st October there is concern about the amount of benefit to be gained from later sowings. Previous in-field evaluations of post-harvest cover crops found a considerable range in crop biomass. Unsurprisingly sowing date is important, and as a rough guide for Lothians and Borders, dry matter yield of root and top growth falls dramatically after mid-September with little contribution from small seed plants sown at this timing. In such situations late sown mixtures need to feature large cereal seeds which are more able to establish and grow. The effects of latitude (as you move up the country) and to a lesser extent altitude (as you move up the hill) also need to be considered. Slug feeding and site fertility (residual nitrogen) were also factors affecting biomass yield.

## Changes to Greening Rules for 2018

For the 2018 Basic Payment Scheme claim year farmers will not be allowed to use Plant Protection Products on their Ecological Focus Areas (EFAs). Although the exact rules are yet to be set out by legislators, it does means that pesticides will no longer be allowed on nitrogen-fixing crops, fallow, cover and catch crops that are counted as EFA.

Following this ruling, many farmers will need to re think how they are going to meet next years EFA obligations and how this might affect autumn sowing plans particularly for nitrogen fixing crops such as beans. Further clarity on exactly how the rules will be implemented is essential.

Other changes to greening that were announced earlier this year by the EU Commission include extending the fallow period from six to nine months and introducing an 8 week period on catch crops. Further to this the Scottish Government plan to widen the list of EFA options i.e. permit hedges and agro-forestry to count, and merge the field margin and buffer strip options.

## Spring Barley Herbicides

There are a number of off-label treatments for annual meadow-grass control in spring barley. For those wanting to control annual meadow-grass it has been a difficult season due to dry soil conditions when spring barley was sown. Residual herbicides used to control annual meadow-grass require soil moisture to be fully effective. This is particularly the case with pendimethalin, a herbicide that has low solubility. An option with some residuals in dry conditions is to treat very early post-emergence. For broad-leaved weeds the choice is between ALS herbicides and synthetic auxins, or a mix of the two groups – a popular strategy to help prevent the development of herbicide resistance. Some synthetic auxins have a tight application window – between the 5 leaf stage and the start of stem extension for 2,4-D, MCPA and dicamba. Newer synthetic auxins such as halauxifen-methyl in Pixxaro and Zypar have a much wider application window.

## Aphids and BYDV (Andy Evans)

Barley yellow dwarf virus (BYDV) has been popping up in in winter and spring crops this season. Several cereal aphid species are capable of transmitting BYDV and the appearance of BYDV this season can be attributed to range of factors.

- The mild winter will have allowed many cereal aphids to overwinter on volunteers as well as on cereal crops, and the warm spell in April/May allowed spread onto emerging spring barley crops.
- Aphid flights into crops have been early this season, allowing BYDV transmission onto spring crops.
- One of the cereal aphids; the grain aphid; has some resistance to the pyrethroid aphicide sprays traditionally used in the autumn on winter crops. With only around 10% of Scottish winter cereals being treated with clothianidin seed treatments, the only autumn option that would guarantee grain aphid control, there has been survival of grain aphid and probable BYDV transmission via this route.

Aphids are now building up on crops this summer, and the options for aphid management are being depleted. Crops should be monitored for aphids on heads and on the flag leaf. If two-thirds of the heads of flowering crops are infested with aphids, or 50% of plants have aphid colonies on the flag leaf then an aphicide treatment may be worthwhile. Beneficial insects such as hoverflies, ladybirds and parasitized aphids in many crops will help to keep aphid numbers below damaging levels. However, it is best to have a last check before milky ripe (GS73) after which an aphicide treatment will no longer be economic. If an aphicide is to be applied, use up any existing stocks of pirimicarb (e.g. Aphox and several other products), as this is

less harmful to beneficial insects and will also take care of grain aphids which may well be resistant to pyrethroid insecticides.

Pirimicarb products have various use up dates, the latest being 31st July 2017 (see Table below).

| **Product** | **Use up/disposal date** | **Product** | **Use up/disposal date** |
|---|---|---|---|
| Aphox | 31st July 2017 | Piri 50 | 31st July 2017 |
| Clayton Pirimicarb 50 | 31st July 2017 | Pirimate 500 | 31st July 2017 |
| CleanCrop Miricide | 31st July 2017 | Pirimex 50 WG | 31st July 2017 |
| Hockley Pirimicarb WG | 31st July 2017 | Pirimicarb 50 | 31st July 2017 |
| Milentus Pirimicarb | 31st July 2017 | Route One Primro 50 WG | 31st July 2017 |
| Phantom | 31st July 2017 | Standon Pirimicarb 50 | 30th June 2017 |

Other aphicides that are available for use in the spring/summer for aphid control include flonicamid (Teppeki) after GS53 only, and the pyrethroid group such as deltamethrin (e.g. Decis), alpha-cypermethrin (e.g. Alert), esfenvalerate (e.g. Sven), lambda-cyhalothrin (e.g. Hallmark), tau-fluvalinate (e.g. Mavrik), zeta-cypermethrin (e.g. Fury 10 EW), and the organophosphate product dimethoate (Danadim Progress).

Bear in mind that the grain aphid may not be controlled by the pyrethroid aphicides due to the resistance issue, so use pyrethroids with caution and only treat crops if thresholds have been exceeded.

The pyrethroid resistance issue may well cause a problem this autumn for BYDV management unless the clothianidin seed treatments are used on winter cereals.

## Slugs

The Metaldehyde Stewardship Group (MSG) has announced new stewardship guidelines for the use of metaldehyde molluscicide products from immediate effect.

There is a new guideline applicable immediately which states that no metaldehyde pellets should be allowed to fall within a minimum of 10 metres of any field boundary or watercourse. The increase from 6 to 10 metres will help protect birds and small mammals, and provide additional protection to water.

In addition, with the view of helping to minimise slug infestations and reduce the need for treatment, metaldehyde slug pellets must only be used as part of a wider Integrated Pest Management (IPM) programme. Factors such as soil and stubble management, planting methods, weather, slug trapping and monitoring should all be considered as part of an integrated slug control programme. A fields soil type, topography and proximity to a water course are key to whether metaldehyde applications could be a risk that will subsequently impact drinking water quality, and should always be considered. If treatment is necessary, it's imperative to refer to the full set of MSG guidelines:

- No pellets to be allowed to fall within a minimum of 10 metres of any field boundary or watercourse
- Use minimum active per hectare to avoid drainage and run-off losses
- Maximum application rate 210g metaldehyde a.i/ha
- Maximum total dose from 1st August to 31st December: 210g metaldehyde a.i/ha
- Maximum total dose rate: 700g metaldehyde a.i/ha/calendar year
- Do not apply when heavy rain is forecast
- If drains are flowing do not apply metaldehyde based slug pellets

The MSG has clarified that labels on packs of slug pellets remain unchanged for 2017. However, the group is clear that the highlighted steps should be implemented with immediate effect. More information on the enhanced stewardship can be found at www.getpelletwise.co.uk

Note that ferric phosphate slug pellets do not have any restrictions on use and tend to be just as effective as metaldehyde slug pellets.

## Nitrogen & Greenhouse Gas Emissions (Donald Dunbar)

There are five main sources of GHG emissions from agriculture;

1. Fuel combustion - carbon dioxide
2. Livestock – ruminants producing methane
3. Soils – release of nitrous oxide and carbon dioxide
4. Nitrogen fertiliser manure and slurry – release of nitrous oxide
5. Cropland conversion – release of carbon from grassland when ploughed

The three greenhouse gases have different levels of impact and are expressed as carbon dioxide equivalents (CO2e).

- Carbon Dioxide =1 x CO2e
- Methane = 25 x CO2e
- Nitrous Oxide = 298 x CO2e

Good nitrogen management reduces;

- Reduces greenhouse gas emissions
- Reduces losses into environment through volatilisation, nitrification and leaching
- Improves efficiency of crop response to available nitrogen
- Is good for farm profit

## Stabilised Nitrogen Fertiliser Products

These inorganic fertiliser products contain use either a Urease Inhibitor or Nitrification Inhibitor.

- Urease inhibitors reduce ammonia emissions to the atmosphere when Urea fertiliser is converted to ammonium in the soil.
- Nitrification inhibitor, reducing nitrous oxide emissions when ammonium is converted to nitrite and nitrate.
- Any negative yield effect is small or non-existent and will be offset by more efficient N use

## NVZ Common Farmer Errors (Craig Bothwell)

Each year RPID carry out NVZ inspections on farmers plans. Any breach results in a Basic payment dedction of 5%. Below is a list of common errors found by inspectors.

- NVZ plan not available
- Applications of nitrogen recorded within closed periods
- Nmax breach (plan not being followed or understood)
- No evidence to support yield or market increment
- Applications of Organic manures with high available N
- Records not matching NVZ plan
- 250kg/ha N field organic manure limit exceeded

In the event of an NVZ inspection farmers need to be able to provide;

- 3 years of NVZ plans and records must be available
- RAMS map (risk assessment map for slurry & manure)
- Slurry Storage capacity
- 170kgN/ha farm loading calculation
- Nmax for each crop type

If farmers are using above average yields to justify additional nitrogen inputs they need to provide;

- Three years of yield data to prove higher than average yields
- Contract from millers to prove that wheat is grown for milling market or for high N grain distilling

Farm records are also inspected to make sure the NVZ plan has been followed. Common issues are;

- Incorrectly recorded fertiliser applications
- Recording 33.5% N and applying 34.5%N
- Importing poultry manure with no account for it in Nmax or NVZ plan
- Incorrect livestock numbers
- Not recording where organic manures are applied
- Field margins, fallow, AECS areas not removed from gross areas on field records
- 250kg/ha N limit of total N from all organic manures other than compost applied to land in any 12 month period

## Site Information

| Winter Wheat RL Varieties – field details and agronomy | | | |
|---|---|---|---|
| **GRID REF** | NT478667 | **PREVIOUS CROPPING:** | Winter Oil Seed Rape |
| **ELEVATION** | 170m | **1 YEAR AGO** | Winter Barley |
| **SOIL TEXTURE** | Loam | **2 YEARS AGO** | Spring Barley |
| **SOIL SERIES** | Humbie | | |
| **SOIL ANALYSIS:** | | | |
| **pH** | 6.4 | | |
| **P** | 12.2 (mod +) | | |
| **K** | 179 (mod +) | **PLOT SIZE** | 10m x 2m |
| **Mg** | 183 (mod) | | |
| **S** | 23.0 (high) | **SEED RATE** | 340/$m^2$ |
| **Mn** | 6.8 (mod) | **DATE SOWN** | 30.09.16 |
| **Cu** | * | | |
| **Organic Matter** | 5.96% | | |

| **ROUTINE APPLICATIONS** | | | | | | |
|---|---|---|---|---|---|---|
| | **N** | **$P_2O_5$** | **$K_2O$** | **S** | **DATE** | **GROWTH STAGE** |
| **FERTILISER (Kg/Ha)** | 0 | 70 | 70 | 0 | 12.10.16 | GS09 |
| | 80 | 0 | 0 | 20 | 14.03.17 | GS23 |
| | 120 | 0 | 0 | 0 | 20.04.17 | GS31 |
| | | | | | | |
| | **PRODUCT** | | **RATE** | | **DATE** | **GROWTH STAGE** |
| **HERBICIDE:** | Picona | | 3.0 L/ha | | 25.10.16 | GS10 |
| | | | | | | |
| **FUNGICIDE** | Cyflamid + | | 0.3 L/ha | | 13.03.17 | GS30 |
| **T0** | Cherokee | | 1.33 L/ha | | | |
| **T1** | Aviator + | | 1.25 L/ha | | 04.05.17 | GS31/32 |
| | Bravo + | | 1.0 L/ha | | | |
| | Talius | | 0.15 L/ha | | | |
| **T2** | Adexar + | | 2.0 L/ha | | 25.05.17 | GS39-45 |
| | Bravo | | 1.0 L/ha | | | |
| **T3** | Proline + | | 0.72 L/ha | | 20.06.17 | GS65 |
| | Amistar Opti | | 1.0 L/ha | | | |
| **PGR** | 3C Cycocel | | 2.0 L/ha | | 10.04.17 | GS 30 |
| | Moddus | | 0.1 L/ha | | 10.04.17 | GS 30 |
| | Terpal (*) | | 0.7 L/ha | | 17.05.17 | GS 35 |
| **OTHER** | (*) Activator 90 | | 100 mls/100L | | 13.05.17 | GS 35 |
| | Prowler | | 3.0 Kg/ha | | 03.10.16 | GS 06 |
| | Prowler | | 3.0 Kg/ha | | 11.11.16 | GS 11/12 |

# Spring barley RL varieties – field details and agronomy

| | | | |
|---|---|---|---|
| **GRID REF** | NT475662 | **PREVIOUS CROPPING:** | Winter wheat |
| **ELEVATION** | 175m | **1 YEAR AGO** | Winter wheat |
| **SOIL TEXTURE** | Loam | **2 YEARS AGO** | Winter rape |
| **SOIL SERIES** | Humbie | | |
| | | | |
| **SOIL ANALYSIS:** | | | |
| **pH** | 6.6 | | |
| **P** | 15 (high) | | |
| **K** | 160 (mod) | **PLOT SIZE** | 10m x 2m |
| **Mg** | 181 (mod) | | |
| **S** | 0.56 (v low) | **SEED RATE** | 360/$m^2$ |
| **Mn** | 3.9 (mod) | **DATE SOWN** | 03.03.17 |
| **Cu** | * | | |
| **Organic Matter** | 4.25 % | | |

**ROUTINE APPLICATIONS**

| **FERTILISER (Kg/Ha)** | **N** | **$P_2O_5$** | **$K_2O$** | **S** | **DATE** | **GROWTH STAGE** |
|---|---|---|---|---|---|---|
| | 60 | 60 | 60 | 15 | 30.03.17 | GS06 |
| | 60 | 0 | 0 | 0 | 20.04.17 | GS11 |
| | | | | | | |
| | **PRODUCT** | | **RATE** | | **DATE** | **GROWTH STAGE** |
| **HERBICIDE:** | Concert SX | | 60 g/ha | | 17.05.17 | GS30 |
| | HighLoad Mircam | | 1.0 L/ha | | 17.05.17 | GS30 |
| | Compitox | | 0.33l/ha | | 17.05.17 | GS30 |
| | | | | | | |
| **FUNGICIDE** | Siltra Xpro + | | 0.5 L/ha | | 25.05.17 | GS230 |
| **T1** | Bravo + | | 1.0 L/ha | | | |
| | Cyflamid | | 0.25 L/ha | | | |
| | | | | | | |
| **T2** | Siltra Xpro + | | 0.5 L/ha | | 20.06.17 | GS 53 |
| | Bravo | | 1.0 L/ha | | | |
| | | | | | | |
| **OTHER** | Manganese | | 1.0 L/ha | | 03.05.17 | GS21 |
| | Manganese | | 1.0 L/ha | | 17.05.17 | GS30 |

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BASF – Adexar, BASF 3C Chlormequat, Pictor, Terpal and Picona.
For further information about Scottish Government funded R&D at SRUC contact:

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SRUC
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http://www.sruc.ac.uk/info/120062/crop_and_soils_systems
http://www.sruc.ac.uk/crops

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