



Compliance is crucial

Of the farms surveyed in [Defra's Farm Practices Survey](#) back in 2009, nearly 50% of growers did not have any nutrient management plan. However, a similar [Defra survey](#) in 2012 showed that around three quarters of farms had consulted an advisor on Cross Compliance or single farm payments. This suggests that the figure for compliant growers is increasing, as is awareness of the regulations. Agronomist and MyCompliance technical lead, Fiona Spires, explains why compliance is so important.

Under Cross Compliance rules, Statutory Management Requirement 1 (SMR1) states that all applications of nitrogen from organic manures and manufactured fertilisers must be planned for each crop in each field, including grass, for the entire growing season. This must be done before organic or manufactured fertiliser is applied for the first time to the crop or a field where a crop will be planted.

The obligation is at the beginning of the season and includes the estimation of soil nitrogen reserves available, nutrients supplied from proposed organic manures and the calculation of the balance due to meet the crop requirement. This requires a detailed nutrient management plan which, if inaccurate, can incur painful fines.

Equally important are the environmental and moral obligations we face in protecting our landscape and the economic obligation when running a business with increasing input costs and challenging grain prices. We can no longer afford to simply blanket apply nutrients. There is a need to understand soil science to achieve the optimum benefit from the products we apply.

Farm productivity hinges on nutrient availability. Soil fertility needs to be balanced so that compacted or fragile soils don't constrain rooting and nutrient uptake, which in turn reduces crop performance and increases the risk of over applying and wastage; excess nitrogen, for example, will simply be lost by leaching or to the air. Soils should be tested regularly for key nutrients and organic matter levels, with fields tested every 3-5 years. We have an obligation to the Code of Good Agricultural Practice to ensure we get this balance right and protect our watercourses.

With phosphate variable zones (PVZs) now at consultation level, we need to keep a close eye on P levels in particular. Remember that in the RB209 fertiliser manual there is a zero requirement for



P application on cereals if the current index is 3 or above. The Rural Payments Agency has imposed several fines where a rotational P application policy has breached this recommendation, despite PVZs not yet being part of the legislation. This can be a particular challenge for high slurry producers with limited space to spread.

MyCompliance advisors are experts on agricultural legislation and regulations and provide guidance on how to meet requirements, prepare for inspections and avoid financial penalties. To find out more or to arrange a visit, speak to your local advisor by calling 0333 0044555 or emailing mycompliancehelpline@frontierag.co.uk

Further advice and support for nutrient management obligations:

- Your local [MyCompliance](#) advisor
- [Yara N Plan](#)
- [EnCompass](#)
- RB209 fertiliser manual
- [The Environment Agency's 'Key Actions for Farmers'](#)
- [The Code of Good Agricultural Practice](#)
- [Local CSF officers](#)
- [PLANET software MANNER-NPK](#)
- [WIYBY website](#)

“Awareness of compliance is increasing among growers, but requirements are demanding and lack of accuracy can incur painful fines.”

Fiona Spires
MyCompliance lead





Spring cropping to beat black-grass

It's now widely accepted that when it comes to black-grass control, fully integrated solutions are fundamental as there is no one answer to the problem. Even with a number of cultural controls in place, seasonal influences can have a big impact on the ultimate grass weed burden post crop emergence. Crop production specialist, Dr Paul Fogg examines why additional measures and in particular a move to spring cropping are now being considered an essential part of the longer term control strategy.

First steps

A critical starting point in developing a robust, long term black-grass control strategy is understanding the populations of your own fields.

Among the beneficial approaches to managing black-grass is rotational ploughing, particularly where weed seeds have been concentrated near the surface after a number of years of shallow cultivation. However, keep in mind that complete inversion is required to prevent the germination of partially ($\leq 5\text{cm}$) buried seeds. If the active seed bank extends throughout the soil, then adopting shallow, minimal soil disturbance will be a better initial strategy.

Delaying drilling until after the second week of October is well documented as being an essential part of the approach when growing winter cereals. This allows glyphosate to control flushes of black-grass pre-drilling and soils are also generally wetter and cooler, giving residual herbicides the best opportunity to work.

Competitive varieties and higher seed rates have also been shown to increase the overall level of control.

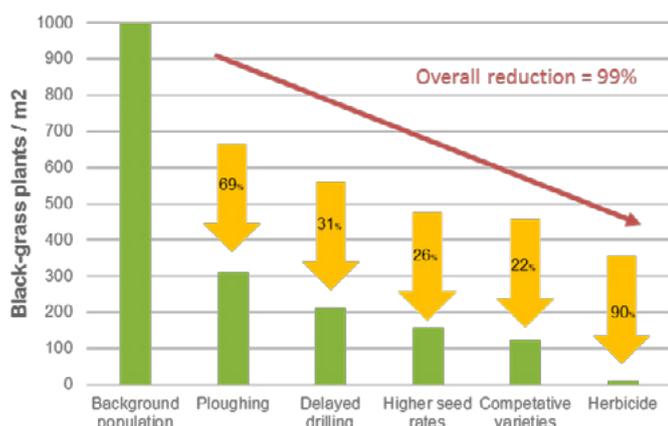


Fig 1: Potential benefit of integrating use of several non-chemical methods with herbicides. Source: AHDB Information Sheet 30, summer 2014 'Black-grass: solutions to the problem'

Spring cropping

Research suggests (Figure 2) that a spring crop can reduce black-grass plants/m² by 88% on average. These findings are supported by long term black-grass trials at Frontier's Staunton 3Dthinking site, where winter (winter wheat, winter OSR, winter wheat) and spring (spring wheat, spring OSR, spring wheat) rotations were compared over a three year period (Figure 3). Black-grass heads were reduced by 97, 88 and 95% in 2012, 2013 and 2014 respectively. These data, alongside the three crop rule under the Basic Payment Scheme, are driving the change in arable rotations to include a greater proportion of spring cropping.

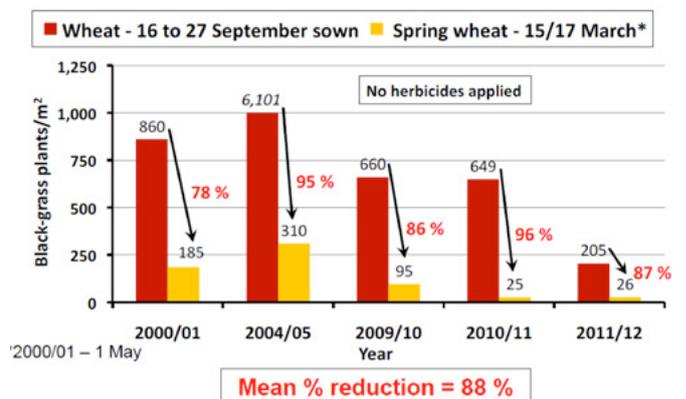


Fig 2: Effect of spring cropping in reducing black-grass populations. Source: Dr Stephen Moss, Rothamsted Research '50 years of failing to control black-grass: what have we learnt and how can we do better in the future?'

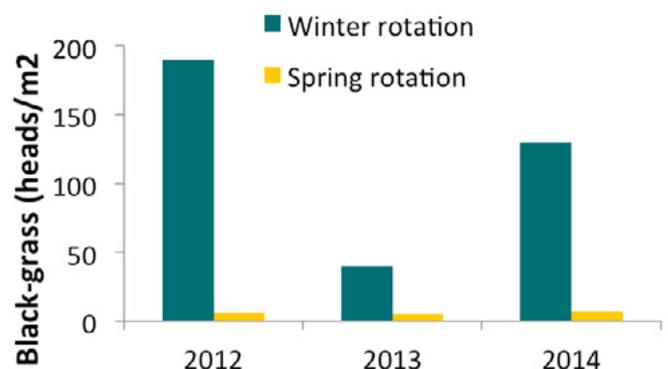


Fig 3: Reduction in black-grass heads/m² in winter and spring rotations at Staunton 3Dthinking site

Establishment

A move into more spring cropping is often part of a change to the farming system in order to better manage difficult grass weeds. Early establishment is key to maximising gross output from any spring crop, but remember that poor establishment is the biggest risk to crop success. Sowing spring barley too early into poor seedbeds, for example, can compromise establishment, but spring barley compensates less if sown too late, so take care if using reduced seed rates. In a good seedbed, establishment is typically 80% (early sown) to 95% (late sown) but this can fall to 55% and 70% respectively in poor conditions.

Target plants/m² and seed rate kg/ha

Spring barley: Aim for 250-300 plants/m², or slightly higher in the north or for earlier drilling. In February to March, establishment is likely to be around 85%, so to achieve 250-300 plants 300-350 seeds/m² would be required. For earlier sowings or poor seedbed conditions, the seed rate may need to be increased to 400 seeds/m².

Spring wheat: Aim for 300-320 plants/m². In good conditions at an optimal sowing date the target seed rate should be 350-450 seeds/m². Further north, for later drillings and where seedbeds are poor, consider increasing to 500 seeds/m².

As part of the 'system change' process, it's important to set clear objectives. What is your starting point and what do you want to achieve? If spring cropping is identified as one of the measures that will ultimately deliver more sustainable grass weed management, think about how you can deliver a freely draining, well consolidated seedbed that can be drilled with minimal soil disturbance as early as possible in spring. Post-harvest cultivations and overwinter fallow allows emerged black-grass to be sprayed off before spring establishment. However, leaving bare soil over winter increases the risk of surface run-off and excess nutrients leaching from the soil.

Overwinter cover crops can be a useful system transition tool to allow early entry into a spring crop. Variety choice will be influenced by your primary objective, for example nutrient capture, grass weed management or soil health. Brassica species are effective at capturing nitrogen and soil restructuring but careful attention needs to be paid to biomass management and destruction timing, while cereal covers are fast growing, have shallow roots and can help bind the soil surface together, reducing soil disturbance in the spring. Whichever species you choose, the cover crop should ideally act as a catch crop, with problem weeds germinating within them to allow control before the next rotational crop.

Flexible wheat varieties

Flexible wheat varieties, such as Belepi and Mulika, also have a role to play if autumn conditions prevent late October drilling. Belepi in particular has demonstrated a competitive growth habit which competes well with black-grass in spring. Also keep in mind the revised Health and Safety Executive guidelines around definitions of winter and spring crops in relation to product authorisations. Given the reduced number of products approved for use on spring crops, in particular spring wheat, the flexibility offered by the new guidelines can be advantageous in some situations.

Winter crops: Crops planted only in the autumn/winter (typically before end of January in the year of harvest). Primarily these will require vernalisation, but this also includes winter-sown spring varieties. Application to winter-sown spring varieties is likely to be at the growers' own commercial risk as crop safety and effectiveness may not have been demonstrated.

Spring crops: Crops planted only in the spring (typically after the end of January in the year of harvest). Generally, these do not require vernalisation. Application to spring-sown winter varieties is likely to be at the growers' own commercial risk as crop safety and effectiveness may not have been demonstrated.

Black-grass control is all about stacking individual control measures, being flexible and adapting strategies to accommodate local conditions and seasonal variations. There is no one quick fix and the best strategies will be built around a change to the farming system, understanding the end goal and recognising that results are, unfortunately, unlikely to be achieved in a single season.

Stack the measures to maximise black-grass control:

- Understand the problem eg resistance status and soil conditions
- Maximise the opportunity for stale seedbeds
- Use rotational ploughing where appropriate and ensure seeds are buried
- Delay drilling until after mid October
- Increase seed rates and select competitive varieties
- Use flexible wheat varieties if delayed autumn drilling isn't possible
- Incorporate spring cropping into the rotation
- Move as little soil as possible at establishment
- Create the best seedbeds possible and consolidate
- Apply robust pre and early post herbicide programmes
- Ensure accurate application and make best use of adjuvants when conditions are right.



“Black-grass control is all about stacking individual control measures, being flexible and adapting strategies to accommodate local conditions and seasonal variations.”

Dr Paul Fogg
Crop production specialist



Preparing your crops for winter: autumn fungicides and grass weed residuals

Disease and insect pest control are year-round activities, while grass weed control must be completed before crop growth resumes in spring. Selecting and applying effective post-emergence herbicides is key to ensuring crops have the chance to grow away in spring without weeds competing for resources and, perhaps more importantly, reducing the number of weed seeds returned to the soil next summer. Crop production specialist, Paul Cartwright, considers how to help OSR crops overcome the challenges.

The season so far

Early herbicides applied pre-emergence or to very small weeds will have contributed to both broadleaved and grass weed control. Early removal of competitive weeds helps establish good yield potential but later germinating or hard-to-control weeds require a robust programmed approach. A competitive crop will complement the investment made in a comprehensive herbicide programme, often making the difference between good and excellent weed control.

Dry soils and sporadic rainfall meant crops struggled to germinate in parts of the South East. Growers may have understandably been reluctant to invest in early season weed control, at least until confident that crops had established and not succumbed to pest grazing or drought. Post-em herbicides will be essential to the success of these crops.

Complete weed control programmes

Where clethodim and/or carbetamide have already been applied, products containing propyzamide sprayed during the late autumn or winter months will complete grass weed herbicide programmes. With no known resistance to carbetamide and propyzamide, these treatments form a vital part of your resistance management strategy across the rotation. However, these active ingredients contribute little to broadleaved weed control, particularly where they are already emerged. If problem broadleaved weeds remain, sequences with bifenox or products containing aminopyralid will be necessary.

In previous seasons, clopyralid + picloram (eg Galera) has been available to use in autumn and winter. These provided useful contact activity on cleavers, mayweed and thistles, but such products are no longer permitted for use in OSR before the beginning of March. In mild winters and particularly where crops are forward, it's possible for crops to have advanced beyond the

latest safe growth stage for application (before flower buds visible above the crop canopy) before calendar date and conditions permit applications, particularly on heavy soil types. Identify where cleavers and thistles have not been adequately controlled by earlier herbicides, pay attention to fields with known problem areas and prepare to act quickly in March if conditions are suitable.

Bifenox (eg Fox) may be applied to OSR crops (EAMU, at grower's risk) and is commonly used for its contact activity on cranesbill, charlock and shepherd's purse. It can contribute some control of cleavers and poppies but results can be variable and selectivity relies on crops being sufficiently frost-hardened, so winter applications may require an oil or other suitable adjuvant to maximise penetration and uptake into the target weeds.

Aminopyralid is only available in co-formulations with grass weed active propyzamide (eg AstroKerb). It's a key active ingredient for controlling difficult weeds such as poppy (including ALS-resistant populations), mayweed and tidying up chickweed that germinates after early season residuals run out of steam.

Irrespective of species, propyzamide is a key final herbicide in grass weed programmes. Black-grass typically draws all the attention, but the reality is often a mixed population and activity on meadow grass, rye grass, brome and wild oats is also valuable.



Charlock showing the effects of a recent herbicide application



Weather has an impact on the environment and herbicide efficacy

Weather and soil conditions significantly affect both residual herbicide activity for grass weeds and water protection. If propyzamide leaches through soils, poor activity is the visible result in field, but this can also mean water issues downstream. Control of weeds emerging from depth may be variable. Ideally, soils should be cold and moist but not saturated, drains not flowing and heavy rainfall not anticipated for at least 48 hours after application.

Propyzamide is most persistent in cold soils but must be applied before the end of January. Soils will be cold enough now, but the decision of when to apply propyzamide herbicides (eg Kerb Flo 500 or AstroKerb) should be based on local conditions. Consider factors such as the ability to travel on fields, weather forecast after application, weed size and workload. Experience tells us that AstroKerb can still produce very good results on a wide range of weeds in cold mid-winter conditions, so don't rush to apply if conditions are not suitable or there is risk of losing product to water.



After heavy rainfall last winter this field became saturated, with water pooling and producing surface runoff in places. Propyzamide washed through the soil (left), while a good kill of black-grass has been achieved on better structured soil.

Leaf moisture on target weeds is not an issue for straight propyzamide applications as uptake is through soil and roots. Dry, or nearly dry, target leaves are required for AstroKerb applications to maximise contact and uptake of aminopyralid. AstroKerb applied to a dry leaf should be rainfast in one hour.

Prevention is better than cure

Foliar diseases threaten photosynthetic potential and in many cases, stem and pod integrity later in the life of the crop. Hopefully by now all crops will have received their autumn fungicides, either as a single or split treatment. If an early fungicide was applied in September or October when developing phoma reached threshold levels, or if early growth regulation was required and this has not yet been followed up, a further fungicide should be applied as soon as possible.

Application of a preventative light leaf spot treatment before winter is essential. Light leaf spot is becoming a widespread threat to OSR crops across the UK, even in the east and south of England which have traditionally been at much lower risk than northern areas and Scotland. There is increasing concern over light leaf spot resistance to triazoles, so employ a preventative approach incorporating alternative chemistry groups.

The frequency of fungicide applications is arguably the most important factor in achieving good light leaf spot control. With virtually no curative activity offered by any active ingredient, be prepared to begin treatments again early in the spring. In mild conditions, an interim application in the winter months may also be required to maintain sufficient protection.

For expert advice on addressing weed, disease and pest issues specific to your individual circumstances, speak to your local Frontier contact.

“Black-grass typically draws all the attention, but the reality is often a mixed weed population.”

Paul Cartwright
Crop production specialist





Time to rethink your fertiliser programme?

Although it wouldn't seem to be the case, fertiliser products and programmes have changed significantly over the last 30 years. Reduced sulphur dioxide emissions mean our air is much cleaner and the majority of OSR and cereal crops now need sulphur fertiliser, which simply wasn't the case in the 1980s. There has also been a big swing to liquid fertiliser, which now accounts for around 25-30% of the nitrogen and nitrogen/sulphur market, fuelled by a move to wider bout widths (>30m), a desire for greater accuracy and a need to free up storage space. These differences have real tangible benefits, but not all of the changes have been positive. National crop nutrition technical manager, Edward Downing, advises why the reduced use of P and K fertiliser needs to be addressed.

The reduction of P and K fertiliser usage

Use of P and K fertiliser peaked in the 1980s and moved steadily downwards to a low point in 2009 (Figure 1). The latest figures for harvest 2015 are less than half of those at the peak.

Increased use of organic manures and more targeted precision applications account for some of the reduction. However, poor farm economics in the late 1990s/early 2000s and the dramatic rise in fertiliser prices in 2008/9 fuelled by global demand outstripping supply also contributed to this decline. While these are understandable, sensible reactions to the financial situation, it's concerning that we have seen little increase in recent years, when farm economics have been more positive and fertiliser prices notably lower.

Although P and K usage on grassland has significantly reduced, the same decline has also occurred for arable crops (figure 2). While the reduction in nitrogen applied has been small, potash usage is down 40% and phosphate has halved.

There has also been a move away from complex compound NPK fertilisers, with proportionally more straight P and K and blended PK products now being used. An increase in variable rate applications has fuelled this use of straights and on occasion, NPK products have been at too big a premium over the blended PK market. There is no big premium this season, with compound NPK products even matching the price of the blended PK products at times.

Where are your soil nutrient levels?

Figure 3 shows the percentage of soils within the key P, K and Mg indices for arable soils. There are reasonable numbers above the Target Indices (P 2, K 2-, Mg 2), but significant amounts below them too. Soils with low indices need fresh water soluble P, K and Mg as nutrient levels are unlikely to be sufficient to achieve optimum yield. Soils already at the target should also be receiving inputs of nutrients to cover crop removal and maintain these levels.

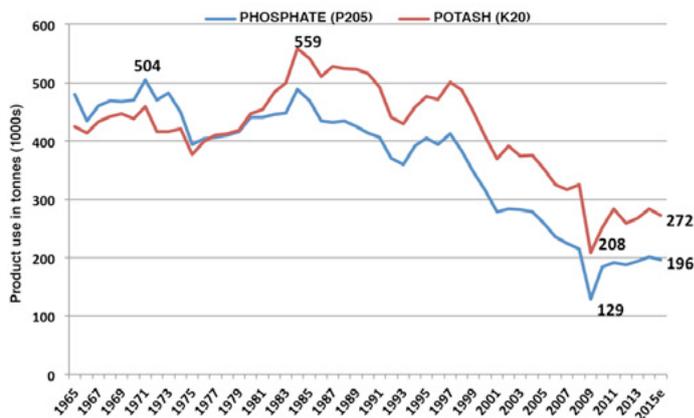


Fig 1: P and K fertiliser usage 1965-2015 Source: British Survey of Fertiliser Practice 2015

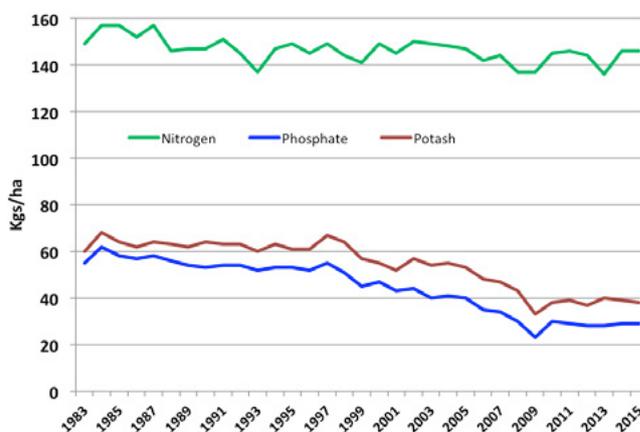


Fig 2: P and K application rates on grassland 1983-2015 Source: British Survey of Fertiliser Practice 2015

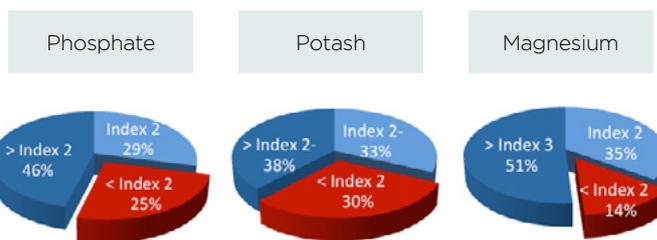


Fig 3: P, K and Mg indices in arable soils Source: PAAG Report 2014-2015

Compound NPK benefits

Products have to be competitively priced in the market, but compound NPKs have a number of benefits over straight P and K, blended PK and even blended NPK products.

CF Fertiliser trials have shown compound NPKs to have an average 0.3t/ha yield benefit. In its trials at the Royal Agricultural University, Cirencester, an average increase of 0.65t/ha was measured at harvest 2016, with wheat yielding 1t/ha more (Figure 4).

Applied	Crop	Yield	Difference	Difference
		t/ha	t/ha	£/ha
Spring 2016	Winter barley	7.7	0.3	£30
Autumn 2015		7.4		
Spring 2016	Winter wheat	9.6	1	£120
Autumn 2015		8.6		
		Mean	0.65	£75

Soil Status P1 K2
Totals applied 200kg N/ha, 68kg SO₃/ha, 127kg/ha P₂O₅, 81kg/ha K₂O
WB £100/t, WW £120/t

Fig 4: Yield benefit of spring NPK programme over autumn applied blended PK programme Source: CF Fertilisers UK Ltd

Other benefits include:

Segregation: Individual nutrients within a poorly sized and density matched blend can separate as the spreader travels. This means parts of the field can receive different levels of nutrients, which isn't possible with a complex compound as each granule contains all nutrients.

Wide bout widths: With a high bulk density and large granule size, these products are ideal for spreading accurately, especially to bout widths of up to 36m, although accuracy at these higher widths is influenced by weather conditions which can reduce available spreading days. It simply isn't possible to spread blended PK and NPK products this far and can be difficult for some straight materials through certain spreaders too.

Reduced passes: Compound NPK should save one pass compared to a blended PK programme and two passes compared to straights, saving time during busy periods as well as money.

Where is the yield benefit coming from?

Compound products have a much higher number of landing sites than blends with the same analysis (figure 5). This is simply where granules land on the soil. Phosphate moves very slowly in the soil, so having nearly 20 times more granules means they will be closer to the plant roots, improving crop uptake.

Nutrient	CF Compound	Blend
N	1052	503
P ₂ O ₅	1052	56
K ₂ O	1052	45
SO ₃	1052	66

Fig 5: Landing sites/m² for 400kg/ha of CF CropMaster Sulphur (27.4.4.7SO₃) vs blended product with the same analysis Source: CF Fertilisers UK Ltd

Can these products be used in a variable rate programme?

Because all nutrients are contained in each granule, rates cannot be varied, but they can fit within variable rate programmes at flat rates for particular crops and where time is restricted.

To make the most of variable rate programmes, P and K should be applied every year but this can mean going through your crops as many as six times including nitrogen and sulphur applications. Applying a base level of P and K to every hectare with an NPK product means variable top up applications can be made to low areas when time allows. As the NPK replaces a nitrogen application, the passes haven't increased but crops still receive some P and K if the variable P and K application can't be made.

What products are available?

Many products are available that can be matched to crops and soil indices on your farm. Most products now contain sulphur too.

CF Products				
Heartland Sulphur	24N	8P	8K	8SO ₃
MultiCut Sulphur	23N	4P	13K	7SO ₃
KayNitro Sulphur	25N	-	13K	7SO ₃
Twenty Ten Ten20N	10P	10K	-	-
Yara Products				
Actyva S	16N	15P	15K	6.5SO ₃
Maincrop	14N	14P	21K	-
Universal 16s	16N	16P	16K	-
Imported				
Compound	10N	15P	21K	20SO ₃

Fig 6: Available products

For your crops to reach their potential they must access enough nutrients from the soil. Applying fresh water soluble fertiliser, particularly P and K, at the start of significant crop uptake in early spring is key in achieving this. Compound NPK products are the best way to efficiently apply these nutrients for improved crop uptake and performance.

“Compound NPKs have a number of benefits over other products and are well worth considering for your fertiliser programmes..”

Edward Downing
National crop nutrition technical manager





Have you secured future stewardship funding?

After some uncertainties following the Brexit vote, the government has assured funding for any successful Countryside Stewardship applications made before the UK officially leaves the EU. In most cases this will provide five years of funding. This confirmation meant many interested growers submitted their Mid Tier applications by the September deadline, which are now being scored by Natural England. It's anticipated that they will be notified of their success or otherwise by mid December. For those still needing to secure future stewardship funding, planning ahead is essential. Kings western technical advisor Neil Harris explains the available options.

Next year's application window is expected to open in March 2017 for a 1st January 2018 start date for successful applications. Natural England has seen several instances of growers in Entry Level Stewardship schemes that expired in 2016 missing the cut-off for requesting a Mid Tier application pack, so if you have an existing Environmental Stewardship agreement, check to see if it expires before 1st January 2018. If it does, you will need to have a Mid Tier application drawn up next year if you wish to continue to access funding from an agri-environment scheme.

The number of Mid Tier applications received by Natural England this year is considerably up on the figure from 2015, so the scoring process is likely to be more competitive this time around. If the upward trend for application numbers continues next year, it will be even more important to seek expert advice to increase the chances of securing a successful application.

Few Higher Tier applications are being processed by Natural England, so many growers with expiring Higher Level Stewardship agreements who may have thought they would naturally progress into a Higher Tier application could be disappointed over the next few years. This year, many who applied through the 'Higher Tier Expressions of Interest' process have been directed by Natural England to apply for the Mid Tier. If you are thinking about applying for Higher Tier next year, having a contingency plan in place to have a Mid Tier application drawn up is recommended.

Countryside Stewardship scheme options and payment rates are generally good, but there is still some concern over the record keeping and photographic requirements attached to several of the options. The initial requirement to photograph just about every option, from wild bird seed mixes to very low input grassland, has been relaxed. Photos of arable options are generally not required. Instead, the Rural Payments Agency requires that a percentage of agreement holders take and submit photos of their options. Photos of fields with grassland options or historic environment options are still required when the application is submitted and before, during and after photos are required for Capital Works.

Despite some initial bad press, the new Countryside Stewardship scheme has a lot to offer. It is a valuable additional income stream for growers, providing a regular annual payment in an otherwise volatile farming sector. Poor ground can be taken out of production and farmed more profitably with agri-environment options, and with careful selection of options, shooting interests can be enhanced too.



Countryside Stewardship has a lot to offer, including a valuable additional income stream

To find out if Countryside Stewardship is right for you and how it could benefit your business, speak to your local advisor.

"If you have an existing Environmental Stewardship agreement, check the expiry date and consider the future options for funding."



Neil Harris
Kings western technical advisor