

CROP MONITOR

Issue 4

Week ending 31 March 2006

In This Issue

Spring Varieties 2006

We provide information on new and existing spring barley and oat varieties from the Recommended List trials.

Wild Oat Control

Identification and control methods are outlined.

Soil Analysis

We outline the procedures to obtain a representative soil sample.

Organic Manures and Their Benefits

Do we take account of organic manures when we are making our fertiliser calculations? Our step-by-step guide highlights the environmental and monetary benefits.

Operation Lapwing - 'As Wild As A Peewit'

The RSPB 'Operation Lapwing' project is now in its third year in Northern Ireland. The project is run in conjunction with the Ulster Farmers' Union (UFU) and provides free advice packs for landowners. It also promotes the good work that farmers are already doing in Northern Ireland to benefit Lapwings.

Lapwings, or Peewits as they are commonly known, have declined by two-thirds in the last 20 years to an estimated 1700 pairs. Peewits breed on grassland and arable land and farmers can help to reverse this decline through simple management techniques.



Courtesy of Chris Knights and RSPB-images.com

The ideal sites for these ground nesting birds are; spring cereals, Set-aside land or newly ploughed fields.

This year the RSPB is keen to obtain records of where Peewits breed in our wider countryside. If you see Peewits on your land between the months of April and June, the RSPB would be very interested to hear from you.

You can also call the RSPB or UFU to receive your free Lapwing management pack with a 5-step plan to help you make a difference. This will give you the chance to enter the 'Lapwing Champion' competition, with a top prize of £1,000, and a regional cash prize of £200 for the Northern Ireland winner.

To receive your free Peewit pack or to enter the Lapwing Champion Competition contact the RSPB on (028) 9049 1547 or the UFU on (028) 9037 0222, or log on to www.rspb.org.uk/operationlapwing

List of Spring Varieties for 2006

Undoubtedly last year was a difficult growing season for many farmers. The harvest of DARD's spring barley and spring oat trials was not without its problems, with lodging and leaning scores higher than usual. Yields in most trials were respectable, despite the weather delayed problems and the new Cereals Recommended List (RL) 2006 has been compiled. The spring varieties on the RL for Northern Ireland this year are listed below. The RL offers the best varieties suited for growing in Northern Ireland. Varieties not recommended this year but which have been recommended elsewhere will continue in trials in Northern Ireland to learn more about their performance and value to growers.

Spring Barley

There are ten recommendations for spring barley in 2006. Five are fully recommended for general use, four provisionally recommended and one recommended for special use.

Varieties recommended for general use (G):

Doyen

- Has been promoted from provisionally to fully recommended this year.
- The highest yielding of the five fully recommended varieties.
- It has large grain, short straw with quite good standing power and good resistance to necking and brackling.
- Disease resistance is quite good and it is intermediate to ripen.

Cocktail

- Remains fully recommended and has become a popular variety.
- Yields are high both in fungicide treated and untreated trials.
- Like Doyen, it has quite good resistance to the major diseases (leaf blotch, mildew and BYDV) although its straw is not quite as strong as Doyen's.

Kirsty

- Treated yields are a little lower than those of Doyen and Cocktail.
- Grain is small with average specific weight.
- Straw quality is average and its resistance to mildew is quite good, although it may be susceptible to leaf blotch.

Riviera

- Remains a firm favourite although its yields are now starting to slip slightly in comparison to the newer varieties.
- It has large grain with high specific weight and is one of the few varieties to give high straw yields.
- Like Kirsty, it has good resistance to mildew, but quite poor resistance to leaf blotch.

Static

- Remains fully recommended and is on a par with Riviera in terms of yield.
- It also has large grain, but low specific weight and its straw yields are intermediate.

Varieties recommended for provisional use (P):

Appaloosa

- Provisionally recommended for the first time this year giving exceptional treated and untreated yields.
- Has small grain with average specific weight.
- It's short straw has good standing power.
- Has good resistance to mildew, average resistance to leaf blotch and is intermediate to ripen.

Westminster

- Provisionally recommended for a second year and will be considered for full recommendation next year.
- Untreated yield was the highest of all varieties.
- Has large grain with average specific weight.
- Straw characteristics are good: long straw, high straw yields with quite good standing power.
- Resistance to disease is above average, although it tends to ripen late.

Power

- Newly recommended to the RL this year.
- Has very high treated and untreated yields and like Westminster, it's resistance to disease is above average.
- Tends to ripen late.

Wicket

- Performance has continued to be good.
- It is large grained with average specific weight and has above average resistance to disease.
- Very short straw has good standing power although its straw yields are low.

Varieties recommended for special use (S):

Annabell

- Continues to be recommended for special use because it's resistance to leaf blotch is very poor and still yields well without fungicide. Levels of *Rhynchosporium* were generally low in 2005, but at Strabane, where more susceptible varieties exhibited significant levels of infection, Annabell was recorded at 33%.
- In addition to its apparent tolerance of leaf blotch at relatively high recorded infections, it is one of three spring barley varieties to have high straw yields, Riviera and Westminster being the other two.

Spring Oats

There are again only two varieties on the spring oat RL, Emotion and Firth remaining fully recommended.

Emotion

- Very high yields when fungicide treated and high yielding in the absence of fungicide.
- Has large grain with average specific weight and average kernel content.
- Straw is long and stands well but has poor resistance to brackling.
- It has quite poor resistance to mildew and ripens early.

Firth

- Treated yields are lower than those of Emotion but it performs better when no fungicide is applied.
- Has large grain with average specific weight but has high kernel content.
- Shorter strawed than Emotion and resists brackling well.
- Significant tendency to produce free kernals.

Spring Cereal Recommended List 2006

		Yield (% of treated controls)	
		Treated	Untreated
Spring barley (100% = 6.41 t/ha)			
G	Doyen	104	98
G	Cocktail	103	91
G	Kirsty	102	93
G	Riviera	101	94
G	Static	101	92
S	Annabell	102	90
P	Appaloosa	110	101
P	Westminster	109	103
P	Power	108	100
P	Wicket	107	91
Spring oats (100% = 6.15 t/ha)			
G	Emotion	104	89
G	Firth	99	90

The DARD Cereal Variety Recommended List for 2006 contains yield and agronomic information on spring and winter varieties of wheat, barley and oats on results from HGCA and DARD funded trials in 2005 and the previous four years. This information is now presented in an abbreviated format, in addition to the usual Recommended List booklet. The shorter Summary Tables Leaflet is currently available from your local DARD Office or by contacting the Plant Testing Station at Crossnacreevy on (028) 9054 8000. The RL booklet will be available shortly.

Seed Testing Prices

For farmers planning to use home-saved seed this spring, the Plant Testing Station at Crossnacreevy offers a number of services to provide accurate indications of seed quality. All prices below include VAT.

Test	Price
Farmer's purity, germination and wild oat test combined	£18.50
Thousand grain weight	£10
Hectolitre weight	£6
Moisture test	£8
Fusarium test	£13

Anyone requiring seed tests should contact:
 Plant Testing Station
 50 Houston Road
 Crossnacreevy
 Belfast
 BT6 9SH
 Tel: (028) 9054 8000

Wild Oat Control

Why Control Wild Oats?

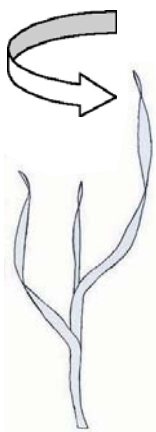
1. Wild oats (*Avena fatua*), if left uncontrolled, reduce cereal yields. One wild oat plant per square metre can cause a 4% yield loss while thirty plants per square metre can reduce yields by 50%.

2. They make harvesting, cleaning and drying more costly and reduce the value of the crop.
3. Wild oats are on the increase having risen from 33% in 1989 to 60% in 2000 in surveyed cereal crops containing wild oats.
4. Their seeds can remain viable in the soil for up to 10 years and a single plant can give rise to 10 plants in the following year. Minor infestations should therefore be tackled promptly while they are still manageable.
5. The wild oat is a noxious weed (Noxious Weeds (Northern Ireland) Order, 1977) and under Cross-Compliance, growers are obliged by law to control wild oats.

How do I identify wild oats?

Wild oats can emerge both in spring and in autumn. Look for “out-of-row” cereal-type plants during the crop’s seedling phase. Oats (either wild or cultivated) can be distinguished from wheat or barley seedlings by their anti-clockwise twisting leaves.

The Seedling



The Head



Look for wild oat heads above the crop. On inspection all seeds will be awned.

The Seed



Look for wild oat seeds on the soil surface after harvest. Wild oat seeds are hairy and slender and have a long bent black awn.

Control Guidelines

- Inspect cereal crops regularly and note problem areas within fields.
- Adopt an integrated approach to the control of wild oats, paying attention to:
 - Preventative measures;
 - Rotation and cultivation;
 - Herbicides and rouging.

Preventative Measures

- Use only uncontaminated seed. If planning to use home-saved seed, first have it tested for germination and purity. This service is available from the Plant Testing Station at Crossnacreevy and can be arranged through your local DARD Office. Do not sow the seed if **any** wild oat seeds are found.
- Straw may contain wild oat seeds, so avoid the use of contaminated animal manures on arable land.
- Prevent spread by contaminated machinery. If possible, harvest infested fields last and clean out the combine afterwards. If a contractor is going to harvest your crops, satisfy yourself that his machinery is not contaminated.

Rotation and Cultivation

- Consider putting badly infested fields into grass. The longer the break from cereals the greater will be the level of control as wild oat seeds can survive in the soil for up to ten years.
- High infestations can be tackled by growing several crops of spring barley or spring wheat in succession. This will allow autumn germinating wild oats to be controlled either mechanically or chemically with a non-selective herbicide (for example, a glyphosate-containing product) before sowing. Spring germinating wild oats can then be controlled, either by roguing or with a post-emergence selective herbicide.
- The spread of wild oats can be reduced by harvesting early for whole-crop silage, before the wild oats have set seed.
- Consider leaving cultivation as late as possible. This will maximise the loss by natural processes (for example, birds) of recently shed wild oat seeds and will destroy any emerged seedlings.

Herbicides and Roguing

- For winter wheat and barley crops apply a post-emergence autumn residual herbicide (for example, a chlorotoluron, isoproturon or pendimethalin-containing product). A follow up wild oat herbicide may be required in the spring (see below).
- For all wheat and barley crops apply a wild oat herbicide (see below) in spring if the wild oat infestation exceeds rogueable levels. (Populations in excess of 1000 plants/ha are probably beyond roguing.)
- Inspect all crops weekly and rogue out any wild oat plants. These should be bagged, removed from the field and burned.

Wild Oat Herbicides Approved for use in Spring

Herbicide	Active Ingredients	Company	Crop Approval	Crops Stages	Weed Stages
Cheetah Super/ Triumph	Fenoxaprop-P-ethyl	Bayer Crop Science	Wheat Only	12-39	12-39
Atlantis	Iodosulfuron + mesesulfuron	Bayer Crop Science	Wheat Only (Not seed crops)	12-39	0-39
Corniche /Tigress Ultra	Diclofop-methyl + Fenoxaprop-P-ethyl	Bayer Crop Science	Wheat and Barley	10-32	12-31
Grasp	Tralkoxydim	Syngenta	Wheat and Barley	12-39	12-31
Axial	Pinoxaden	Syngenta	Wheat and Barley	12-41	13-39
Topik	Clodinafop-propargyl	Syngenta	Wheat Only	11-39	12-39

Although some wild oat herbicides can be expected to control the weed over a wide range of crop growth stages, yield is likely to suffer if control is left beyond GS31 of the crop.

Soil Analysis

Why do we need to soil test?

A soil test provides growers with accurate information on which to base their nutrient management plans. The test identifies if the major nutrients of phosphate (P) and potash (K), are present in adequate levels for good crop growth, and if any lime is required to correct soil pH. Supplying the correct level of nutrients not only protects the environment from any potential pollution but can also save money.

When to sample:

In most soils, pH and nutrient levels change slowly and so it is not necessary to resample and analyse each year. In general sampling every fourth year is satisfactory for fertiliser recommendations but pH may need more frequent monitoring. Sampling must be at a time when the soil nutrient status is in a settled state. The following guidelines give an indication of the most suitable time to soil sample.

- Extend the time between sampling and the last fertiliser or manure application for as long as possible.
- Do not sample within six months of a lime or fertiliser application (except nitrogen).
- Sample at the same point in the rotation and well before growing a sensitive crop.
- Avoid sampling when the soil is very dry.

How to sample:

The results of any soil test are only as good as the sampling permits. If a sample of soil from a field is not truly representative of the whole field, the results will be of little value.

A gouge corer or screw auger may be used in arable rotations, to collect samples at a depth of 15cm. Uniformity of sampling is particularly important where crops are established from ploughing. To collect a representative sample, 20-25 individual cores should be taken and bulked together to give a single soil sample. These cores should be taken by walking the field in a 'W' pattern and taking one core randomly every 10-20m depending on field size.

Samples from individual fields should be bulked together in polythene bag large enough to contain around 2lb (1kg) of soil and be securely sealed and labelled.

Where to sample:

A common problem with soil sampling is including sampling areas that are not typical parts of the field. Avoid sites of old manure heaps, and bonfires and leave out headlands and areas around trees, pylons, gateways and anywhere stock may have congregated.

What to sample:

The main nutrients to test for are phosphorus (P) and potash (K), pH should also be checked. Other nutrients that can be tested for include sulphur, magnesium, copper, zinc and boron. However unless a particular nutrient problem has been identified in previous crops or a particular nutrient sensitive crop is being grown, a pH, P and K soil analysis should be adequate.

Interpretation of Results:

Each soil analysis should be accompanied by a recommendation of nutrient or lime applications required, because each soil laboratory has slightly different methods of analysing soil for their nutrient status. Although each method is correct, application rates of lime, phosphate or potash can only be supplied correctly from the laboratory where the analysis was done.

Soil sampling can be arranged through your local DARD Office or Crops Advisor charged at £9.25 per sample. Development advisors are also available to develop your competence in interpreting your soil analysis results.

Organic Manures and Their Benefit

Slurries and solid manures are valuable fertilisers containing useful amounts of the major plant nutrients nitrogen (N), phosphorus (P) and potassium (K) as well as sulphur (S), magnesium (Mg) and trace elements. However, they may also be potential sources of pollution. The Arable Benchmarking results from 2004 indicated that fertiliser is the largest variable cost accounting for 41%. With increasing economic pressures, it makes sense to exploit the fertiliser value of manures, while taking action to prevent pollution. Under the Nitrates Directive the maximum permissible loading of total organic manure N is 170kg/ha (averaged over the farm holding), and this figure includes the N excreted by grazing livestock.

Nitrogen

Nitrogen is present in manures in different forms:

Readily available nitrogen is the N that is potentially available for rapid crop uptake. It is equivalent to fertiliser nitrogen. Slurries and poultry manures are "high" in readily available N (40-60% of total N) compared with FYM, which is "low" in readily available N (10-25% of total N).

Organic N is the N contained in organic forms, most of which is not available in the first season after application. This N will be slowly released and will become potential available for crop uptake overin subsequent growing seasons.

Crop available nitrogen is the readily available N that remains available for crop uptake after accounting for any losses of N.

To make optimum use of the N in organic manures, they should be applied at times of maximum crop uptake, generally during the spring period. There are two major losses that reduce the efficiency of readily available manure N, - **Ammonia volatilisation, and nitrate leaching.**

If FYM and poultry manure are left on the soil surface following land application, typically 20% to 35% of the readily available N they contain can be lost to the atmosphere, contributing to monetary loss and environmental pollution.

The amount of N leached or lost by gaseous emission is mainly related to the manure application rate, readily available N content and timing of applications. Slurries and poultry manures are high in readily available N and hence have a greater potential to loose N than FYM, which is “low” in readily available N.

In the case of slurries, injectors and band spreaders reduce ammonia loss while dry matter (DM) also has an important influence. Low DM (watery) slurries can infiltrate the soil more rapidly than high DM slurries, and hence have lower ammonia volatilisation. For example, a 6% DM slurry typically loses 20% more N than a 2% DM slurry.

Table 1. Speed of manure incorporation required by ploughing to conserve readily available N

Manure type	Conservation target	
	90%	50%
Slurry	Immediate	6 hours
FYM	1 hour	24 hours
Poultry	6 hours	48 hours

Tables 2 and 3 provide the typical nitrogen content of manures on a fresh weight basis for both manures and slurries.

Table 2. Nitrogen-Typical total nitrogen content (fresh weight basis)

	Dry Matter %	Total Nitrogen kg/t
Cattle farmyard manure	25	6.0
Pig farmyard manure	25	7.0
Sheep farmyard manure	25	6.0
Layer manure	30	16
Broiler litter	60	30

One of the difficulties in using Table 3 is estimating the DM of slurry. A simple guide for estimating slurry DM is to place a pole into the tank. If the pole falls quickly to the side the slurry is approximately 2%DM. If the pole falls slowly to the side it is 6%DM, however, if the pole stays upright, the slurry is approximately 10%DM.

Table 3. Nitrogen – Typical total Nutrients content (fresh weight basis)

	Dry Matter %	Total Nitrogen kg/m ³
Dairy	2	1.5
	6	3.0
	10	4.0
Beef	2	1.0
	6	2.3
	10	3.5
Dirty Water	<1	0.3

To convert kg/m³ to units/1000gallons, multiply by 9 (for example, 6%DM dairy slurry has 27 units/1000 gallon).

Table 4 summarises the N availability to the next crop. The soil incorporation figures assume incorporation by ploughing 6 hours after application for slurries and 24 hours for solid manures. Cultivation using discs and tines is likely to be less effective than ploughing in minimising ammonia losses.

Table 4. Percentage of total Nitrogen available to next crop following manure and slurry applications (% of total Nitrogen)

	Dry Matter (%)	Spring (Feb-Apr) All Soils
Surface Applied		
FYM – Fresh		20
Old		15
Layer manure		35
Broiler litter		30
Cattle slurry	2	50
	6	35
	10	20
Pig slurry	2	60
	4	50
	6	40
Soil Incorporated		
FYM – Fresh		25
Old		20
Layer manure		50
Broiler litter		45
Cattle slurry	2	55
	6	45
	10	35
Pig slurry	2	65
	4	55
	6	50

Phosphate and Potash

Manures are valuable sources of plant available phosphate (P) and potash (K) although short term availability can be lower than from fertiliser P and K.

Where crop responses to P and K are expected for example, indices of 0 or 1 for combinable crops or potato crops, the **available** P and K content of the manure should be used to estimate the manure P and K supply. However, where P and K applications are for maintenance of soil reserves that is, index 2 and above, **the total** P and K content of the manure should be used.

Table 5. Phosphate, Potash, Magnesium, and Sulphur (kg/t) of solid and slurry manures (fresh weight basis)

	Dry Matter (%)	Phosphate (P ₂ O ₅)		Potash (K ₂ O)		Sulphur (as SO ₃)	Magnesium (as MgO)
		Total Phosphate (kg/t)	Available Phosphate (kg/t)	Total Potash (kg/t)	Available Potash (kg/t)	Total Sulphur (kg/t)	Total Magnesium (kg/t)
Cattle FYM	25	3.5	2.1	8.0	7.2	1.8	0.7
Layer manure	30	13	7.8	9	8.1	3.8	2.2
Broiler manure	60	25	15	18	16	8.3	4.2
Dairy slurry	2	0.6	0.3	2.0	1.8	0.4	0.4
	6	1.2	0.6	3.5	3.2	0.8	0.7
	10	2.0	1.0	5.0	4.5	1.1	1.0
Beef slurry	2	0.6	0.3	1.5	1.4	0.4	0.4
	6	1.2	0.6	2.7	2.4	0.8	0.7
	10	2.0	1.0	3.8	3.4	1.1	1.0
Pig slurry	2	1.0	0.5	2.0	1.8	0.5	0.3
	4	2.0	1.0	2.5	2.3	0.7	0.4
	6	3.0	1.5	3.0	2.7	0.9	0.5

Based on the above tables how do I calculate my manure or slurry requirements and what are the potential savings?

The first step is to determine your P and K requirements based on the soil index. For example, the P and K requirement for spring barley with an Index of 1 is 80kg/ha (64 units/acre) and 150kg/ha (120 units/acre) respectively.

To calculate an application rate for broiler litter, use the available P and K values from Table 5.

1 ton of broiler litter contains 15kg of P and 16kg of K

Therefore my application rate based on the Phosphate requirements for spring barley would be $80/15 = 5.3\text{t/ha}$ (2ton/acre).

This would also supply

(8.1×5.3) 43kg/ha of Potash (34.4 units/acre)

The second step is to ensure that the application rate of available N in the organic manure does not exceed crop requirement for N as given in DEFRA Reference Book 209

1 ton of broiler litter contains 30kgN/t.

If I apply 5.3t/ha that will supply 159kg of total organic nitrogen, and (after soil incorporation in spring) 72kg available N. Crop N requirement for spring barley on most mineral soils in NI is between 80 and 120 kg N/ha. Hence, applying 5.3t/ha of broiler litter will not exceed crop requirement.

The third step is to ensure that the application rate of total N in the organic manure, when coupled with applications of manure N to other parts of the farm holding, gives an average application rate over the entire holding of less than 170kg/ha of total organic nitrogen.

What Nitrogen does this supply to the crop if I surface apply or plough the manure within 6 hours?

Using Table 2 broiler litter contains 30 kg/ton of nitrogen.

If the manure was not incorporated the N supply using Table 4 would be

$$30 \times 30\% = 9\text{kg/t.}$$

Therefore if I apply 5.3t/ha this would provide (5.3 x 9) **48kg/ha of N (38units/acre)**

If the litter was incorporated within 6 hours it would supply

$$30 \times 45\% = 13.5\text{kg/t of N}$$

Based on the application rate of 5.3t/ha this would supply **72kg/ha of N (57 units acre)**.

A difference of 24kg/ha of N (19 units/acre) or almost 3/4 a bag worth of C.A.N.

What is this worth?

Based on current fertiliser prices a kilogram of nitrogen costs 51p (based on CAN @ £140).

Therefore 5.3t/ha of broiler provides, £24.50/ha of N or £36.50 if the manure is incorporated, a saving of £12 per hectare in nitrogen.

In addition, the broiler litter also supplies £35.20 of phosphate and £11.20 of potash.

The potential savings per hectare in fertiliser costs could amount to £82.90 per hectare (£33.50/acre).

However, an application cost must be taken from this, which could amount to £12.50 per ha for spreading and loading. An additional cost of haulage must also be considered but this will depend on each farms locality to a manure source.

Always consult your buyer protocols before using any chemical

All previous editions of Crop Monitor and Crop Management Notes are available on-line at [www.ruralni.gov.uk /crops](http://www.ruralni.gov.uk/crops).

Compiled by:

Malachy Mason, Crops Technologist, Greenmount Campus, College of Agriculture Food and Rural Enterprise Tel. (028) 9442 6742 or E-mail malachy.mason@dardni.gov.uk

Dr. Stephen Bell, Crops Technologist, Greenmount Campus, College of Agriculture Food and Rural Enterprise Tel. (028) 9442 6766, or E-mail stephen.bell@dardni.gov.uk

Dr. Ethel White, Dr. Lisa Black, Applied Plant Science Division, Plant Testing Station, Crossnacreevy Tel. (028) 9054 8000 or E-mail ethel.white@dardni.gov.uk

Crop Development Advisers can be contacted at the office, mobile or via E-mail

Robin Bolton (028) 7772 1823 / 077 4896 7013 or robin.bolton@dardni.gov.uk

David Crawford (028) 4461 8075 / 078 998 64358 or david.s.crawford@dardni.gov.uk

James Knox (028) 9442 6786 / 077 9661 4984 or james.knox@dardni.gov.uk

Edited by **Bill Simpson**, Senior Crops Development Adviser, Greenmount Campus Tel. (028) 9442 6683 / 077 8810 8722 or bill.simpson@dardni.gov.uk