Crops
Environment
& Land Use
Programme

National Tillage Conference 2013

'Profiting today, Planning for tomorrow'

Teagasc
Agriculture and Food Development Authority

NATIONAL TILLAGE CONFERENCE 2013

'Profiting today,

Planning for tomorrow'

Published by

Teagasc

Crops Environment and Land Use Programme

Oak Park Crops Research

Carlow

Thursday, 31st January 2013

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Programme

09.30	Registration /Tea/Coffee
10.30	Conference Opening ***Professor Gerry Boyle, Teagasc Director***
Session 1:	***Chaired by Professor Gerry Boyle, Teagasc Director***
10.45	Tillage sector development plan ***Andy Doyle, Irish Farmers Journal***
11.00	Tillage sector development plan – Panel response and discussion ***Panel: Andy Doyle (IFJ), Noel Delany(IFA), Paddy Browne (Teagasc), Tomás Codd (Farmer), Pat Ryan (Liffey Mills)***
Session 2:	***Chaired by John Spink, Head of Crops Research, Teagasc***
11.30	Machinery costs: key factors ***Dermot Forristal and James Irish, Teagasc***
12.00	Soil fertility management on tillage farms ***Mark Plunkett, Richie Hackett, and David Wall, Teagasc***
12.30	Assessing the impact of a GM blight resistant potato ***Ewen Mullins, Teagasc***
12.45	Discussion
13.00	Lunch
Session 3:	***Chaired by Matt Dempsey, Irish Farmers Journal***
14.30	Yields in 2012 – what went wrong? ***John Spink and Shane Kennedy, Teagasc***
15.00	Fungicide sensitivity and disease control ***Steven Kildea, Teagasc***
15.20	Fungicide performance 2012 and recommendations for 2013 ***Liz Glynn and Jim Grace, Teagasc***
15.40	Discussion - Disease control for the coming season
16.00	Close of Conference ***Tom Barry TD***
16.15	Tea/Coffee

Contents

Tillage sector development plan

Andy Doyle
Irish Farmers Journal
On behalf of the Teagasc Tillage and Energy Stakeholder group

SUMMARY

The publication of the Food Harvest 2020 report helped reverse the image of agriculture in Ireland. The Celtic Tiger had passed and industries which showed steady performance year on year once again showed their importance for the national economy. Agriculture had been suppressed for many years but its continuously increasing export performance became the focus for the possibility of further expansion in the sector, both internally and externally. Agriculture was again seen as a sector with considerably potential to increase output and this expansion was seen as a means to provide relief from our current economic woes.

In FH 2020 targets were set for many agricultural sectors to either increase output or increase the value of their output. But there were no such sector-specific targets set for the development and expansion of tillage. This left a fear that the sector, which uses almost 10% of the nation's land, could be bypassed as new plans for agricultural development unfold in the years ahead. If the sector was to feature in government's plans for the future a plan showing the development potential was needed.

The tillage sector currently utilises 350,000ha and produces approximately 2.3 million tonnes of grains and other crops with an estimated farm gate value of €700 million. This is about 9% of our land area, about 11,000 growers and approximately 30% of the 51,500 jobs in the food sector. The sector produces ingredients for the feed, malting, milling, distilling, food, oils and other end uses.

The Teagasc tillage and energy crops stakeholder group thought it would be useful for the sector, and for Food Harvest 2020, to produce a development plan which would set out in detail the potential for individual tillage crops. This was conducted last year by the non-Teagasc members of that committee, with the help of Teagasc staff. The plan includes a SWOT analysis of each crop and an analysis of the realistic expansion potential envisaged within the different market sectors. The increased output was then valued and assessed for its potential to generate additional jobs within the sector.

These projections found potential for an additional 140,000ha in the crops grown today, primarily to underpin animal enterprises with energy and protein feed, but also to expand greater value-added food and beverage markets. The study also calculated a need for an additional 84,000ha if sugar beet production recommences and if the country is to achieve its obligatory requirement for renewable heat. The greatest potential for area increases is seen in oilseed rape and energy crops, followed by barley and sugar beet.

It is estimated that the additional production projected from the sector could generate over 2000 additional jobs with a cumulative output value increase of over €540 million. But the achievement of this potential will be influenced by a range of factors such as policy changes and land access.

Tillage Sector Development Plan

Andy Doyle

On behalf of the industry members of the Teagasc Tillage Crop Stakeholder Consultative Group

Today

- Why this plan was produced
- Brief outline of the main contents
- Invitation for discussion on how to make it happen

Why produce a plan

- Food Harvest 2020 Report set objectives and targets for other agricultural sectors
- No targets for tillage but it stated:

  "Domestic demand would rise on the basis of the predicted increase in numbers in the livestock, dairy and pig sectors to 2020. This increase in demand .... means there are opportunities to increase production without significantly affecting market prices."

- Absence of a plan could see the sector ignored as Irish agriculture is developed

Crops in Ireland

- 9% of area (23%+ of land very suitable for tillage)
- €700M output at farm gate
- 30% of 51,500 jobs in food sector
- Approximately 11,000 growers
- 2.3Mt /year produced + up to 3Mt imported
- Feed, malting, milling, distilling, food, oils
- Very few break crops
- High yield potential in cereals

A viable plan

- Having a viable plan should help in:
  - The supply of quality traceable food, feed and drink products for the home and export markets
  - The allocation of research resources to drive national productivity and crop options
  - The acknowledgement of tillage as an important enterprise which delivers sustainable income for many farmers

Commodity groups

Some years ago Teagasc established commodity stakeholder groups to help guide its research and advisory strategy.

These are comprised of members from the farming, processing, supply chain and other stakeholder groups.

Industry Stakeholder Representatives

Name	Profession
Larry O'Reilly, Chairman	Farmer
Brendan Barnes	APHA
Tom Barry	Farmer / Business man / TD
Tom Bruton	Energy Consultant
Tomás Codd	Farmer
Andy Doyle	Irish Farmers Journal
Donal Fitzgerald	Merchant / Seed trade
Michael Hoey	Farmer / Country Crest
John O'Loughlin	Farmer
Pat Ryan	Merchant / Liffey/Drummonds

What we set out to do

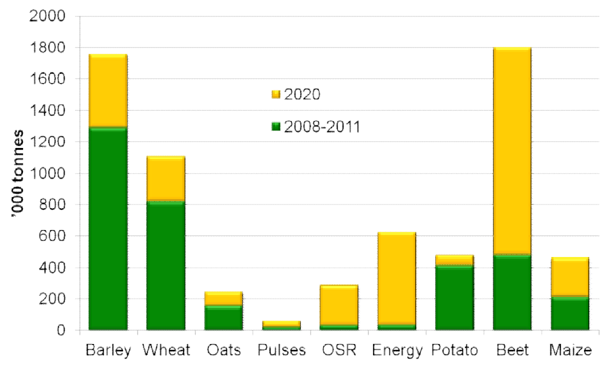
- Look at current land use enterprises in tillage and energy and examine the potential for expansion in each sector
- The plan was to identify the potential but not to provide the roadmap – that is for the FH 2020 implementation groups

Crop by crop analysis: Overview

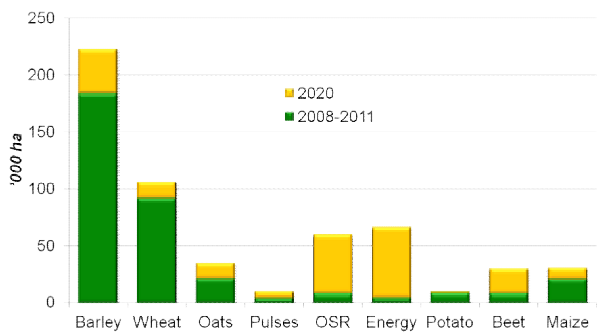
Note:

- Individual crop opportunities
- Not all likely to occur
- Not necessarily additive

Crop Potential 2020: Tonnes



Crop Potential 2020: Area



Barley

- **Currently**
  - 184k ha producing 1.3Mt
- **Increasing demand**
  - Feed (expansion in beef/dairy) - 348,000t
  - Malting/roasting - 118,000t
  - Export
- **Extra 39,660ha**
- **Additional €77m output**

Wheat

- **Currently**
  - 92,000ha producing 0.82 Mt
- **An extra 245,000t**
  - Feed (expansion in beef/dairy)
  - Distilling - 44,000t
  - Export
- **Extra 14,000ha**
- **Additional €54m output**
- **Increased first wheat**

Oats

- **Currently**
  - 21,000ha to produce 160,000t
- **Increasing demand - 88,000t**
  - Feed – mainly equine (75,000t)
  - Food – 12,000+t
- **Extra 13,760ha**
- **Additional €16.3m output**

Pulses

- **Currently**
  - 3,500ha to produce 18,700t (peas + beans)
- **Import 1.3Mt of protein feeds**
  - Peas 4,000t
  - Beans 42,000t
- **Extra 6,740ha**
- **Additional €9.74m output**

Oilseed rape

- **Currently**
  - 8,000ha (2,300ha in '03 to 17,000ha in '12)
- **Increasing demand**
  - Food 39,000t
  - Energy 216,000t
- **Extra 51,800ha**
- **Additional €102m output**

Potatoes

- **Currently**
  - 8,700ha in 2012
  - 350,000 – 430,000t per annum
  - 62% of area in Louth, Meath, Dublin & Wexford
  - 86% main crop 9% earlies
- **Diversify from ware**
  - Seed Exports
  - Salad potatoes
  - Chipping (local chippers)
  - Processing market
- **Extra 1,470ha**
- **Increase value by up to €4.8m**

Beet

- **Currently**
  - 8,000ha in 2012
- **Require 1Mt sugar beet**
  - (up to 30,000ha)
- **Increasing bioethanol demand (142 mL)**
- **Extra 22,000ha**

Energy crops

- **Currently**
  - 4,500ha
- **Extra 62,300ha**

Maize

- **Currently**
  - 20,875ha producing 313,000t
- **Demand to increase in intensive dairying regions**
  - +10,000ha

Production and output changes

	2008/11 t	2020 t	2008/11 ha	2020 ha	Increase ha
Barley	1,288,900	1,755,500	184,000	223,660	*39,660*
Wheat	820,400	1,109,400	91,800	105,800	*14,000*
Oats	154,420	246,320	21,100	34,860	*13,760*
Pulses	18,700	64,700	3,560	10,300	*6,740*
OSR	32,300	287,300	8,100	59,900	*51,800*
Energy	36,000	628,000	4,500	66,800	*62,300*
Potatoes	415,000	482,000	8,700	10,170	*1,470*
Beet	480,000	1,800,000	8,000	30,000	*22,000*
Maize	313,000	463,000	20,875	30,875	*10,000*

Challenges / Threats

- Increasing production costs
- Cheap grain imports
- Price volatility
- Access to land and land fragmentation
- High disease pressure / fungicide resistance
- Varieties for Irish conditions
- Infrastructure - harvesting, drying, storage and distribution
- Future CAP & energy policy changes

Actions needed

- Research to improve yields, margins and achieve quality
- Improved land access policy
- Continued access to agro-chemicals
- Improved crop varieties for our climate
- Increased use of organic manures
- Promote rotations to enhance yield potential
- Facilities to process/clean grain for export
- Range of measures to support bioenergy
- Political changes in EU sugar regime

Thank you

Your comments and actions are now essential

Notes:

Notes:

Notes:

Machinery costs: key factors

Dermot Forristal and James Irish
Teagasc, Oak Park

SUMMARY

Machinery on tillage farms continues to be a complex and challenging input to analyse. The frequent long-term nature of machinery purchases, coupled with difficulty in predicting depreciation and repair costs, makes cost analysis difficult; while the benefits of machinery such as improved timeliness are challenging to quantify. Machinery cost analysis is becoming more important however, as volatile markets coupled with small scale can result in significant cost risk on Irish tillage farms. Good grain market prices can stimulate investment in machinery which may prove difficult to subsequently fund when grain prices decline. Analysis is vital.

The Teagasc national farm survey indicates that machinery costs on ‘mainly tillage’ farms are approximately 20% higher than those on UK farms. This competitive disadvantage needs to be addressed. Individual farm cost analysis is vital. Tillage farmers need to discuss and analyse costs as enthusiastically as crop yields. Teagasc has a number of tools which aid this process including the e-Profit monitor. All growers should benchmark their costs using the e-Profit monitor.

Crop production in Ireland can be challenging. Our weather can leave us with quite short working windows requiring increased machine capacity to ensure timely field operations. Our farm size can make it difficult to achieve economies of scale. However growers’ efforts to increase scale by renting land can result in increased costs. Machinery costs are impacted by field size, but also by the distance between land blocks. A spreadsheet based cost model was developed and used to assess the impact of land dispersion on machinery costs using a single grower example. The model calculates the time spent in road transport and the associated costs based on block location and machine capacity. In this case study, it was estimated that machinery costs on land distant from the home base were from €3 to €151/ha more than on the home farm, depending on block size and distance from the base. While this model needs to be developed and validated, it indicates that growers need to assess machinery costs carefully when valuing land for rental. Careful selection of land blocks can reduce machinery costs.

Machinery costs: key factors

Dermot Forristal and James Irish
Teagasc CELUP and Advisory
Oak Park Crops Research

Outline

- Why are costs important now
  - survey figures
- Cost analysis
  - e- Profit Monitor
- Pitfalls / Irish challenges
- Dispersed land
  - Land block distance and costs
- Conclusions

Why are costs important now?

- Volatile markets
- Cost reduction essential
- Long term decisions critical
- Smaller scale challenges
- Need to question our approach to machinery

Sources of cost data

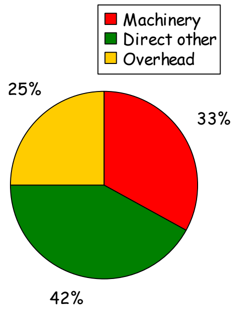
- Teagasc NFS + equivalent FBS in UK
- 1990s Oak Park detailed survey
  - Total machinery costs €379/ha, range €181- €468/ha (today's values)
  - Basis for costing program
- Farm accounts
  - Limited by depreciation methods etc
- e-Profit monitor
  - Up to you to make it work – needs numbers

Teagasc NFS cost breakdown

NFS- Mainly Tillage

Machinery

- **33%** of Total Costs
- **45%** of Direct + Machinery
- **Largest** Single Cost Category



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NFS + UK FBS

	NFS		UK
Category	**Mainly Tillage**		**Cereals**
	All	**>100 ha**	**All**
Number	93	23	342
Tillage	64%	71%	84%
Average farm size	58 ha	170 ha	201 ha

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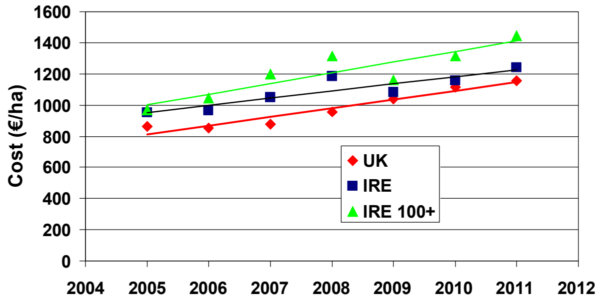
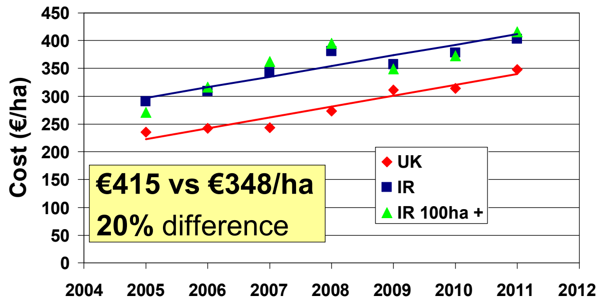
NFS vs FBS total costs (€/ha)



NFS vs FBS machinery costs (€/ha)



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Costing challenges

- **Machinery costs are difficult to calculate**
  - Long replacement cycles
  - Variable cost elements – some random
  - Predicting depreciation; repair costs; estimating interest
- **Machinery benefits are difficult to evaluate**
  - Timeliness difficult to quantify and value with weather
- **Options not adequately considered**
  - Alternatives to ownership
  - Ownership options

Machinery is an input with costs and benefits
Needs to be Analysed. Needs planning

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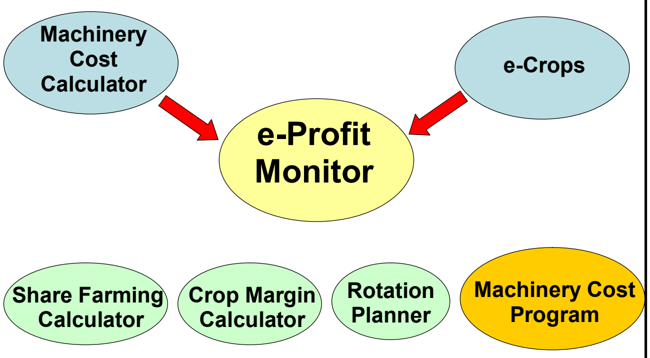
Financial analysis essential

- **Your cost estimates ➔** better than industry norms
- **Identifies high-cost items for attention**
- **Essential for machinery and other fixed costs**
- **Competitiveness determined**
- **Facilitates decision making**
  - Forward trading
  - Crop rotation

Requires your action

Teagasc financial toolbox



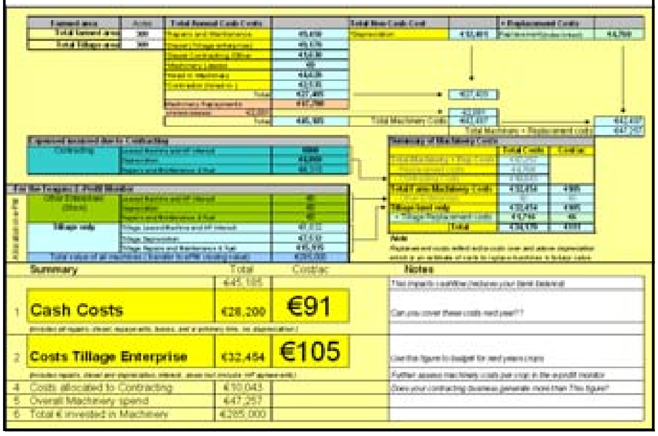
e-Profit monitor

- **Detailed financial analysis**
- **Key outputs**
  - Full analysis by crop
  - Cost €/ha and €/t
  - Break-even yield or grain price
  - Benchmarking vs standard or group

e-Profit machinery cost calculator

- **Snap-shot of single year machine costs**
  - Fuel
  - Repairs and maintenance
  - Depreciation, interest, (repayments)
- **For specific machinery decisions**
  - Full Oak Park machinery cost program
    (More comprehensive but more detail)

e-Profit machinery cost calculator



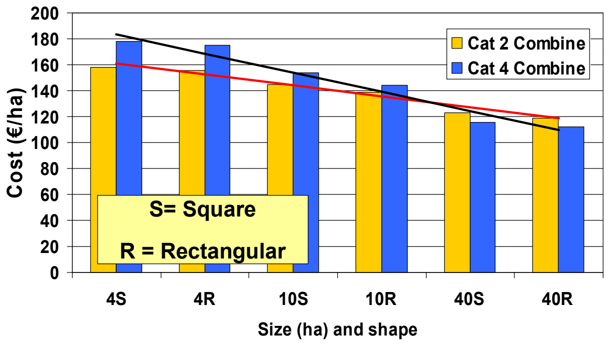
Costing pitfalls

- **Machinery is an asset with investment potential**
  - Almost always incorrect; It's inflation!
- **Spending to a 'Repayment Capacity'**
  - Not sensible if machinery is a depreciating asset
  - Exposed to volatile markets
- **Adopting technology that scale does not justify**
  - Replacing machines too often to access technology
  - Manufacturers marketing very strong
- **Purchasing machines to achieve economies of scale**
  - Ineffective if paying too much for land to achieve that scale

Unique Irish challenges

- **Weather:**
  - Shorter work windows – more capacity needed?
  - Limits machinery options
  - Compaction risk
- **Scale:**
  - Small scale – Higher costs, greater cost risk
- **Land cost / land availability**
- **Field size**
- **Dispersed nature of land**
  - Block size and block distance

Field size/shape: Combine cost



The cost of dispersed land

- **Machinery on the road still incurs costs!**
  - **Fuel:** ➔ different rate (l/hr) depending on task
  - **Labour:** ➔ same rate as field work
  - **Depreciation:** ➔ varies but power units depreciate
  - **Repairs/maintenance:** ➔ varies but power units
- **Time lost on the road requires extra machine capacity**

Dispersed land + Cost factors

- **Block distance from:**
  - Base, machine night store, grain store, next block
- **Block size:**
  - And relationship with machine capacity
- **Travel speeds:**
  - Roads, traffic, machine max. speed
- **Block cropping:**
  - Crops requiring different operation timing

What does it cost ?

- **Little/no research survey data**
- **Simple costing model developed**
  - Based on Oak Park machinery cost programme
  - Machine type and size, distances, travel speeds etc.
  - Assumptions on speeds, costs component impact
- **Not validated**
- **But logical and highlights potential costs**

Costing estimate - Methodology

- **For each block/site and for all operations**
  - **Transport cycles calculated**
    - Operation X trip number
    - e.g. 2 ploughing trips; 10 grain hauling trips etc
  - **For each trip: Road time calculated**
  - **Costs calculated**
    - Oak Park costing programme
    - Adjusted for operation type:
      - e.g. plough on road – less hourly fuel rate and less depreciation and maintenance than in the field

Single land block: Data spreadsheet

Operation	Spec	Block no.	Block size (ha)	Distance (km)	Distance back	Speed (kmh)	Crop	Tractor used (kW)	Machine cost (€/ha)	Fuel operation (l/ha)	Fuel transport (l/hr)
Ploughing	5F	2	12	4.8	4.8	25	Wheat	125	21.29	25	17.25
One pass	3m	2	12	4.8	4.8	25	Wheat	125	19.46	15.6	17.25
Spray 1	24m	2	12	4.8	4.8	30	Wheat	100	2.29	1	13.8
Spray 2	24m	2	12	4.8	4.8	30	Wheat	100	2.29	1	13.8
Spray 3	24m	2	12	4.8	4.8	30	Wheat	100	2.29	1	13.8
Spray 4	24m	2	12	4.8	4.8	30	Wheat	100	2.29	1	13.8
Spray 5	24m	2	12	4.8	4.8	30	Wheat	100	2.29	1	13.8
Fert Sp1	24m	2	12	4.8	4.8	30	Wheat	100	1.26	1	13.8
Fert Sp2	24m	2	12	4.8	4.8	30	Wheat	100	1.26	1	13.8
Combine	6W HS	2	12	4.8	4.8	20	Wheat	200	81.55	13.2	27.6

		Block ID	Area (ha)	Dist out (km)	Dist back (km)	speed out kmh	speed back kmh	Fuel Loaded (l/km)	Fuel Emp (l/km)	Crop
Grain	16t trailer	2	12	4.8	4.8	36	32	0.84	0.57	Wheat
Seed	16t trailer	2	12	4.8	4.8	35	35	0.84	0.57	Wheat
Fert	16t trailer	2	12	4.8	4.8	30	36	0.84	0.57	Wheat
Water	16t trailer	2	12	4.8	4.8	30	35	0.84	0.57	Wheat

+ 4 page widths of calculations!➔
+ 22 pages deep of land blocks ↓

Sample farm 320ha

- Real farm distances – but cost assumptions
- Owned land + rented land
- 22 Land blocks:
  - 5 ha – 28 ha block size
  - 0 km – 34 km distance to main base (but secondary base)
- Assume all blocks have one crop type.
  - More crop types ➔ More trips ➔More costs
- Additional machine capacity requirement not costed
- Cost estimates made

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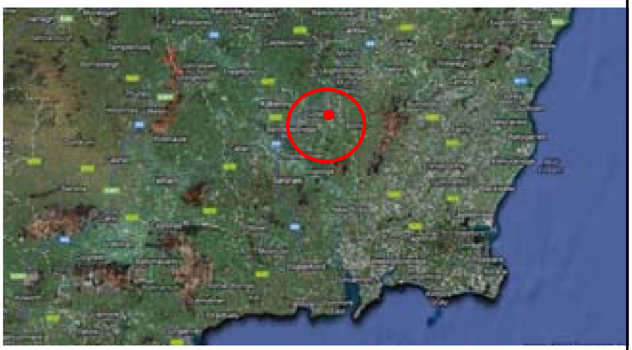
Sample arable farm



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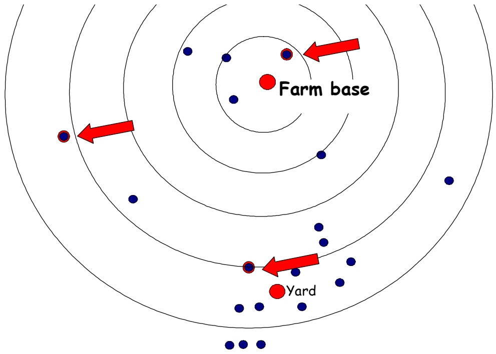
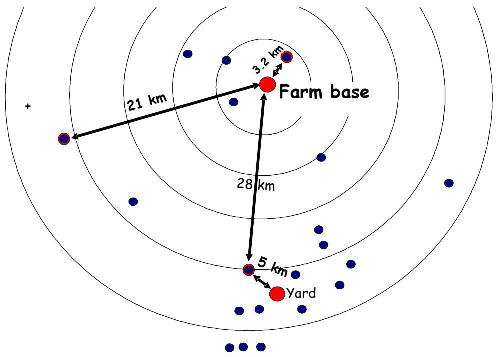
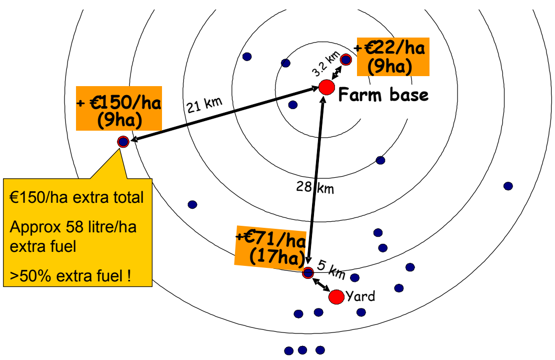
Land distance and costs



Land distance and costs

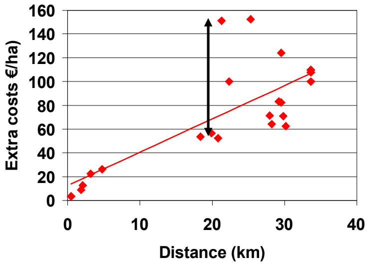


Land distance and Costs



Simple relationship?

- Distance only?
  - No!
  - 20km: €50 - €150
- Block size
- Machine capacity
- Travel speeds
- Next nearest block



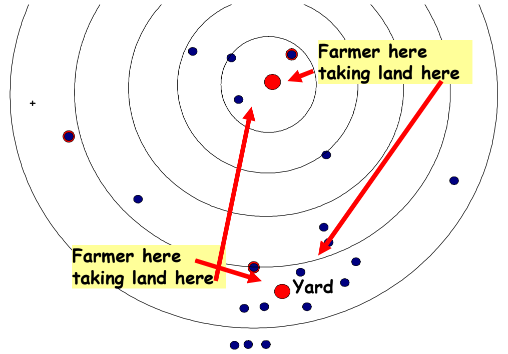
Overall results

- Extra costs – 22 blocks
  - €3.28 ➔ €151.28/ha range
  - €66.42/ha average
- €20,825/yr extra
- 407 hrs machine time on road
  - 1.3 hrs/ha

Implications

- Extra costs – no benefit
- Reduced competitiveness
- Wasted time – more capacity required
- Bigger capacity machines ➔ Gets worse!
- Eroding the effect of scale on machinery costs

Land distance and costs



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Solutions - 1

- **Be aware of costs and factors influencing them**
- **Value land:**
  - Based on location and block size
  - (In addition to soil type, fertility, cropping history, field size, drainage etc)
- **Other:**
  - Choose machines appropriately
    - Capacity, road speed – but limited effect
  - Location of water, fertiliser and machinery storage sites
  - Grain delivery site options

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Solutions - 2

- **Leading to:**
  - Less time/cost lost on road travel
  - Less fuel cost/reduced carbon footprint
  - Greater profit
  - Greater efficiency
  - Greater competitiveness
  - Less waste

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Conclusions

- **Machinery Costs are significant and challenging**
- **Farm level analysis essential**
  - e-Profit monitor good start
  - Machinery cost calculators and programmes
- **Beware of costing pitfalls**
- **Irish challenges**
  - Dispersed nature of land
- **Block size, distance and location important**
  - €3 /ha to €151 /ha difference
  - Can erode scale – less competitive
- **Cost awareness can lead to reduced costs**

Soil fertility management on tillage farms

Mark Plunkett, David Wall and Richie Hackett
Teagasc, Johnstown Castle and Oak Park

SUMMARY

The availability of an adequate supply of essential plant nutrients, especially nitrogen (N), phosphorus (P), potassium (K) and sulphur (S), at the right times is an essential component of high yielding crop production systems. The quantities of individual nutrients (in chemical and organic fertilisers) we apply each year must, at least, replace the nutrients removed by the crop at harvest time in order to maintain the soil fertility levels.

Soil pH has a large influence on soil nutrient availability and uptake. Aim to maintain soil pH at 6.5 for optimum crop production. Apply lime as recommended and according to the most sensitive crop in the rotation; for example barley (6.5) tends to be the most sensitive, while oats (6.0) tend to be tolerant to lower soil pH level. The soil P and K index indicates the soils ability to supply P and K during the growing season. To maximise crop yield potential aim to have soils at Index 3 for P and K. For soils which are at Index 4, the advice is to omit P applications for 2 to 3 years and retest to monitor changes in soil P levels, and to omit K applications for one year and revert to index 3 advice until the next soil test. Soils at index 1 and 2 have a very low to low P and K supply and it is recommended to build soil fertility levels over time to soil index 3. In order to build soil P and K levels an additional 10 kg P/ha and 15 kg K/ha will be needed until the next soil test is taken (i.e. 3 to 4 years). The rate of change in soil P and K levels will depend on the soil type. For example light to medium loamy soil types tend to change faster than medium to heavy clay loam soil types.

To maintain soil fertility at the optimum soil Index 3, aim to replace P and K removed at harvest in the grain and straw. The levels of P and K removal will depend on the crop type and crop yield. For example a 7.5t/ha spring barley crop will remove 28.5kg P/ha and 86 kg K/ha. The ***Phosphorus and Potassium calculator for Grassland and Tillage Crops*** is a tool that is available to calculate the crop P and K removals for your farm. This information can also be used in conjunction with soil test results and nutrient application records to make more informed fertiliser management decisions to better meet the shorter term crop yield targets and longer term soil fertility goals.

Within the last decade a number of changes to the mix of crops grown on Irish tillage farms have taken place primarily driven by new demands from evolving cereal grain and oilseed markets and the demise of the sugar beet industry. In many cases this has led to differences in the requirements for specific nutrients and a re-think in the way tillage farmers must fertilise the soil to meet the demands of these new crop rotations. This has been the experience on the Cork, Meath and Wexford BETTER farms where the crop rotations have been modified to maximise the yield potential of the different soils, to spread the workload more evenly over the year, and to suit the demands of the grain markets in each region.

On all 3 BETTER farms there was a good history of soil testing and an emphasis on building soil fertility levels. Fertiliser programmes were tailored to meet crop P and K demands depending on crop yield and soil type on these farms. Changes in crop rotations in recent years have resulted in changes in crop nutrient requirement; for example higher rates of compounds delivering higher P:K ratios have been selected to better deliver crop nutrient requirements.

A number of fertiliser trials have also been conducted as part of the BETTER farms programme. Early results (which require further testing) indicate that the method of P application can help to increase P use efficiency on low P-index soils. In 2012 combine drilling of P was a more efficient method compared to surface broadcasting for spring cereals. Phosphorus applied as a seed dressing or as a foliar P showed no significant response on low-P sites.

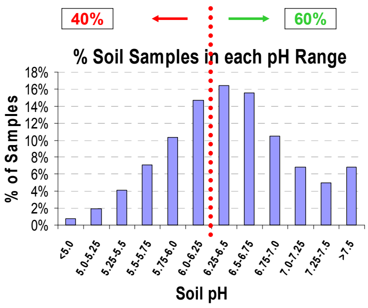
Soil fertility management on tillage farms

Mark Plunkett, David Wall and Richie Hackett
Teagasc CELUP
Johnstown Castle and Oak Park

Outline

- Soil Fertility On Irish Tillage Farms
  - National Soil pH trends
  - National P & K trends
- Soil Fertility Management on Tillage BETTER Farms
- Early results from P response trials in 2012
- Conclusions

Soil pH levels on Irish tillage farms



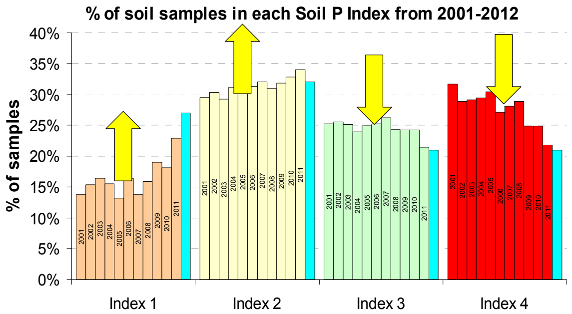
- Target pH 6.5
- 40% soils < pH 6.25
- Soil pH thresholds
  - pH 6.5 for Barley
  - pH 6.3 for Wheat
  - pH 6.0 for Oats
  - pH 6.5 for OSR
- Lime to crop rotation

Soil P & K index system

- Soil nutrient supply increases from Index 1 to 4
- Index 1 & 2 soils require additional nutrients to build soil fertility levels to target Index 3
- Aim to maintain soils at Index 3 for P & K
- Index 4 soils are a resource, so exploit them!

Soil Index	Soil Supply	Response to Fertiliser	Fertiliser Programme	Cost P & K for Sp. Barley 7.5t/ha
1	Very low	Definite	Crop Offtake +Build Up	€220
2	Low	Likely	Crop Offtake +Build Up	€185
3	Medium	Unlikely	Crop Offtake	€150
4	High	None	No Application	€0

Soil P trends on Irish tillage farms



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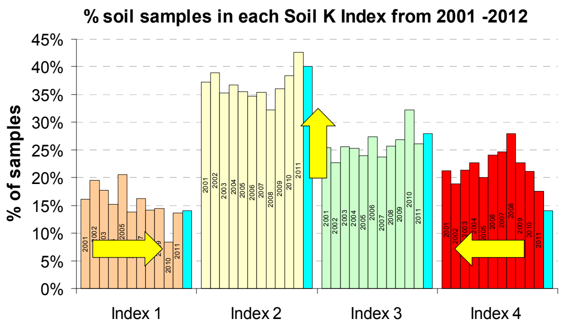
Soil K trends on Irish tillage farms



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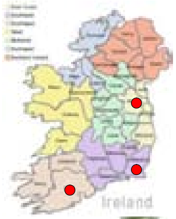
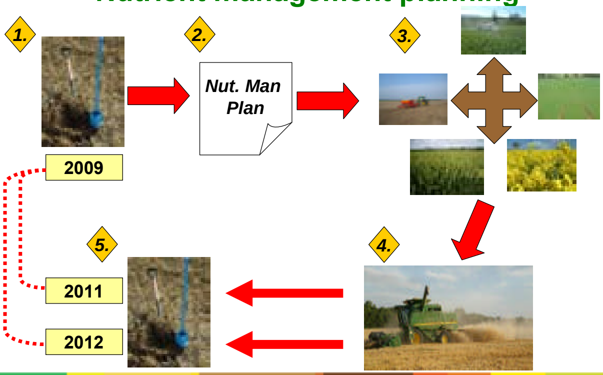
Teagasc tillage BETTER farms

- Intensively managed tillage farms
- Started in 2009
- Integration of research & extension
- Aims to increase the adoption of new technologies & best management practices on farms
- Platform for on-farm demonstrations & open day events



Nutrient management planning



Cork BETTER farm

- **Crop management**
  - Move towards larger blocks of continuous cereals
  - Producing high yields year on year
- **Fertiliser programme**
  - 370 kg/ha 10-10-20
  - Use pig slurry where possible
- **Case study: Winter Barley**
  - Soil fertility : Low to medium P & K
  - Soil type: Free draining sandy loam
  - Rotation: Continuous W. Barley

Winter barley - P balance

Year	2009	2010	2011	2012
Av. W. Barley yield (t/ha)	10	10	9.65	8.9
P Applied (kg/ha)	37	37	37	37
P Removed (kg/ha)	38	38	36.7	33.8
Field Balance (kg/ha	- 1	- 1	+ 0.3	+ 3.2
Av. Soil Test P Change			-1.9 mg/L	-0.9 mg/L

Winter barley - K balance

Year	2009	2010	2011	2012
Av. W. Barley yield (t/ha)	10	10	9.65	8.9
K Applied (kg/ha)	74	74	74	137
K Removed (kg/ha)	102	98	95	87
Field Balance (kg/ha)	- 28	- 24	- 21	+ 50
Av. Soil Test K Change			- 31 mg/L	- 2.4 mg/L

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Key messages from Cork farm

- Sample '***Reference Area***' to monitor soil P & K trends
- Balance crop P & K applications to match
  - Crop yield
  - Soil type
- Lower yields in 2012 resulted in soil P recovery on this soil type
- Additional K required with 10-10-20 for high yielding crops
  - Increase rate of application
  - 50% K applied once every 3 years
  - Other fertiliser compounds need to be considered (N:P:K ratios)

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Wexford BETTER farm

- **Crop management**
  - Select crops to suit soil type
  - Recent move to winter cropping / Spread work load
- **Fertiliser strategy**
  - Apply P & K in single application
  - Increase in the K ratio of new fertilisers used
- **Case study: Crop rotation**
  - Soil fertility : very low soil P & medium soil K
  - Soil type: heavy moderately drained soils
  - Rotation: WW, WO, WW, WB, OSR

Average P balance for crop rotation

Year	2009	2010	2011	2012
Av. Crop yield (t/ha)	6.9	8.0	9.6	7.7
P Applied (kg/ha)	32	38	39	37
P Removed (kg/ha)	26	30	37	28
Field Balance (kg/ha)	+ 6	+ 8	+ 2	+ 9
Av. Soil Test P Change			+0.03 mg/L	+0.4 mg/L

Average K balance for crop rotation

Year	2009	2010	2011	2012
Av. Crop yield (t/ha)	6.9	8.0	9.6	7.7
K Applied (kg/ha)	72	86	85	99
K Removed (kg/ha)	83	80	104	78
Field Balance (kg/ha)	- 11	+ 6	- 19	+ 21
Av. Soil Test K Change			- 5 mg/L	- 0.04 mg/L

Key messages from Wexford farm

- Tailor your fertiliser programme to your suit soil type
  - Heavy clay soils
  - Large capacity to supply P & K
  - P & K changes very slowly
- Match P & K applications to crop rotation
  - Winter cereals higher P & K removals than spring cereals
- Select suitable fertiliser types
  - Higher K fertilisers
    P:K ratio from 1:2 (N:P:K 18-6-12) to 1:2.6 / 1:3.3 (11:9:22 or 13:6:20)
  - Higher fertiliser application rates may be required
    ≥ 400 kg/ha
  - *Buy what you need not what you are being sold!*

Key messages from the Meath farm

- Soils & Crops
  - Match crops to soil types & soil fertility levels
  - Work soils when the moisture levels are appropriate
  - Good crop establishment is essential
- Building soil fertility
  - Building soil fertility takes long time periods (≥5 years)
  - Longer land leases give more opportunity to improve soil fertility
- Replenish soil nutrient levels if shortfalls occur
  - Historic use of high K fertilisers sustained soil K levels in years when fertiliser prices were high and less K was applied
  - Fields with low soil P levels received fertilisers with higher P ratio while maintaining high K levels e.g. 10-7-21 or 10-8-21

Fertility management on tillage farms

- Soil test regularly to know soil fertility levels
- Fertilise to meet crop P & K demand
- Monitor soil fertility & calculate crop nutrient balance
- Adjust fertiliser strategy to reach short term yield targets & long-term soil fertility goals

Early results from P response trials

- P Trials in Spring barley
- Two soil types
  - Well drained loam
  - Moderately drained heavy loam
- P Application Methods
  - Combine drilled P (CD)
  - Surface broad cast & ring rolled in (SB)

Effect of P on Rooting & Tillering

Soil Index1 – Well drained loam soil

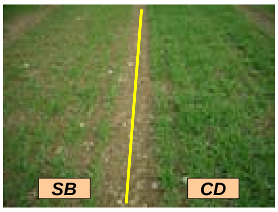
P response trials in S. barley 2012

Effects of P on early growth stages

Moderately drained Clay Loam

0 kg P/ha v 30kg P/ha

Well drained Loam

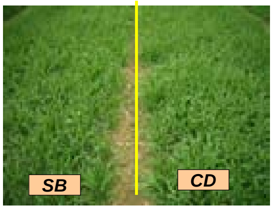


20 kg P/ha v 30kg P/ha

P response trials in S. barley 2012

Effect of P fertiliser on later growth stages

Moderately drained Clay Loam



30 kg P/ha v 30kg P/ha

Well drained Loam

50 kg P/ha v 45kg P/ha

Conclusions from P trials in 2012

- Early results indicate that combine drilled P is a more efficient application method than surface broadcast on low P Index soils
- As expected, there was no response to additional P on high soil P sites (Index 4)
- There was no significant response to either seed P / foliar P on a range of low soil P sites (Index 1 & 2)
- Further research is been conducted on multiple soil types & years to further validate there early results

BETTER farm crops programme

We would like to acknowledge the farmers and advisors involved in the Tillage BETTER Farms programme

Thank you for your attention

Teagasc The Irish Agriculture and Food Development Authority

Assessing the impact of a GM blight resistant potato

Ewen Mullins
Teagasc, Oak Park

SUMMARY

In 2012, Teagasc received a license from the EPA to complete an environmental study on a potato variety (Desiree) that had been genetically modified with a resistance gene to late blight disease. Teagasc is completing the study as a member of the 22 partner 'AMIGA' consortium (www.amigaproject.eu), which is tasked with Assessing and Monitoring the Impacts of GM crops on Agro-ecosytems and is funded through the EU's 7th Research Framework Programme.

Teagasc are not advocates of GM crops and there is no industry involvement in this project, which is focussed on:

- Improving our knowledge on the environmental effects of specific GM crops with relevance to European agri-systems
- Developing EU-wide protocols that can normalise the evaluation of a GM crop across multiple regions and/or countries
- Estimating the compatibility of specific GM crops with Integrated Pest Management (IPM) principles

To achieve these work objectives, Teagasc are using a GM potato variety (A15-031) equipped with a single gene taken from a wild potato species (*Solanum venturii*). Generated at the University of Wageningen (www.durph.nl/uk), A15-031 has consistently demonstrated durable resistance to blight disease.

By completing field studies at Oak Park through to 2016, Teagasc will assess the impact of this GM variety on soil biodiversity (e.g. bacteria, nematodes and plant beneficial fungi); monitor the response of the blight organism itself; gauge the response of the blight resistance gene under Irish conditions in the presence/absence of a standard IPM strategy used in both the Netherlands and Ireland.

We have all witnessed the intractable debate between the anti- and pro- sides of the GM debate. As a consequence, we have been repeatedly asked by the public to generate objective information that is open to all. Therefore, in parallel to the project, Teagasc are committed to releasing all data from the project and disseminating transparent, impartial, research derived information to Irish farmers and the public at large.

Assessing the impact of a GM blight resistant potato

Ewen Mullins

Teagasc CELUP

Oak Park Crops Research

amiga

Assessing and Monitoring the Impact of GM crops on Agro-ecosystems ('AMIGA')

- EU funded project
- 22 partners, 15 countries, 11 work packages
- 2011 - 2015
- Goal?
  - Improve knowledge on specific GM crops relevant to EU
  - Develop protocols to normalise GM crop evaluation across EU regions and countries
  - Estimate the compatibility of specific GM crops with Integrated Pest Management (IPM) principles

What is the role of Teagasc in AMIGA ?

- Involved with 3 work packages
  - Impact of GM crop on soil biodiversity
  - Investigate role of IPM for specific GM varieties
  - Communication, dissemination and education
    - Encourage public debate on GM issues with Irish-specific facts
- Research tool?

Late blight

- 1983 – 2007, blight epidemic in all but 4 years
- Commercial sprays required 7-10 days (~15 sprays/crop)
- Novel strains now exist
- Increased aggressiveness
- Displaced native blight strains

Phytophthora infestans
'late blight disease'

GM potato with late blight resistance

- A15-031, var. Desiree
- Contains single gene (vnt1.1) from wild potato species
- Developed by AMIGA partners as part of the 'DurPh' project
- Successive field studies in the NL
- A15-031 shows durable resistance to blight
- Resistant to blight strain 13_A2

What have we done ?

What have we done ?

GM potato line (A15-031)

Non-GM potato (Desiree)

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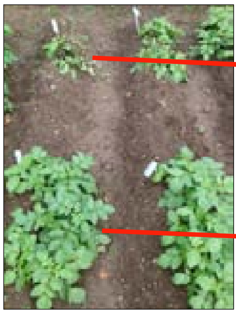
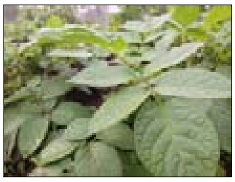
What have we done ?



Non-GM



GM

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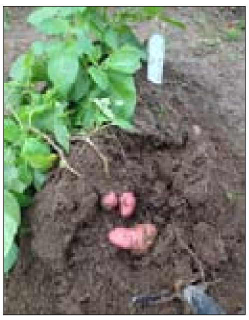
What have we done ?



Tuber production by GM variety (A15-031)

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What happens for 2013 ?

- GM potato vs non-GM potato field study
- Identical study planned for the Netherlands
- Goal is to utilise identical sampling procedures to normalise EIA protocols
- Soil sampling around site at multiple time points
- Quantify impact of growing GM potato on soil microbes
- Weekly monitoring of blight levels to determine how blight 'responds' to novel source of resistance

To conclude…

- Continue dissemination with open day and media
- Not about advocating the GM industry
- Not about proving that GM is the sole answer
- Hypothesis driven (negative, positive, null impact)
- Transparent research-based knowledge for tillage sector and public at large
- Advocating public discussion

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Cereal yields in 2012 – what went wrong?

John Spink and Shane Kennedy
Teagasc, Oak Park

SUMMARY

Cereal yields in 2012 were significantly reduced compared to the 2011 season. The 2012 cropping season was characterised by a warm winter followed by a very wet and dull summer. But what was it about the season that actually caused the low yields?

There were some instances of high levels of BYDV infection and reports of poor insecticidal control of aphids. But the characteristic yellowing and stunting of plants which would be seen in the spring and summer were not common, and it seems unlikely that widespread BYDV was the cause of the national yield reduction.

High levels of take-all infection could be found in 'at risk' crops in late winter but the wet summer reduced the impact on yield and commercially many second or subsequent cereal crops yielded well.

The 2012 season provided ideal conditions for high levels of Septoria but monitoring showed that there was no significant increase in triazole insensitivity between the 2011 and 2012 seasons. Field experiments showed that even with high disease pressure, sequences and mixtures of the different fungicide groups correctly timed provided high levels of disease control. Therefore widespread yield loss due to Septoria should not have been an issue unless spray timings were not achieved or incorrect active ingredients or doses were selected.

There were very high levels of ear blight infection in 2012, which is difficult to control as fungicide sprays need to be timed exactly as the crop is flowering, and even the best fungicides will only give about 50% control. In Teagasc field experiments in 2012 the best ear fungicides resulted in a 0.75 t/ha yield improvement over ear sprays that would not have been expected to give much control of ear blight, yield loss due to ear blight could have been in the order of 1.5 t/ha where sprays were not correctly timed, which was very difficult to achieve in the wet conditions around flowering.

Very wet soil conditions and frequently water logging were a common feature in the summer of 2012. In some crops there were obvious losses due to water logging, particularly in spring barley, with areas of crop lost completely in wetter areas of fields. However, there are likely to be much more widespread losses where sub-clinical impacts on crop growth occurred. It is likely therefore that water logging was responsible for a significant proportion of the national yield loss, and this seems to be borne out by reports of crops on heavier soils being much poorer than on lighter free draining soils.

Monitoring of crop growth and development in 2012 showed that grain filling started on average 10 days later than in 2011, was 2 to 6 days shorter and incident radiation during the grain filling period was 13-22% lower than in 2011. This represents a significant reduction in source availability for grain filling, and its significance is supported in that wheat which is a source limited crop suffered greater yield reductions than barley which in Irish conditions is usually a sink limited crop. This is likely to be the major cause of yield loss.

Whilst the 2012 season shows that crop production will always be at the mercy of the weather, our weather is less extreme than in some grain producing regions of the world where in bad seasons almost complete crop loss can occur. It also demonstrates that with careful crop management at least some of the vagaries of the weather can be reduced.

Cereal yields in 2012 - what went wrong?

John Spink and Shane Kennedy
Teagasc CELUP
Oak Park Crops Research

Cereal yields 2011 vs 2012

	2011	2012	% reduction
W. Wheat	10.2	7.2	29%
S. Wheat	8.3	6.0	28%
W. Barley	9.1	7.7	15%
S. Barley	7.5	6.1	19%
W. Oats	7.8	6.8	13%
S. Oats	7.9	6.2	22%
Mean	8.5	6.7	21%

Cereal yields 2011 vs 2012

- Yields lowest on ‘source’ limited crops
- Winter barley faired best having set large ear numbers over autumn/winter
- ‘Good’ wheat crops performed worse than ‘thin’ crops

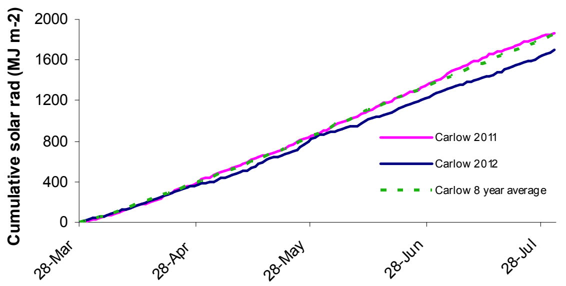
Causes of yield reduction?

- BYDV and Take-all
  - Very warm wet winter
  - Occasional high levels of BYDV and poor aphid control
  - High levels of primary take-all infection
    - plants dying in January
    - Some second/third wheats down to 2.5 t/ha
  - But generally impacts on yield small

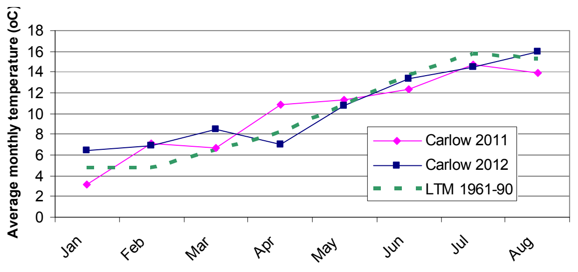
Causes of yield reduction?

- BYDV and Take-all
- Poor grain filling conditions
  - Grain filling started 10 days later than 2011
  - Grain filling shorter by 2 to 6 days
  - 13-22% reduction in radiation during grain fill

Solar radiation in 2012 - below 2011 & below average



Cold April and warmer grain filling



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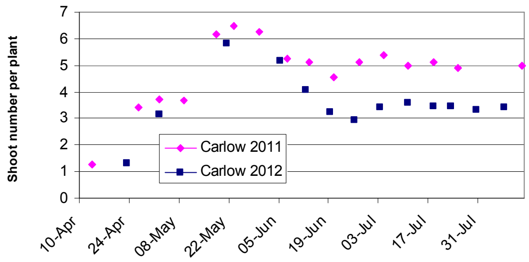
Spring Barley
Shoot production and death



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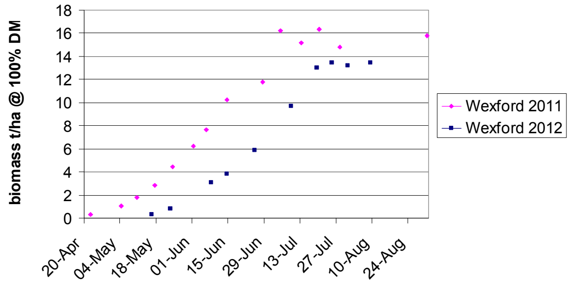
Spring Barley
Delayed and reduced crop growth



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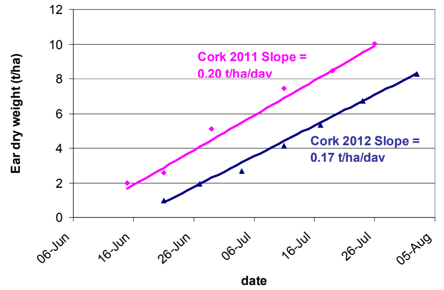
Spring Barley
Ear growth 2012 - later and slower than 2011



** Data from replicated field trials at Fermoy, Co. Cork in 2011 and 2012*

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Spring Barley
Monitor crops performance

	Yield (t/ha @ 15% moisture)	Grain Number (m^{-2})	Grain Weight (mg @ 15% moisture)
2011	10.3	20624	50.4
2012	7.5	17085	45.0
% reduction	28%	17%	11%

** Data are means from replicated field trials at Carlow, Wexford and Cork in 2011 and 2012*

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Causes of yield reduction?

- BYDV and Take-all
- Poor grain filling conditions
- Water logging
  - Anecdotally yields worst on heavy poorly structured ground
  - Complete crop loss in wet areas
  - Sub-clinical effects elsewhere?

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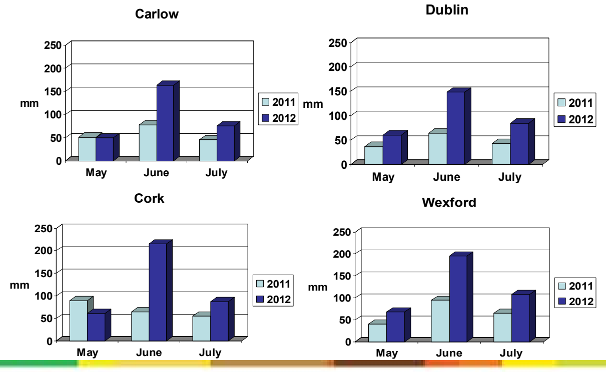
Water logging effects

- Long term effects after 3 days of water logging
- Root death
- Reduced photosynthesis – down 80%
- Fewer grains per ear
- Smaller grains
- Yield reductions of 37-45%

Summer rainfall 2011 & 2012



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Winter wheat yield - regional variation

	Min	Max	Average
Carlow	6.25	10	7.5
Cork E	5	10	6.4
Cork W	3.7	10.5	6.5
Donegal	6.4	10.13	8.19
Dublin	5	12	8
Kildare	5	10	7.5
Kilkenny	4.2	9.6	7.1
Laois	6.25	10	7.5
Louth	5	8.65	7
Meath	5	10.7	7.1
Offaly	5	9.2	7
Tipperary N	5.75	10	7.8
Tipperary S	3.75	9.5	6.5
Waterford	5	10	6.4
Westmeath	5	9	6.7
Wexford N	5.4	9.8	7.2
Wexford S	3.7	10.5	7.2
Wexford W	3.7	10.5	7.2
Wicklow	6	11	7.8

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Generally poorest yields in the south

	Min	Max	Average
Carlow	6.25	10	7.5
Cork E	5	10	6.4
Cork W	3.7	10.5	6.5
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Dublin	5	12	8
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Kilkenny	4.2	9.6	7.1
Laois	6.25	10	7.5
Louth	5	8.65	7
Meath	5	10.7	7.1
Offaly	5	9.2	7
Tipperary N	5.75	10	7.8
Tipperary S	3.75	9.5	6.5
Waterford	5	10	6.4
Westmeath	5	9	6.7
Wexford N	5.4	9.8	7.2
Wexford S	3.7	10.5	7.2
Wexford W	3.7	10.5	7.2
Wicklow	6	11	7.8

Causes of yield reduction?

- BYDV and Take-all
- Poor grain filling conditions
- Water logging
- Fusarium
  - Yield improvements of 0.75 t/ha to good (fusarium active) T3s
  - Yield loss total 1.5 t/ha?

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Causes of yield reduction?

- BYDV and Take-all
- Poor grain filling conditions
- Water logging
- Fusarium
- Poor septoria control

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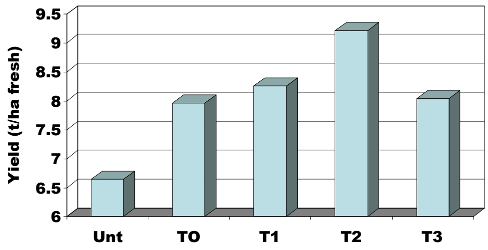
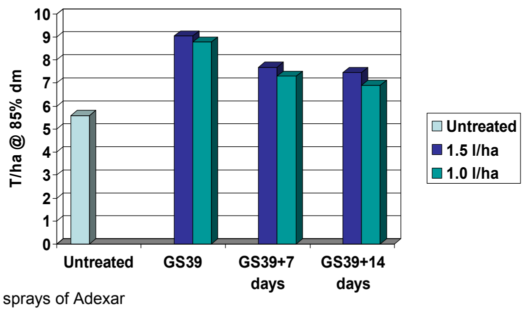
Yield effect of spray timings



Single sprays of 1.6 l/ha Adexar + 1.0 l/ha Bravo

Importance of timing and rate for yield



Single sprays of Adexar

Conclusions

- Poor yields largely down to high rainfall and warm dull grain filling conditions
- Ear Blight likely to have reduced yields somewhat even where sprays were well chosen and timed
- Poor foliar disease control may have further reduced yields in some cases

Thank you for listening
and
wishing you a successful 2013

Teagasc

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Fungicide sensitivity and disease control

Steven Kildea
Teagasc, Oak Park

SUMMARY

Following a dry and warm start, 2012 will be remembered for its wet summer. It is these conditions that resulted in the high levels of foliar and ear diseases observed around the country. These were most severe on winter wheat, with Septoria and Fusarium head blight (predominantly caused by *Microdochium* spp.) causing most of the damage. The weather conditions led to advanced crops at the beginning of the season followed by slow crop growth between spray times and poor spraying conditions at those timings. This resulted in some spray programmes starting too early and long gaps between sprays, which together resulted in sprays not being correctly timed to protect the key yield forming leaves (leaves 1, 2 and 3) and the ear resulting in poor disease control. While ear diseases were also a problem on spring barley crops, foliar diseases such as net blotch and Rhynchosporium were well controlled.

The sensitivity of *Septoria tritici* to the triazole fungicides epoxiconazole and tebuconazole and the SDHI fungicide izopyrazam was tested in populations collected from 25 winter wheat crops. All of the isolates collected proved to be sensitive to the SDHI fungicides. The frequency of strains with reduced sensitivity to prothioconazole and epoxiconazole fungicides continue to increase. But strains with resistance to epoxiconazole and prothioconazole and cross resistance to metconazole and tebuconazole make up a minority of the population so Gleam and Prosaro should still be reasonably effective. Whilst most crops have some strains with reduced sensitivity to the triazoles, their frequency varies from crop to crop. Crops in the north-east of the country showed the highest levels and those in the south-west showed the lowest frequencies.

The performance of products containing a single triazole has declined, both as protectants and eradicants. The newer SDHI/triazole mixed fungicides gave levels of disease control similar to or better than the triazole mixture Gleam (metconazole and epoxiconazole). A dose response for the SDHI mixes was evident both in disease control and yields.

There is significant risk of resistance developing to the SDHI's in a similar way to the resistance which developed to the stobilurines. Given the declining performance of the triazoles, the inclusion of a multi-site fungicide such as chlorothalonil or folpet in any spray is necessary to reduce the risk of resistance development.

Fungicide Sensitivity and Disease Control

Steven Kildea
Teagasc CELUP
Oak Park Crops Research

Outline

- 2012: An overview of disease control
- Wheat & Barley
  - Sensitivity issues
  - Disease control
- Fusarium

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2012: Poor disease control

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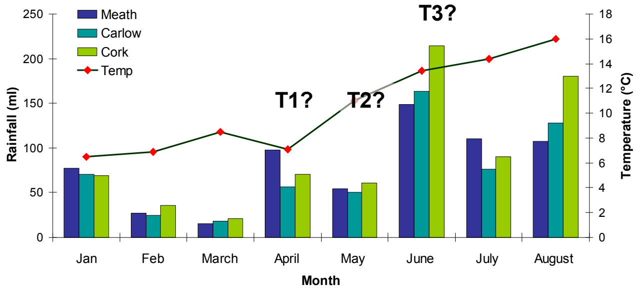
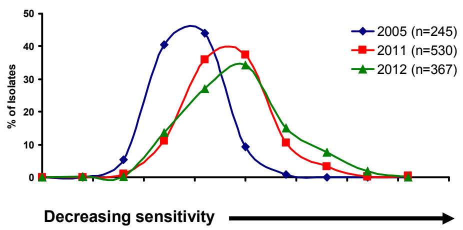
Wet at the crucial times



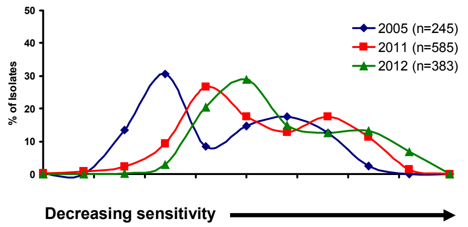
Pathogen sampling

- Monitoring since 2002
- 25 commercial crops (blue)
- Septoria on wheat
- Sensitivity to triazoles (Opus & Folicur)
- Sensitivity to SDHIs (IZM)
- Fusarium Head Blight (Wheat & Barley)

Continued slide in Opus sensitivity



Further decrease in Folicur sensitivity



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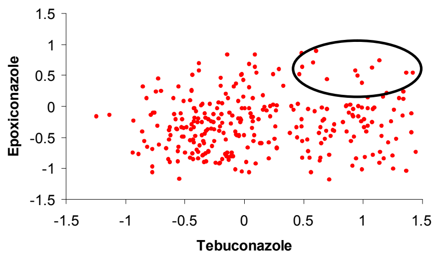
Limited cross-resistance between triazoles



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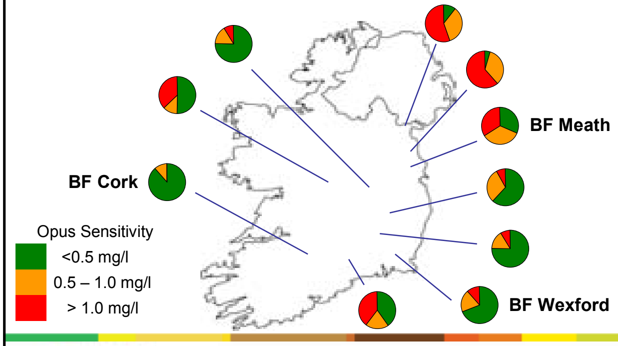
Sensitivity varies between crops



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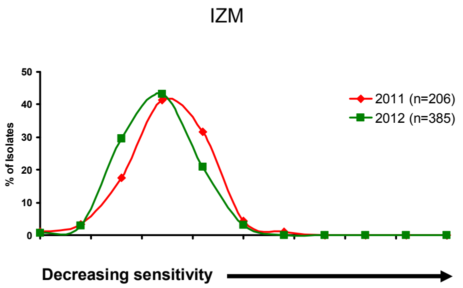
No resistance to SDHIs detected



Product performance-2012 (*Septoria*)

- Trials at Oak Park (Cordiale) under high disease pressure
- Disease control from ¼ - 2x recommended rate
  - Applied T2 (1st June)
  - Straight triazoles, triazole mix & SDHI/triazole
  - Assessed 3rd July (leaves 1-2)

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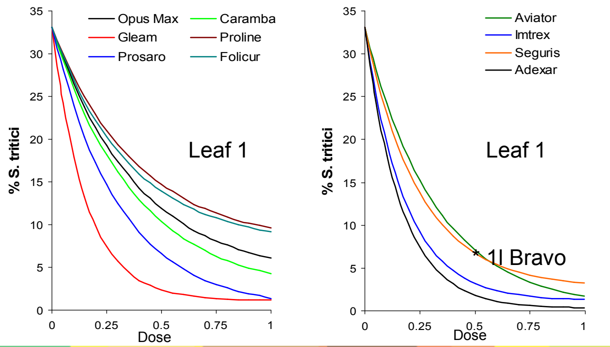
Strength of SDHI mixes as protectants..



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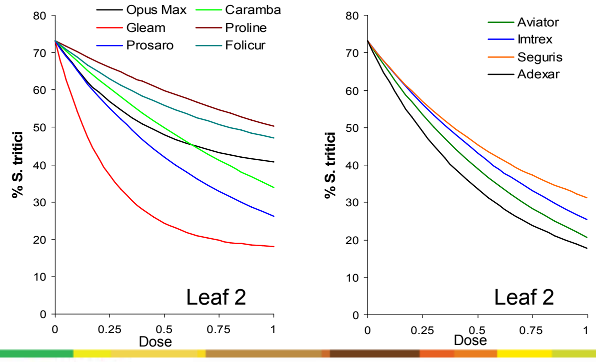
…but more notably as eradicants



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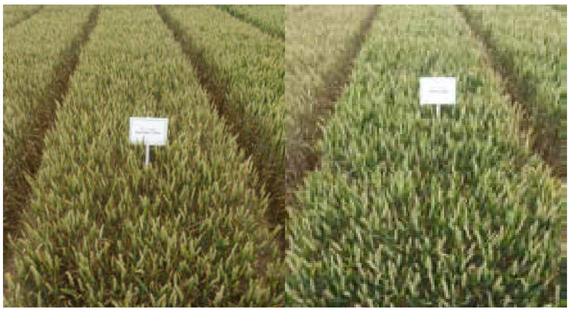
Clear visual differences



Opus Max 1.5 l/ha Adexar 2.0 l/ha

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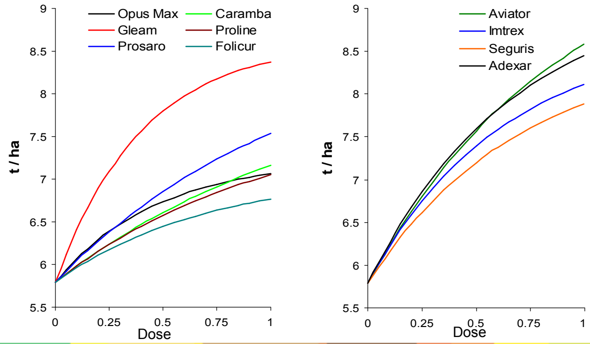
SDHI mixes providing over 1.0 t /ha over solo triazoles



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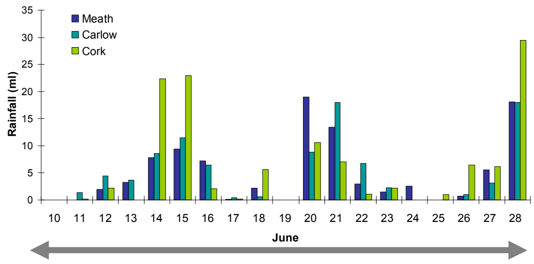
Limited foliar disease control issues in Barley

GS 31/32: Untreated
GS 39: Untreated

GS 31/32: Bontima 0.8 l/ha
GS 39: Fandango 1.0 l/ha
+ Bravo 1.0 l/ha

Saffron, Oak Park 21.06.2012

2012: Ideal conditions for Head Blight



Prolonged flowering period with almost constant wetness

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Predominantly *Microdochium* spp

Untreated Oakley, Oak Park 10th July

- High levels of FHB in wheat crops
- Sporadic in spring barley
- Non-toxin producing *Microdochium* spp.
- High levels of leaf infection also observed

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Essential to protect against resistance

- Continued slide in triazole sensitivity
- Widespread problem
- SDHI mixes are now essential components of wheat & barley programmes
- We need to protect them from resistance
- Multisite fungicide essential with SDHI mix!

Fungicide performance 2012 and recommendations for 2013

Liz Glynn and Jim Grace
Teagasc, Oak Park

SUMMARY

Each year, timing of application, product choice and rate of fungicide are key to achieving the maximum response. This was particularly evident in 2012 with high disease pressure. The T2 timing in winter wheat was the most responsive, giving up to and over 2t/ha. This was evident on the three Teagasc Tillage BETTER farms in Cork, Wexford and Meath, where programmes trials were carried out. The inclusion of a triazole at T0, either solo or in a mix, did not significantly add to yield compared to Bravo applied at 1.0 l/ha. There was no significant difference in yield between a triazole and an SDHI at T1 and all the SDHI's performed equally well at T2, with no statistically significant difference between products. The levels of ear blight evident on crops this year meant that product choice at T3 was important, with prothioconazole containing fungicides performing well due to the high levels of *Microdochium* spp., against which it is the most active ingredient.

Work has been carried out over the last number of years looking at the effect of the inclusion of Bravo to both Opus Max and Aviator Xpro at full rates, on both susceptible and resistant varieties. The results were very positive with Bravo adding to yield in all cases, contributing up to 1.0 t/ha on resistant varieties like Lion and 1.3t/ha on susceptible varieties, such as Einstein.

Fungicide timing trials on spring barley showed tillering (<GS30) and flag leaf/booting (GS39-45) applications to be the most responsive in 2012. The addition of a third spray at stem extension or ear emergence did not add any benefit, to either disease control or yield. The levels of leaf fusarium on spring barley were quite high in 2012, the use of an SDHI at T2 helped in reducing these levels and encouraging green leaf retention. Bontima gave the best greening effects, however Siltra xpro gave a significantly higher yield response.

For winter wheat the use of chlorothalonil at T0 is sufficient to protect yield and reduce selection for insensitive Septoria isolates, on both susceptible varieties and earlier sown crops, but is unlikely to be needed on later sown crops or resistant varieties. Chlorothalonil is essential as a mix partner at both T1 and T2 applications for yield and as part of an anti-resistance strategy. The choice of fungicide at T1 will depend on disease pressure, with a high rate SDHI plus a triazole needed if pressure is high. If septoria levels are moderate a full rate triazole at T1 will suffice. At T3 the diseases present, and their levels will dictate what product to use, with Gleam a good option if septoria is the main target and Prosaro if the risk of ear blight is high.

For spring barley, it's important to protect the crop early in the season, at tillering, as losses after this stage are hard to recover from. Fungicide applications should be limited to two timings, as there was no positive response shown from extra applications in 2012 trials. An equivalent amount should be spent at each timing.

Fungicide performance in 2012 and recommendations for 2013

Liz Glynn and Jim Grace
Teagasc CELUP
Oak Park Crop Research

Winter wheat

- **Importance of timings**
- **Product choice and mixes**
- **2013 recommendations**

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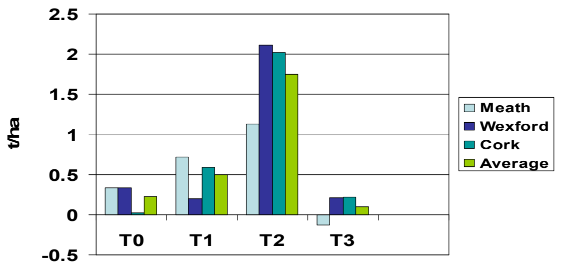
Response to individual spray timings



T0	T1	T2	T3
Bravo	Proline + Bravo	Adexar + Bravo	Gleam
1.0	0.8 + 1.0	1.6 + 1.0	2.0

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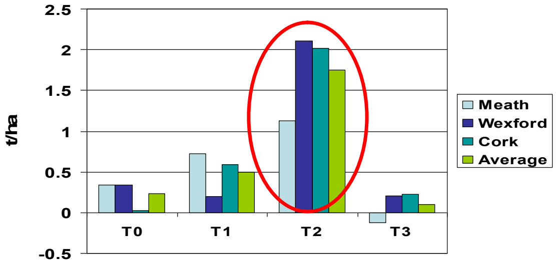
T2 response dwarfs all others



T0	T1	T2	T3
Bravo	Proline + Bravo	Adexar + Bravo	Gleam
1.0	0.8 + 1.0	1.6 + 1.0	2.0

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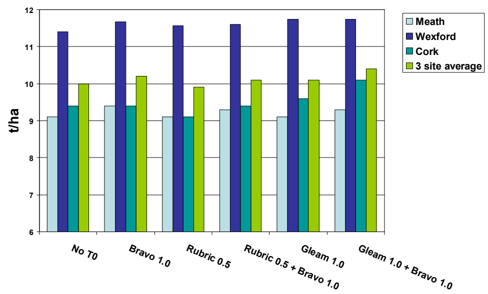
T0: no significant improvement over straight Bravo



T0	T1	T2	T3
	Proline + Bravo	Adexar + Bravo	Gleam
	0.8 + 1.0	1.6 + 1.0	2.0

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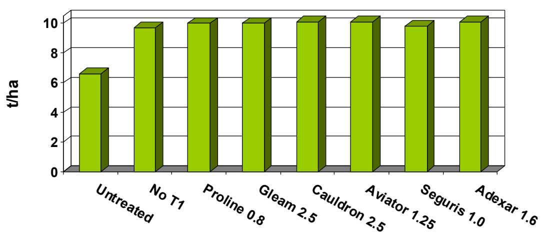
No significant difference between products at T1



T0	T1	T2	T3
Untreated	Bravo +	Adexar + Bravo	Gleam
	1.0 +	1.6 + 1.0	2.0

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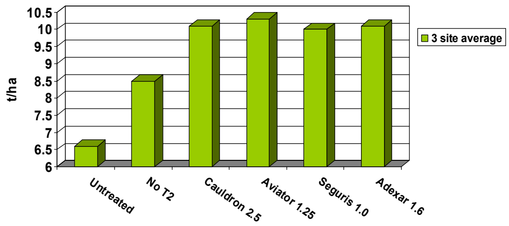
No significant differences between SDHI's at T2



T0	T1	T2	T3
Untreated	Adexar + Bravo 1.6 + 1.0	Adexar + Bravo 1.6 + 1.0	Gleam 2.0

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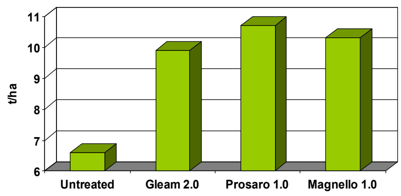
At T3 there was a big response to *Microdochium* control



T0	T1	T2	T3
Bravo 1.0	Proline + Bravo 0.8 + 1.0	Adexar + Bravo 1.6 + 1.0	

2 site average (Meath & Wexford)

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The addition of Bravo

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Aviator Xpro

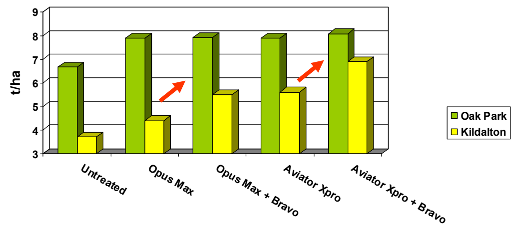
@ 1.25l/ha at T1 and T2

Aviator Xpro + Bravo

@ 1.25l/ha + 1.0l/ha at T1 and T2

Kildalton Cv. Einstein

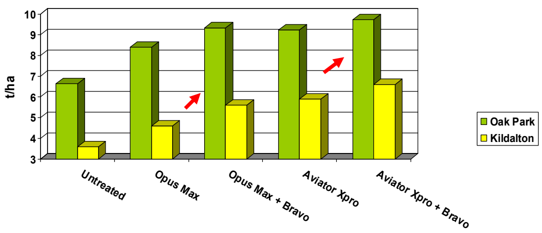
Bravo improved both disease control and yield



2 full rates of either Opus Max or Aviator applied at T1 and T2 +/- Bravo

Cv. Einstein

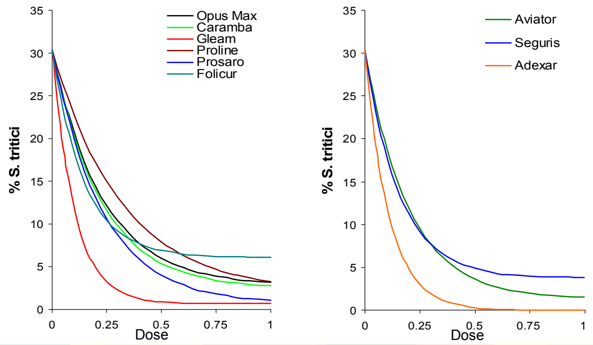
Even on more resistant varieties



2 full rates of either Opus Max or Aviator applied at T1 and T2 +/- Bravo

Cv. Lion

Three year protectant performance



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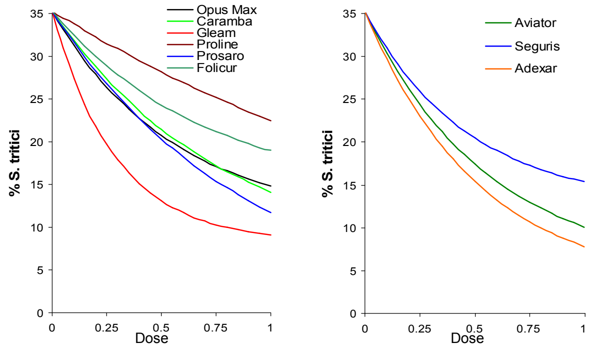
Three year eradicant performance



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Recommendations for: Early drilled/susceptible varieties

T0	Chlorothalonil (Ctl) @ 1.0l/ha
T1	Full rate Triazole + Ctl 1.0l/ha **Or** SDHI + Triazole + Ctl 1.0l/ha
T2	80-100% SDHI + Triazole + Ctl 1.0l/ha
T3	Prosaro (ear blight & Septoria) Gleam or Caramba (Septoria)

A multi site product should always be included at T1 and T2

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Recommendations for:
Late drilled/resistant varieties

T0	None needed
T1	Full rate Triazole + Ctl 1.0l/ha
T2	80-100% SDHI + Triazole + Ctl 1.0l/ha
T3	Prosaro (ear blight & Septoria) Gleam or Caramba (Septoria)

A multi site product should always be included at T1 and T2

Spring barley

- **Importance of timings**
- **Product comparison at T2 timing**
- **Guidelines for 2013**

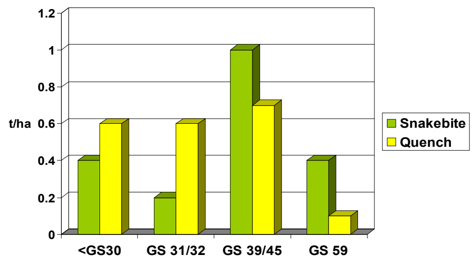
Spring barley timing trials

Trt No	<GS30	GS 31/32	GS 39/45	GS 59
1	+	+	+	+
2	+	+	+	-
3	+	+	-	+
4	+	+	-	-
5	+	-	+	+
6	+	-	+	-
7	+	-	-	+
8	+	-	-	-
9	-	+	+	+
10	-	+	+	-
11	-	+	-	+
12	-	+	-	-
13	-	-	+	+
14	-	-	+	-
15	-	-	-	+
16	-	-	-	-

+ Sprayed with Siltra @ 1.0l/ha

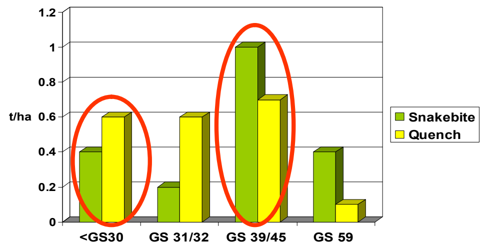
- Unsprayed

Yield response at different timings



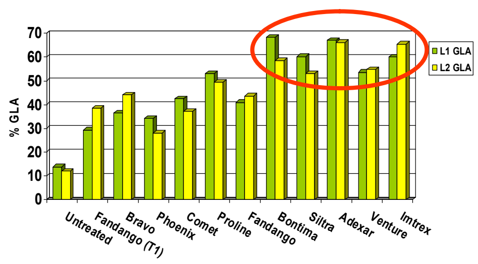
There was no significant yield improvement by using more than 2 sprays

Tillering and booting proved to be the key spray timings



There was no significant yield improvement by using more than 2 sprays

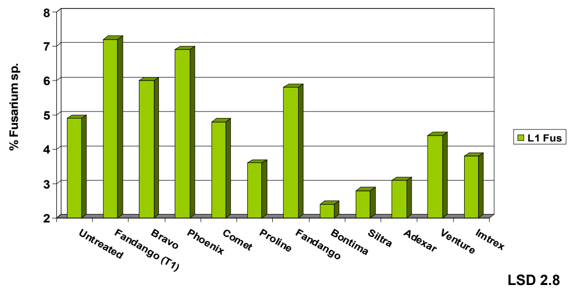
SDHI's gave very good green leaf retention



Leaf 1 LSD 16.8

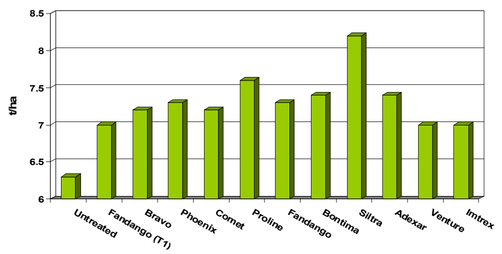
Leaf 2 LSD 16.7

….and excellent leaf fusarium control



LSD 2.8

Siltra gave the highest yield performance



LSD 0.323

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Spring barley guidelines for 2013

- Early disease control is important
- No benefit from more than 2 sprays
- Similar spend at each timing

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Thank you for listening
Best wishes for the coming season
Teagasc
The Irish Agriculture and Food Development Authority

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National Development Plan 2007 - 2013

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