Aberdeenshire Arable Monitor Farm

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Aberdeenshire

Report from Knockothie Meeting – 6th June 2012

Date of next meeting: Thurs 12th July, 2012, 2pm.

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The Aberdeenshire Arable Monitor Farm Programme is an HGCA project supported by the Scottish Government SRDP Skills Development Scheme.

Meeting Programme:

- Welcome from Chairman
- Introduction to Knockothie Farms
- Agronomy & precision farming
- Machinery
- Visit to Broomfield Farm
- Group breakout session

1. Welcome

Chairman, Peter Chapman, welcomed everyone to the meeting. The idea behind the meeting was to extend the project by visiting other progressive arable farmers in the region to see what their up to, taking any learning back to Savock Farms. The visit encouraged a good turnout with 68 members present.

2. Introduction to Knockothie Farms

The farm is a 2,400 acre mainly arable unit. For a full list of the crops, varieties, stock, locations and areas see Appendix 1.
The Davidson family came to Knockothie in 1926. The farm was a dairy retailing milk in Ellon and the business remained in dairy until 2004 when poor milk returns led to a major switch to arable. The large sheds were put to finishing around 20,000 pigs annually for Grampian Country, producing lots of dung to sustain the arable cropping. In the meantime Fetterletter farm, Fyvie was purchased adding 600 acres. Stuarts brother-in-law, Craig Hamilton, joined the business and manages the 160 sucklers at Fyvie. The Vion/GCP pig finishing was now providing little margin and given their scale they were classed as an IPCC with the extra compliance costing around £4,000 per year. Therefore the pigs were dropped. To add another arm to the business, planning approval has just been obtained for a Playbarn and Café.

The farm is spread over 12 miles with workshop and input storage at Cassiegill, Ellon, the grain store and drying at Broomfield, Ellon and the cows at Fetterletter, Fyvie.

The long term goal for the arable operation is to; reduce cultivations on these difficult soils, make better use of inputs, introduce controlled traffic farming (CTF) in 3 years time (with a standard 10m working width) to reduce tracking of the field to 20% (i.e. 80% of the field never sees a wheel) and to build up the soil structure, natural nutrient and microflora balance. The Albrecht system of soil analysis is being used, measuring total nutrients, not just what's available. Ca:Mg balance is being measured – have used Gypsum on one field to strip out excess Mg and it is now a far better field. There is plenty Phosphate in the soil for 5 or 6 generations, but need to make it available through long term improvement – needs oxygen and hence drainage.

3. Agronomy & Precision Farming (Lewis McKerrow, AgroVista)

Lewis' role in the business:
1. Agronomy including sprays and seeds.

2. Managing all the precision farming data so that far better use can be made of it.
Lewis handles precision farming nationally for AgroVista.

Rotation
Very simple to date; 2 years WB, 1 year WOSR. This creates a huge peak of work in the autumn and even in the spring if weather compresses spraying days. The sprayer also does liquid fertiliser application. Clearly a risk of grain losses at harvest if there is a big delay in getting to the last WB fields. Propose to change the rotation slightly next year.

Major agronomic problems in this min till system and these soils are Sterile Brome and slugs. Fetterletter has lighter soils so is easier to manage. Non-ploughing systems for rape are especially bad for slugs and brome. While there are more options to treat brome on OSR, they may need to look at Avadex granules (need a special applicator) to get at areas where sprayer cannot work – amazed how quickly it has spread from headlands, round telephone poles, etc.

Cultivations
If use no plough system then need more time input after sowing – looking at seedbeds, volunteers, quality of establishment. Meadow grass is a problem as is chickweed given the fertility left by dairying. Need to think about these extra costs of non-plough systems before shifting.

Fertiliser

All liquid system. N applied in 2 splits to OSR, 3 to WB. Sulphur also applied on first pass. P and K all applied as straights using the excellent GPS field mapping data built up over the last 10 years. Positives of liquid system – accuracy and ability to work in wet. Negatives of liquid – bulky moving around all this liquid, can scorch crops in wrong conditions. To scorch flag leaf of WB on last N application is very costly.

Seeds/Varieties
WB – shifted back to Sequel from Volume hybrid. Safer when doing such a large area. Volume was v good in places (>4t/ac), but brackled and lost lots of heads in others where weather prevented timely cutting. May look at WB blends. Growing 6 rows so if could add in a 2 row it would boost specific weights e.g. Escadre/Sequel mixes.

Sprays
See Appendix 2 for details from 2 fields.
Barley – 3 spray fungicide programme.
OSR – Kerb for brome grass (expensive!). 2 spray flower spray – been flowering over such a long period this year. Sclerotinia risk high.

Trials

- tried new generation SDHI fungicides last year, but made little difference as it was a low disease year.
- tried late applied foliar N on OSR pods last year – saw no effect on yield maps, but more damage due to extra pass.
- this year using amino acids to improve rooting and early flowering/seed development. Early results look good, but too early to conclude. No P and K applied down spout so getting roots developed in autumn is a concern.

Precision Farming
Had all the kit, but not using the data. Hence Lewis role.
Yield maps show very clear headland problem dragging down average yields. Keen to do more draining.
Canopy scans used to vary N rate. Every pass of sprayer takes a new scan. N sensor rig is on the front linkage and can fold up. Cap cost around £16,000.
WB first N application was a fixed amount over all the fields.
Second application was varied +/- 15% depending on scan (poor areas extra 15%)
Third application +/- 30% though sprayer struggles to reduce pressure to -30% level and also worried about scorch if +30%. Maybe switch to solid N for last application?

May do vari-rate seed from this autumn – apply more seed to poorer areas.

What's the overall ethos? Add more to poor bits or limit those and boost applications to best bits which have potential? Feeling is that in early season the aim should be to add more to poor bits to give them a chance to perform. Later switch emphasis to boosting the grain in the best areas, but with wary eye to lodging risk.
Question over vari-rate growth regulator to match lodging risk.

Putting in a more powerful fixed base station to avoid moving the unit around and to get more accuracy.

4. Machinery

Stewart has moved to large scale kit to get speed and timeliness in our limited autumn sowing weather window.

When the business contract farmed Slains they had a demo of a Quadtrac with a large plough and Simba express cultivator and were very impressed – did a one pass seedbed with the Simba at 14 km/hr.

Fixing a Horsch drill to the 6m Quad Till allowed them to do 70 acres per day and this was used for 2 years. However, they found the weight of the unit with the drill (2.25t) too great in poor conditions. Now switched to a separate drilling pass with a plain drill. Min till worked OK until last autumn – created porridge in wet so had to pull in ploughs.

Quad till now used to do one pass rape sowing with an autocast unit.

Next step is shifting to controlled traffic farming at 10m widths. All kit must fit 10m multiples. Using chaser bins running on the combine tracks to gather grain to lorries.

Built own heavy duty mole drainer (see above). Added level guidance system. Goes in 4.5 feet. Aim is to grow some SB this year so can do draining on winter stubbles. Drain at 20m widths, burying 4 inch plastic coil, back filling with pebbles to top of subsoil. Materials likely £200/ac. Contractor would likely cost £1,000 to £1,200 per acre for full job.

5 Broomhill storage and drying

10,000t total capacity. Shed is an old carpet factory building bought S/H. Central roof grain conveyor is from a Lincolnshire intervention store.

Two Alvan Blanche continuous flow driers using gas. One outside the shed does the drying – it was originally used to dry paper and has had teething problems. The one in the shed is ex Aberdeen Grain and does the grain cooling. Drier capacity is 15t/hr, combine 40t/hr. Due to drier problems they have used Elrick last 2 years. OSR will continue to go there for this harvest at least.

Grain comes off the combine into chaser bins (see opposite) which then fill lorries which transport to the store. Eric Scott local haulier does most. Feels it is cheaper than tractors and trailers.

Frontier and Scotgrain are main grain buyers. Use pools to get a good average.

6 Feedback on Knockothie Farms – Group Exercise

4 subgroups:

- The overall business
- Machinery cultivations & establishment
- The agronomy and crop performance
- Grain handling & marketing

Feedback from Group discussing Overall Business

Strengths

- Economies of Scale
- Location- good for diversification, close to Ellon/Aberdeen
- Land- tough, but has yield potential
- Infrastructure - especially sheds
- Dedicated Staff
- Agronomist's relationship – working as part of business
- Lots of info - mapping etc
- Stuarts innovative attitude
- S/H Kit and ability to adapt

Weaknesses

- Rotation
    - Very concentrated workload
    - Brome
    - Clubroot? – and other disease
    - Role for WW/SB?
- Difficult land – heavy soil type
- Need grass in rotation? Too much crop, need a break
- Dangers of being leading edge
- Grain Handling is W.I.P
- Problems of adapting S/H kit
- Making effective use of all buildings.

Feedback from Group discussing Agronomy/Crop performance:

- Impressed by back to basics
    - Soil knowledge
    - Yield info
- Rotation - Too much WB/OSR?
    - Sclerotinia/clubroot probs? Modest SB/WW introduction would help
- Diversification of varieties needed
- Like Fert system
- Agronomy programme comprehensive
- Challenge – How to absorb and use all the precision info – Down to Lewis!

Feedback from Group discussing Machinery System

Positives

- Stuart willingness to try things
- The liquid fert system is good
- Able to pick up 2nd hand machines and adapt for own use
- Good use of Machinery Ring to provide flexibility
- The move to controlled traffic has be good

Concerns

- Huge investment in machinery – is it working?
- Question the viability of min till in our soils & climate - the issue is the impact on soil structure.
- Prefer traditional plough and power harrow on these soils?
- Unsure about the rotation; the positive is an August harvest which normally has better weather, however, the negative is it pushes all the work into a narrow 6-week window. Should consider adding sp barley to the rotation
- Unclear whether better in long run to chop the straw to help soil structure
- Believe cereals should be combine drilled with fert (especially spring sown crops)

Feedback from Group discussing Grain Handling & Marketing

Positives

- Excellent clear span grain store at Broomfield
- Marketing – good use of pools & varieties
- Using Whitehills grain store provides simplicity, however, must come at a cost

Concerns

- Priority should be to get drier properly installed (surely 6,000t of crops justifies a good drier)
- Not keen on the idea of cooling using the 2nd drier
- The grain store will need some form of ventilation

Lessons for the Monitor Farm at Savock?

- Straw –
    - Asset or Liability?
    - Role in Soil structure
    - How incorporate to break down
- Value of drainage + subsoiling
- Utilising the mapping data
- Key is improving soil structure – focus on that rather than any particular system

6 Other Project Business

Next meeting

Thurs 12th July, 2pm - Savock Farms, Foveran. (Andrew & George Booth)

- Soils, root development and crop nutrition – two speakers, Mike Salter and Dr Audrey Litterick.
- Market Update – Andrew Stephen, WN Lindsay
- Plan to follow the meeting with a BBQ (5pm)

Appendix 1

Visit to Knockothie Farms, Ellon, 6th June 2012 – Courtesy of Stuart Davidson. (www.knockothiefarms.com)

Farming 970ha (2,397 acres) of which 818ha is owned with 152 ha on a contract farming arrangement. Mostly heavy, difficult soil. There are three main steadings; Cassiegills (arable base), Broomfield (grain store) and Fetterletter, Fyvie (Cattle). The farms are approx 12-miles apart.

Business was re-structured when father and uncle retired. Previously was dairying, stopped in 2004, now combinable crops are the main enterprise. Stuart's aim is to improve the business performance and profitability, with a clear focus on improving the soil management, soil chemistry/biology and drainage.

2012 Cropping

Crop	Area (ha)	Varieties
W Barley	469.8	Sequel, Volume, & Escarde
W OSR	321.1	Cracker, Artoga, Abaco & Temple
Grass	105.3	
Set-aside	49.7	
Fallow	24.2	
	970.1	

Livestock

There is a 160 spring calving suckler cows which are based at Fetterletter, Fyvie, which are looked after by Stuart's brother-in-law (Craig Hamilton) who is also a director in the business.
Used to contract finish pigs in past but stopped and now use compost (4,500t pa) to maintain organic levels and to improve the soil structure.

Rotation

Due to the scale of operations plus farming on heavy land the rotation is normally all autumn sown crops – WB, WB_2 , OSR.

Crop Establishment

Operate both plough and min till systems. (Haven't used a powered cultivator for over 10yrs)
6m Quadtill + Horsch drill (Philip Watkins) used to establish crops.
Agronomy – Lewis McKerrow, Argovista.

Precision Farming
Been field mapping on GPS for 10-years and yield mapping for 4-yrs.
Operate N sensors (Agleader) on Bateman to apply N applications which are all liquid. Basal P&K fertiliser applied as straights vari-rate.
Use autosteer with Case (RTK). Operate 36m tramlines.

Grain Handling
Cart off combine with chaser bin and use contract lorries to move grain from fields to store.
Installed 2nd hand Alan Blanch continuous flow drier using LPG with a mobile drier used for cooling. 10,000t grain store at Broomfield.
Crops marketed through the trade.

Controlled Traffic Farming (CTF) (www.controlledtrafficfarming.com)
Working towards CTF which aims to run all field operations on the same tracks to reduce soil compaction and damage. Moving towards 10m operations with 30m tramlines.

Contractor – Baling straw and compost spreading. Will use to plough if behind.

Labour – 2 FT tractormen plus seasonal harvest.

Crop Performance
Last year (2011 harvest), average yields were 3.6t/ha (29 cwt/ac) OSR and 6.85t/ha (2.8t/ac) W. Barley based on crop sales.
The 3-year average is 3.4t/ha OSR and 7.5t/ha W Barley

Main challenges
- Farming effectively on a large-scale on heavy land and in a late area.
- Improving the soil structure, nutrients and drainage (back to basics)
- Improving the margins and overall profitability
- Improving the attention to detail

Appendix 2

Field Record – Example of two crops

Field – CA9 **Crop – Winter Barley**
Previous crop – Winter Barley **Variety – Sequel**
Sowing date – 21/9/11 **Cultivation methods – Plough, one-pass, roll**

Fertiliser Inputs

Fertiliser	Date applied	Rate	Nutrient	Nutrient Units
Food Compost	05/09/2011	13.5 t/ha	12 kg N	9 units
Liquid N (19N:19S)	08/03/2012	236 l/ha	45 kg N	36 units
Liquid N (35%)	27/03/2012	225 l/ha	79 kg N	68 units
Liquid N (35%)	10/05/2012	125 l/ha	44 kg N	35 units
Total N			**180 kg N**	**144 units**

Other Fert				
Compost - K	05/09/2011	13.5 t/ha	90 kg K	72 units
Compost - P	05/09/2011	13.5 t/ha	53 kg P	42 units

Ag-chem Programme

Timing	Date applied	Product	Rate/ha	Type	Description
Autumn Weed Control	29/09/2011	Firebird	0.2	Herbicide	DFF + Flufenacet
		Picomax	1.5	Herbicide	Pendimethalin + Picolinafen
		Grounded	0.25	Wetter	Wetter for increased residual activity
T0	23/03/2012	Groove DF	2	Trace el	Manganese
		Ennobe	0.5	Fungicide	Epoxiconazole + Prochloraz
		Instinct	0.25	Fungicide	Fenpropidin (mildew)
T1	01/05/2012	Epsotop	2.8	Trace el	Magnesium
		Jaunt	0.6	Fungicide	Prothioconazole + Fluoxastrobin + Trifloxystrobin
		Canopy	0.6	Growth reg	
		Starane XL	0.8	Herbicide	Broad leaved weeds
T2	25/05/2012	Epsotop	2.8	Trace el	Magnesium
		Jaunt	0.5	Fungicide	Prothioconazole + Fluoxastrobin + Trifloxystrobin
		Arizona	0.75	Fungicide	Folpet
		Cerone	0.25	Growth reg	

Field – BU1 **Crop – OSR**
Previous crop – Fallow/cover crop **Variety – Cracker**
Sowing date – 25-28th August 2011
Cultivation methods: Claydon SR, Quadtill Autocast, Quadtill then Horsch drill

Fertiliser	Date applied	Rate	Nutrient	Nutrient Units
Liquid N (35%)	27/09/2011	85 l/ha	30 kg N	24 units
Liquid N (35%)	01/03/2012	200 l/ha	70 kg N	56 units
Liquid N (35%)	30/04/2012	275 l/ha	96 kg N	77 units
Total N			196 kg N	157 units

Other Fert				
Gypsum	pre-crop	sulphur supply		
MOP	15/02/2012	70 kg/ha	42 kg K	34 units
Phosphate	None applied - soil status high			

Ag-chem Inputs

Timing	Date applied	Rate/ha	Product	Description
Autumn weed control	19/09/2011 **Post-em**	2.5	Springbok	Weed control - Metazachlor + Dimethenamid P
		0.25	Grounded	Wetter for increased residual activity
Late Autumn spray	03/11/2011	0.15	Markate	Insecticide - Rape winter stem weevil
		1.75	Kerb Flo	Sterile Brome/AMG/Volunteer Cereals
		2.8	Libspray 211	Trace elements
		2	Terra-sorb	**Trial plot - Amino acids**
Stem extension spray	22/03/2012	0.35	Galera	Mayweed control
		0.2	Capitan 25	Fungicide -Flusilazole
		0.4	Tebucur 250	Fungicide - Tebuconazole
		1.5	Aquebor	Boron
Early Flower spray	05/05/2012	0.94	Galileo	Fungicide - Picoxystrobin
		0.1	Roller	Spreading wetter
		0.25	Benchmark	**Trial plot - Amino Acids**
Late Flower spray	28/05/2012	2	Compass	Fungicide - Ipridione + Thiophanate
		0.05	Roller	Spreading wetter