Liver Fluke

Heather Stevenson
SAC Veterinary Services
Dumfries

SAC Consulting is a division of SRUC

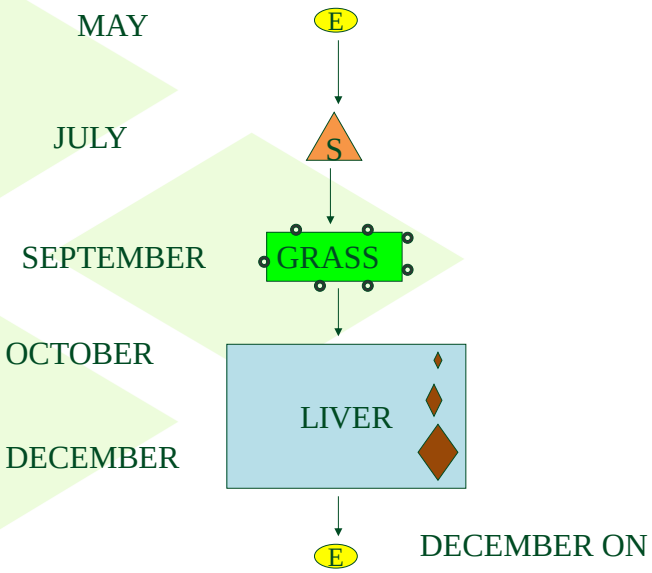
Leading the way in Agriculture and Rural Research, Education and Consulting

Picture: Dieter Palmer

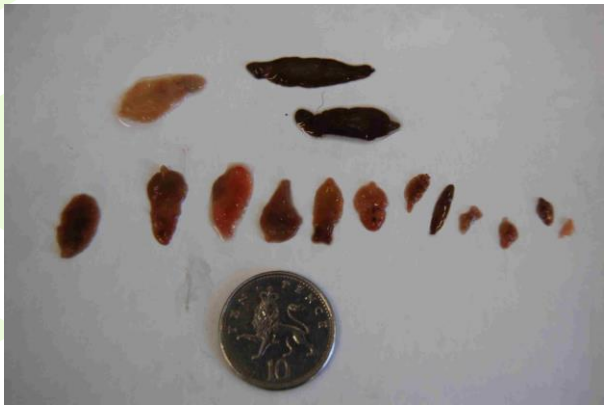
Fluke requirements

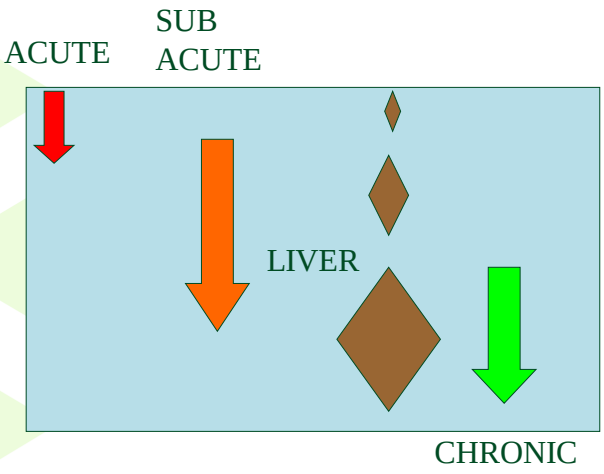
- Snails
- Water
- Temperatures >10ºC
- Sheep, cattle, deer, rabbits, horses, man

Fluke Lifecycle



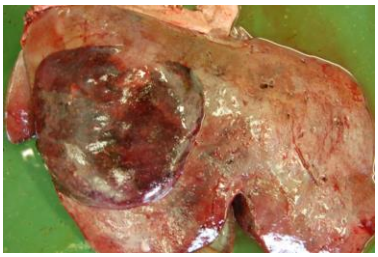
Immature and Adult Fluke



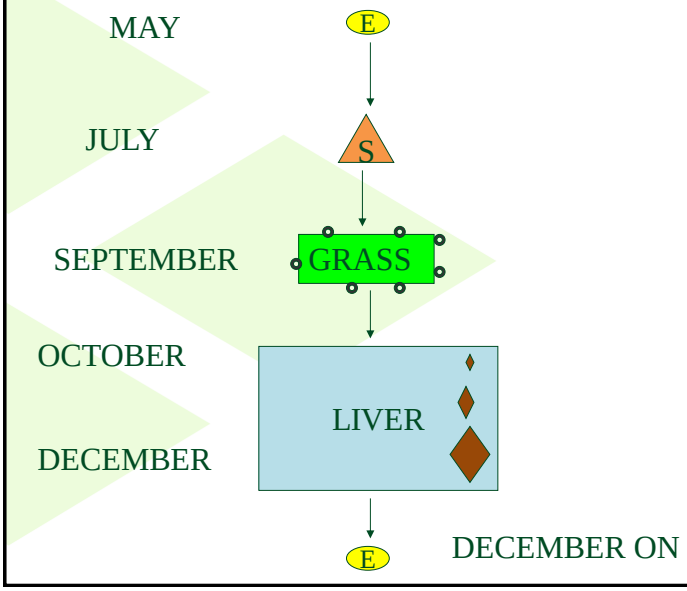


Normal Liver

Acute/Subacute Fluke



Fluke Lifecycle



Chronic Fluke

Chronic Fluke (Subclinical)

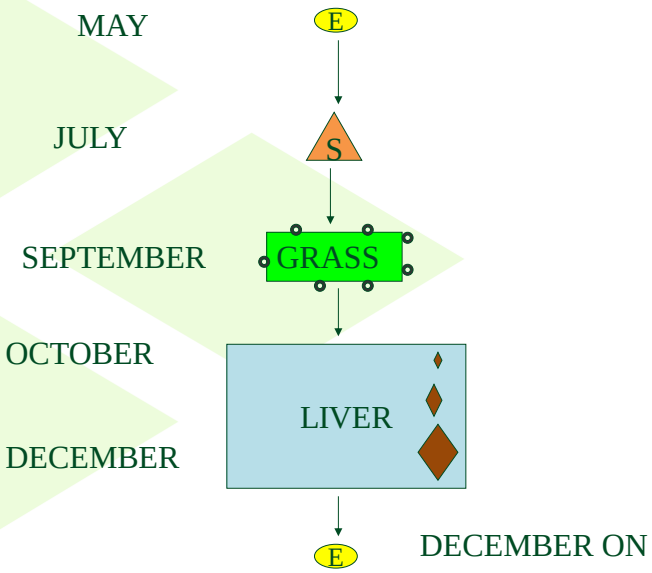
Other problems

- High barren rates and abortions
- Deaths due to clostridial disease
- Deaths when handled for treatment
- Deaths due to liver failure after successful treatment
- Metabolic disease
- Acute fluke deaths of sheep wintering on dairy farm
- TREATMENT FAILURES

Other losses

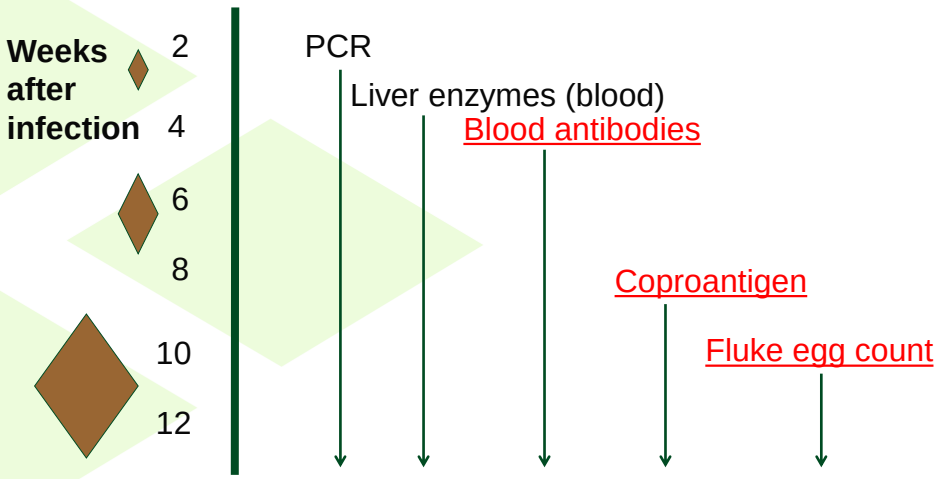
- Reduction in milk yields
- Increased deaths of young lambs
- Poor lamb growth rates
- Poor store cattle weights
- Increased time for cattle to finish (+8%)
- Death of suckled calves due to chronic fluke
- Downer suckler cows
- Liver condemnation at abattoirs
- Treatment costs including time

Fluke Lifecycle



Fluke egg

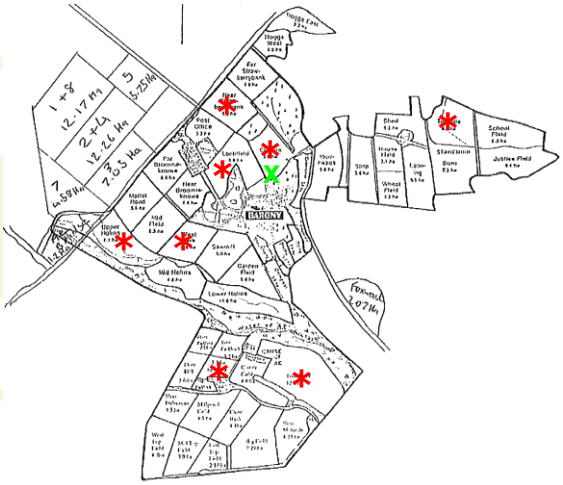
Test Timeline



Pictures: Lammert Moll

Snail Habitats

Barony Field Map

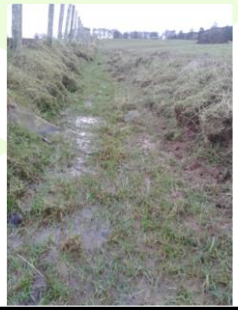


Loch Field

Steading Field

Barony Fields

Good Snail Habitats



Mid September

- All sheep on farm last fluked in January.
- Cows/calves usually housed mid November.
- Lambs should all be fat in less than 6 weeks.
- Summer rainfall slightly above average.
- (Cows and calves, ewes, purchased gimmers, fat lambs.)

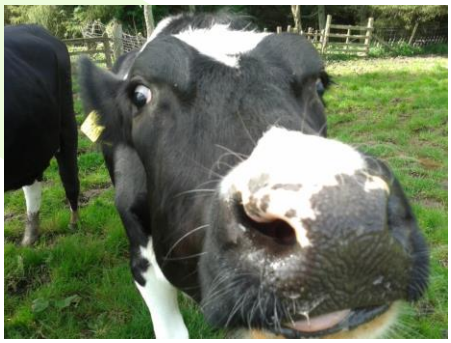
Barony Field Map

Jubilee Field - Hoggs

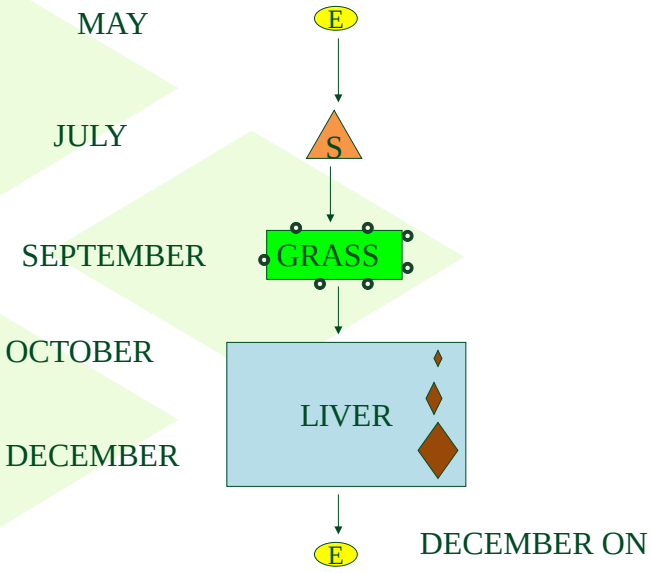
Trial Field – In Calf Heifers

Blood Antibody Results (21/11/14)

- Heifers – 100% positive.
- Hoggs – 20% positive.



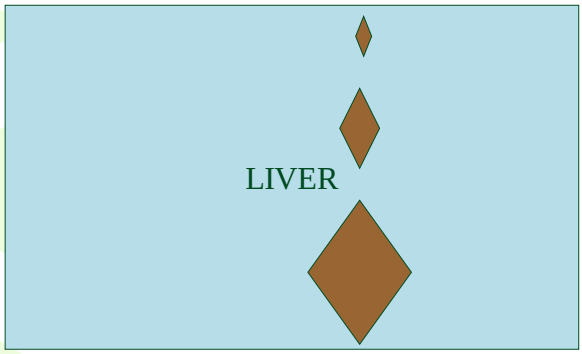
Fluke Lifecycle



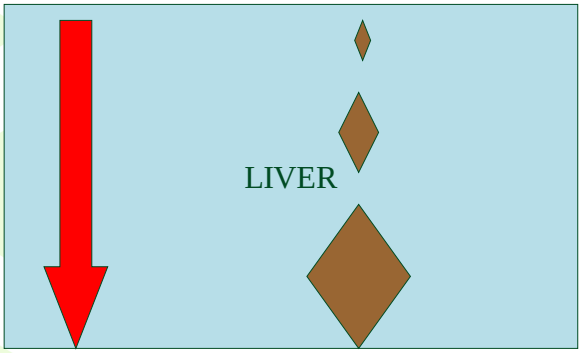
Choice of product

Choice of product

- Products vary in their ability to kill fluke
- Time of year
- Age of fluke present in liver
- Withdrawal period
- Method of administration
- Is a worming dose also required?
- What has been used in the past?
- Did it work?



TRICLABENDAZOLE



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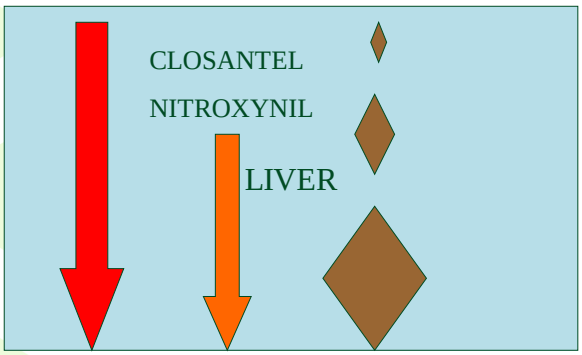

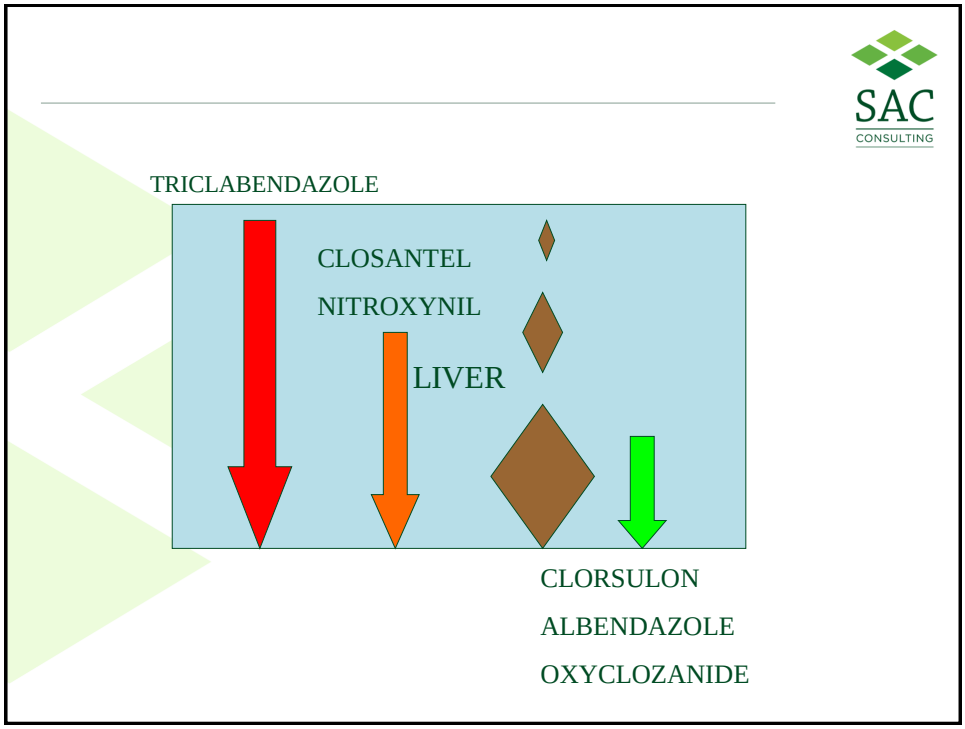
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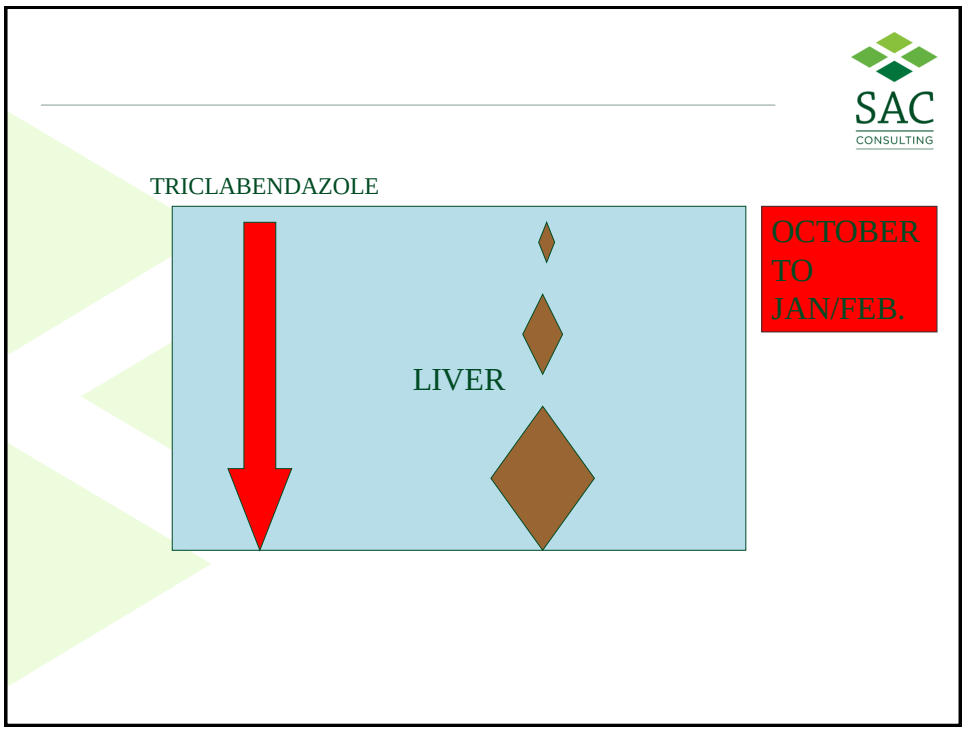
TRICLABENDAZOLE
CLOSANTEL
NITROXYNIL
LIVER
CLORSULON
ALBENDAZOLE
OXYCLOZANIDE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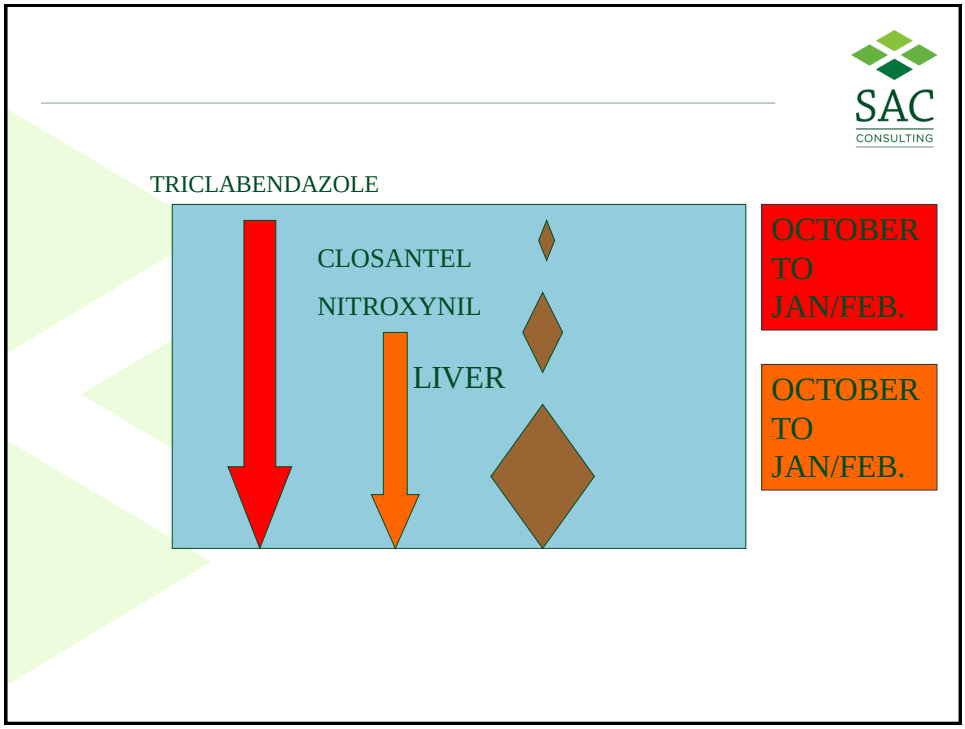
LIVER
OCTOBER
TO
JAN/FEB.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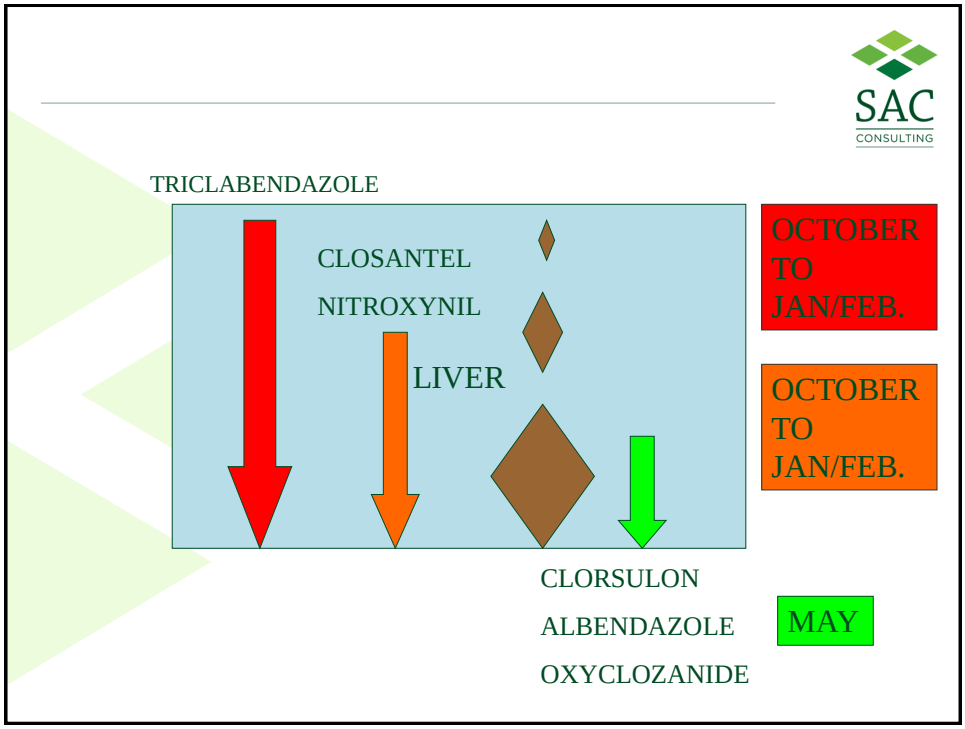
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CLORSULON
ALBENDAZOLE
OXYCLOZANIDE
MAY

Pick a Product

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FLUKIVER

TUPS IN OCTOBER
(No resistance to Triclabendazole diagnosed.)

LEVAFAS DIAMOND

COMBINEX

CLOSAMECTIN INJECTION

SUCKLER COWS
8 WEEKS AFTER HOUSING

FASINEX 5%

FASIMEC DUO

EWES LAMBING OUTSIDE IN MAY

CYDECTIN TRICLAMOX POUR ON

LONG KEEP STORE LAMBS IN EARLY NOVEMBER

ANIMEC SUPER

ZANIL

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(Triclabendazole resistance diagnosed.)

TRODAX

PURCHASED GIMMERS IN LATE SEPTEMBER
(Came from a very wet area.)

ALBEX 10%

RYCOBEN

DAIRY COWS AT DRYING OFF IN FEBRUARY
(Housed mid October)

TRICLAFAS 5%

Pick a Product

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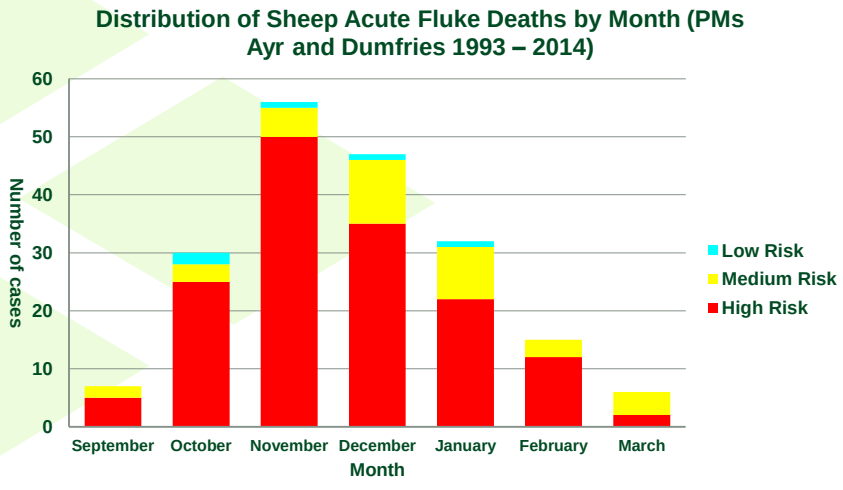
DAIRY COWS AT DRYING OFF IN FEBRUARY
(Housed mid October)

TRICLAFAS 5%

Assess Fluke Risk

- Where have they grazed particularly from August on?
- What grazed these fields earlier in the year?
- Sheep?
- Re-seeds, silage fields?
- Are there wet areas, could there be snails?
- Was the summer wet or dry?
- Likely date of housing?
- Problems in previous years?
- Any signs of ill health/poor production that could be due to fluke?

When To Treat?



When to treat?

- Fluke treatments are not long acting
- Sheep - October, January and late spring/early summer.
- High risk years/farms – as above plus extra treatments 4-6 weeks after the October and January doses.
- Extreme years on wet farms - ? Every 4 weeks in autumn, ?treat and house.

When to treat?

- Beef cattle - treat at appropriate interval after housing (?plus at housing in high risk years/farms)
- Outwintered cattle - treat winter and spring (?3 times in highest risk years)
- Consider checking for fluke eggs before turn out.
- Useful websites:
- www.nadis.org.uk
- www.scops.org.uk
- www.cows.org.uk

My Stock Were Treated – Why Have The Livers Been Condemned?

- Re-infection
- Inappropriate product used.
- Incorrect timing of treatment.
- Product not expected to kill 100% of fluke in the liver.
- Treatment failure e.g. underdosing, product out of date.
- Treatment failure – resistance.
- Scarring and fibrosis of liver.
- Error.

My Sheep Were Treated Why Are They Still Dying?

- Re-infection – dosing interval too long.
- Inappropriate product used.
- Incorrect timing of treatment.
- Treatment failure e.g. underdosing, product out of date.
- Treatment failure – resistance.

Resistant Fluke

- Resistant fluke survive being exposed to the correct dose of a drug that would normally be expected to kill them.
- They pass this advantage to their offspring via their genes.
- The next generation of fluke are also resistant.

Triclabendazole

- First became available in 1984.
- Resistance in Scotland first recognised around 1998.
- Now reported in many countries.
- How much is out there?

Checking For Resistance

- Mark and weigh 10 sheep/cattle.
- Collect individually identifiable faecal samples.
- Dose accurately.
- Re-sample 3 weeks later if fluke eggs counts are being carried out, 2 weeks later if coproantigen testing is being carried out.

Quarantine Treatment – Why Bother?

Picture: Dieter Palmer

Quarantine Treatment – Why Bother?

- Any farm - To kill liver fluke and prevent deaths/production losses.
- Farms with snail habitats but no history of liver fluke – To prevent deaths/production losses and prevent liver fluke becoming established on the farm.
- Farms that already have liver fluke – To prevent deaths/production losses and prevent the introduction of liver fluke that are resistant to triclabendazole.

Quarantine Treatment – Why Bother?

- Where have they come from?
- Are they likely to be infected?
- What time of year is it?
- What age of fluke are most likely to be in the liver?
- Have they been treated? What with and when?
- Could collect samples but interpret results with care.

- Treat with triclabendazole and either monitor or treat with closantel or nitroxynil 6 weeks later.
- Treat with closantel or nitroxynil and repeat 6 - 7 weeks later.
- If housed on arrival (and no immediate disease risk) delay treatment for 6 to 8 weeks and treat with closantel or nitroxynil.
- Graze in fields with no snails for as long as possible.

Quarantine Treatment – Why Bother?

- Extra costs and hassle.
- If triclabendazole resistant liver fluke have already been confirmed locally then spread may occur via:
- Movement of wildlife and straying stock.
- Heavy rainfall may cause flooding across boundaries or wash snails/cysts downstream.
- Snails could be transported on the feet of birds.

Fluke Forecasts

WHAT ABOUT THIS YEAR?

Fluke Forecasts

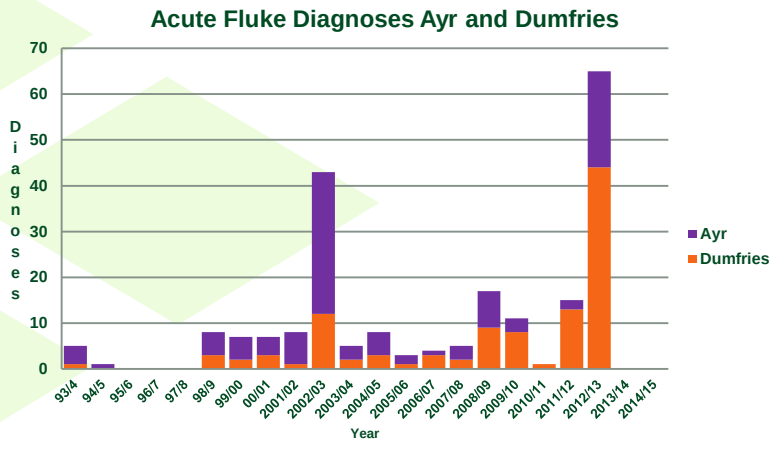
- Developed in the 50s and 60s.
- Based on the knowledge that summer weather conditions influence the fluke lifecycle.
- Compared meteorological data with the number of sheep deaths due to acute/subacute fluke.
- Are they still accurate and relevant? Has the disease changed?

Reasons for Developing Fluke Forecasts

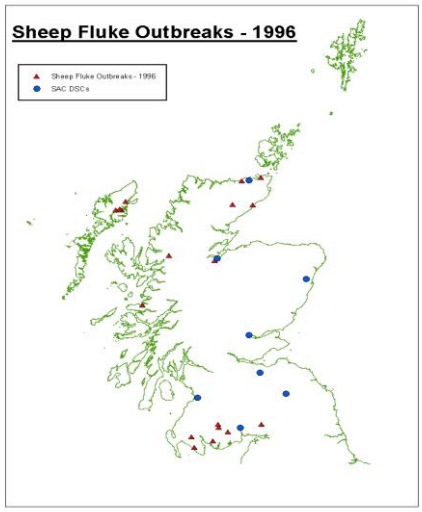
- "to assist in a decision to use molluscicides" ✗
- "to design grazing control" ✓
- "to assist in the recommendations for treatment and other forms of fluke control" ✓

Meteorological Office Regions

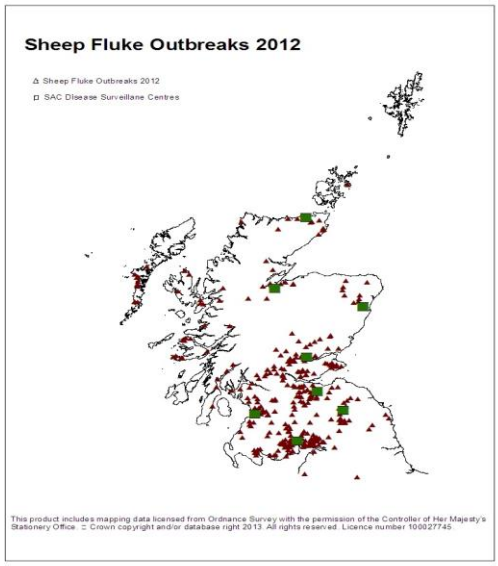
Acute/Subacute Fluke - Ayr and Dumfries



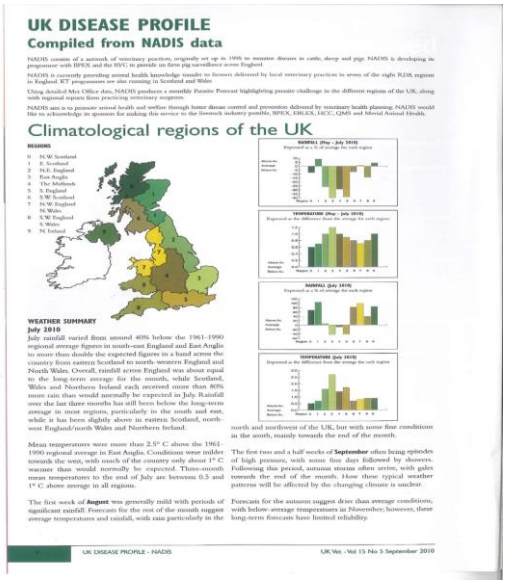
Sheep Fluke Outbreaks 1996



Sheep Fluke Outbreaks 2012



NADIS Regional Parasite Forecasts



UK DISEASE PROFILE

Compiled from NADIS data

NADIS consists of a network of veterinary practices, originally set up in 1986 to monitor diseases in cattle, sheep and pigs. NADIS is developing its programme with BPEX and the BVPC to provide on-farm pig surveillance across England.

NADIS is currently providing animal health knowledge transfer to farmers delivered by local veterinary practices in seven of the eight RDS regions in England. ICT programmes are also running in Scotland and Wales.

Using detailed Met Office data, NADIS produces a monthly Parasite Forecast highlighting parasite challenge in the different regions of the UK, along with regional reports from practising veterinary surgeons.

NADIS aim is to promote animal health and welfare through better disease control and prevention delivered by veterinary health planning. NADIS would like to acknowledge its sponsors for making this service to the livestock industry possible, BPEX, EBLEX, HCC, QMS and Moredun Animal Health.

Climatological regions of the UK

REGIONS

0 N.W. Scotland
1 E. Scotland
2 N.E. England
3 East Anglia
4 The Midlands
5 S. England
6 S.W. Scotland
7 N.W. England
N. Wales
8 S.W. England
S. Wales
9 N. Ireland

WEATHER SUMMARY

July 2010

July rainfall varied from around 40% below the 1961-1990 regional average figures in south-east England and East Anglia to more than double the expected figures in a band across the country from eastern Scotland to north-western England and North Wales. Overall, rainfall across England was about equal to the long-term average for the months, while Scotland, Wales and Northern Ireland each received more than 80% more rain than would normally be expected in July. Rainfall over the last three months has still been below the long-term average in most regions, particularly in the south and east, while it has been slightly above in eastern Scotland, north-west England/north Wales and Northern Ireland.

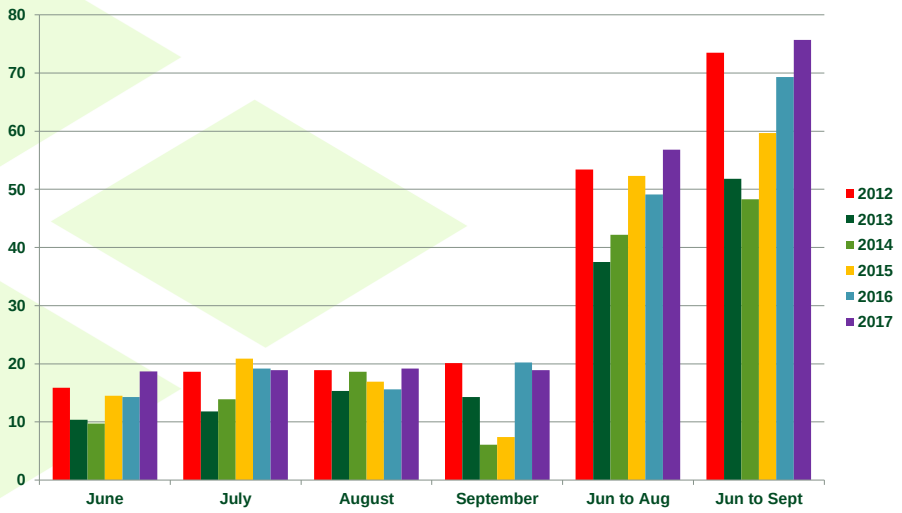
Mean temperatures were more than 2.5° C above the 1961-1990 regional average in East Anglia. Conditions were milder towards the west, with much of the country only about 1° C warmer than would normally be expected. Three-month mean temperatures to the end of July are between 0.5 and 1° C above average in all regions.

The first week of **August** was generally mild with periods of significant rainfall. Forecasts for the rest of the month suggest average temperatures and rainfall, with rain particularly in the north and northwest of the UK, but with some fine conditions in the south, mainly towards the end of the month.

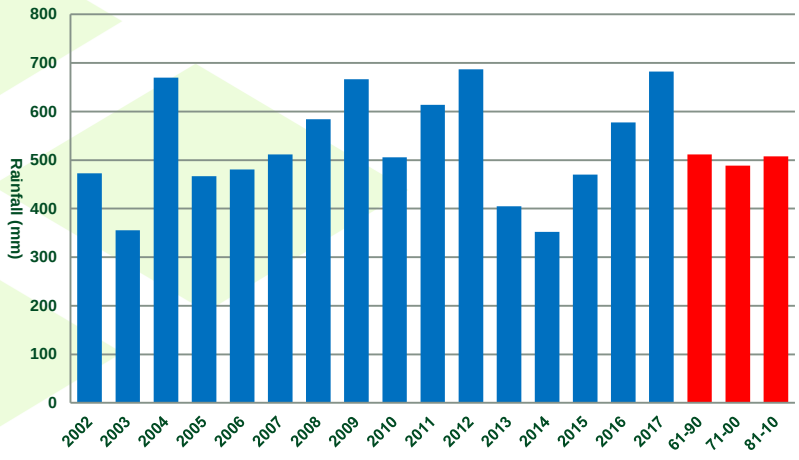
The first two and a half weeks of **September** often bring episodes of high pressure, with some fine days followed by showers. Following this period, autumn storms often arrive, with gales towards the end of the month. How these typical weather patterns will be affected by the changing climate is unclear.

Forecasts for the autumn suggest drier than average conditions, with below-average temperatures in November; however, these long-term forecasts have limited reliability.

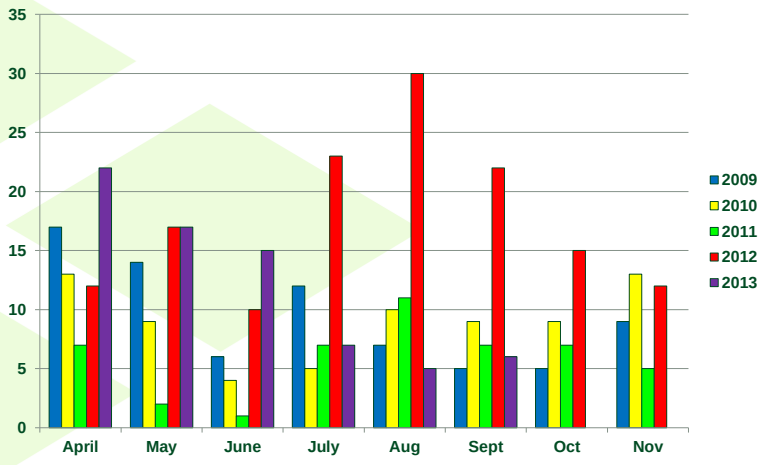
Scotland West Wet Days (≥1mm rain) 2012 to 2017



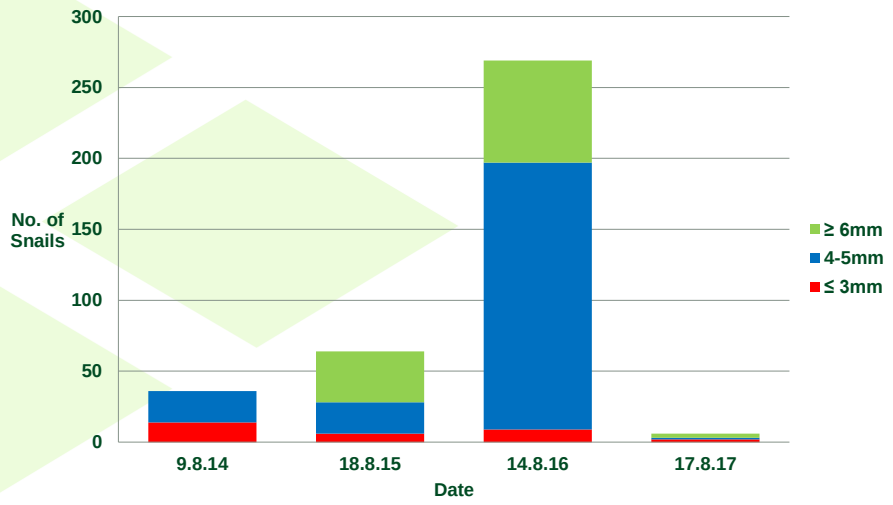
Scotland West June to September Rainfall and 30 year Averages



Fluke Forecasts – Netherlands Snail Monitoring



SRUC Barony Campus Snail Nos. Mid August



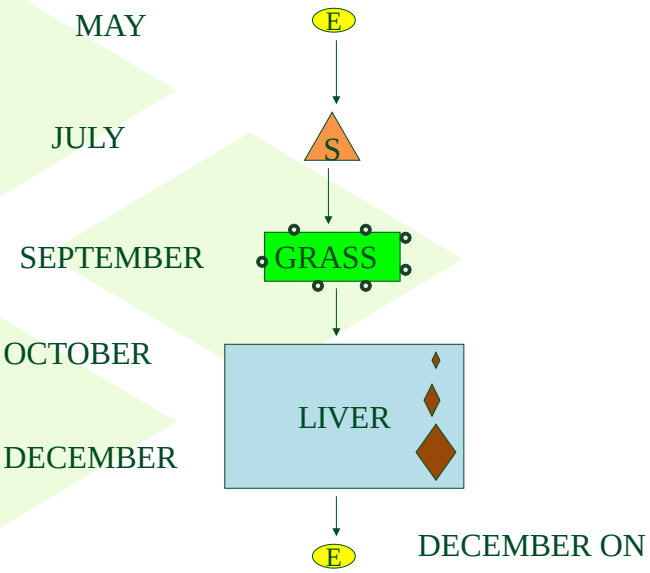
The Future?

- Met. Office climate meeting June 2013: “UK could be in the middle of a 10 to 20 year cycle of wet summers”
- Predicting Impacts of Climate Change on Fasciola hepatica: Fox et al 2011 “Maps show unprecedented levels of future fasciolosis risk in parts of the UK with risk of serious epidemics by 2050”

The Future?

- Since 2012 there is more awareness of liver fluke.
- More research is being carried out.
- Snail control?
- New tests?
- New treatments?
- Vaccination?

Fluke Lifecycle



Plan Ahead To Reduce Losses

- Kill adult fluke late spring/early summer.
- Check that triclabendazole is working.
- Assess risk by field.
- Improve, manage or avoid high risk areas.
- Reduce stocking density in autumn.
- Check fluke forecasts.
- Investigate sudden deaths or ill thrift both before and after treatment.
- Treat with an appropriate product for the time of year.
- Quarantine purchased stock.

Grazing Options

- Fence off snail habitats.
- Improve drainage, reduce compaction.
- Remove stock, especially sheep, from high risk fields as soon as possible in late summer/autumn.

Lambs Particularly If High Risk Year/Farm

- Finish or sell as soon as possible.
- Graze on lowest risk fields in autumn.
- Consider grazing on brassicas/chicory.
- House to finish.
- Monitor weight gains.
- Investigate the first death.
- Monitor for infection – antibodies, fluke eggs, abattoir feedback.

Don't chew the grass!

Apparent Triclabendazole-Resistant Human *Fasciola hepatica* Infection, the Netherlands

Suggested citation for this article

To the Editor: In December 2007, a 71-year-old sheep farmer sought care with a 4-month history of intermittent right upper quadrant pain, night sweats, anorexia, and a 5-kg weight loss. His medical history was unremarkable, and he had not traveled outside the Netherlands for ≈30 years. Physical examination revealed no abnormalities.

Fascioliasis affects millions of humans worldwide (*3*); however, fascioliasis acquired in the Netherlands has been reported only sporadically (*4*), even though *F. hepatica* infection in sheep and cattle is prevalent there (*5*). The patient in this report had not eaten watercress or other aquatic plants and had not ingested ditchwater. However, he had worked in and around ditches on farms in the area, admitted chewing grass sporadically, and might have occasionally ingested vegetables previously fertilized with livestock manure. The patient remains asymptomatic but infected.

Winkelhagen et al, Emerging Infectious Diseases, 6th June 2012, http://dx.doi.org/10.3201/eid1806.111038

SRUC

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Adult Rumen Fluke

SAC CONSULTING

1st September

- Milking herd, late pregnant heifers, bulling heifers, dry cows (M, PH, BH, DC).
- Want to house on 20th October.
- Pregnant heifers due to calve from 20th January.
- Dry cows already treated for fluke.
- Summer rainfall above average.
- Deer common on farm.