NEMATICIDE STEWARDSHIP PROGRAMME

Getting it Right

For you
For the environment
For the consumer

Covering requirements of PA4G
Why are we doing this??
Is it because these products are hazardous?

Yes - but there is more to it than that
Why is nematicide stewardship important?

Stewardship manages hazards and ensures that applications are:

- Safe to you the user
- Safe to environment
- Applied correctly to the soil
- At the correct dose
- No operator exposure incidents
- No wildlife incidents
- No surface water incidents
- Best pest control
- Minimise residues, economical, legal
Greater consistency and precision in their most costly and important pesticide application will pay handsome dividends for potato growers at planting,

But achieving this will demand a much greater understanding of the limitations of current machinery and the need for extra care in its use.

Peter Jones: Agrii regional roots development manager
Applicators

What type of granular applicator do you use?
<table>
<thead>
<tr>
<th>Current status</th>
<th>Legality</th>
<th>What is needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>No PA Certificate</td>
<td>Illegal</td>
<td>PA1 + PA4g</td>
</tr>
<tr>
<td>PA2 Pre 1994</td>
<td>Legal</td>
<td></td>
</tr>
<tr>
<td>PA2 Post 1994</td>
<td>Illegal</td>
<td>PA4g</td>
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<tr>
<td>PA4</td>
<td>Legal</td>
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</tr>
<tr>
<td>Grandfather</td>
<td>Legal</td>
<td>But</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All Change</td>
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</table>

Sustainable Use Directive!!
Sustainable Use Directive

UK pesticide law is changing.

Do the changes affect you?
User Training and Certification

ALL professional pesticides users must have a certificate by 26\textsuperscript{th} November 2015.

Grandfather rights $\times$

What certificate?

Two choices!
Grandfather rights replacement

What are Grandfather Rights?

Under previous legislation, anyone born before 31st December 1964 did not need a specified Certificate of Competence (CoC) to apply a professional plant protection product (PPP).

From 26th November 2015 EVERYONE will require a Certificate of Competence to apply PPPs.
New Grandfather Certificate

Level 2 Award in Safe Use of Pesticides replacing Grandfather Rights (QCF) (PAGR) Qualification Guidance

Register via local NPTC Assessment Centres

Registration Fee £26 + Test £???

Assumes prior knowledge &
Level 2 Award in Safe Use of Pesticides
Replacing Grandfather Rights

- Workbook – in own time
- Training – not required but refresher recommended
- Knowledge Assessment - (1 to 1 verbal)
- Safe Handling and Application (051)
  - Minimum 1 Unit from:
    a) Handheld equipment (052)
    b) Machines application to own land (053)
    c) Other Specific Equipment (054)
1. Prepare a granule applicator for work, calibrate and operate it to ensure correct application rate without risk to themselves, other people and the environment.

2. Use the product labels to determine the approved uses for the product and its potential hazards to human safety, non-target areas and the environment in general.

3. Carry out daily and routine maintenance of the applicator.

4. Carry out the correct procedure for clearing personal protective equipment and application equipment which may have been contaminated with pesticide.
Society expects

People expect food to be produced to the highest of standards, that its production causes the minimal environmental impact and that it is safe to eat!
Society expects

That is the reason that Nematicide stewardship and calibration is now part of The Red Tractor assured produce scheme
‘I have 3yr old twin boys so I just don't have the time to wander round the supermarket studying labels. The Red Tractor mark says it all to me. Even the boys know its no tractor no trolley - ...........’
Emma from Surrey. - netmums.com
Society expects

✓ Residue Free Food
✓ MRL - Residue sampling
  ✓ Maintain Harvest Intervals
  ✓ Ensure correct dose
✓ Hots spots
✓ Due diligence
✓ Daily record sheet
### Daily Usage Record Sheet

<table>
<thead>
<tr>
<th>Day:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Field:</th>
<th>Time:</th>
<th>Amount used (left over):</th>
<th>Area applied to:</th>
<th>Rate /Ha</th>
<th>Comments:</th>
</tr>
</thead>
</table>

Carried forward for this field from previous day:

1
2
3
4
5
6
7
8
9
10
11
12

When changing fields estimate weight remaining in hoppers

At the end of the field add up chemical used, calculate area applied to & calculate Kg/Ha applied

At the end of each day add up chemical used, calculate area applied to & calculate Kg/Ha applied

If chemical actually applied is greater than maximum dose mark affected area and notify manager
Soil Granular Nematicides

All are harmful or toxic

All are dangerous to game, wild birds and animals

Your Health
anticholinesterase

Environmental Health

Carbamate insecticide
Vydate 10g

Organophosphate insecticide
Mocap 15g
Nemathorin
SYMPTOMS OF POISONING

These may include excessive sweating, headache, weakness, faintness and giddiness, nausea, stomach pains, vomiting, tightness of the chest, small pupils, blurred vision, muscle twitching.
The Product Label exercise.

*Working in groups of 3 or 4 answer the following questions*

1. What is the correct PPE to wear when filling the hopper?
2. Any restriction?
3. What should you do before using this product?
4. What type of compound is this product?
5. What guidelines should you follow if you become contaminated?
6. What should you do in case of a spillage?
7. What is the product harvest interval?
User issues

Wear correct PPE (see label):

- Appropriate coveralls!!!
- Face shield/respirator  What is EN 41??
- Boots to be inside overalls - gloves outside sleeves
- Work up-wind when filling containers
- Clean contaminated clothing after use
User issues - Filling the container
User issues - Closed Transfer Systems

Prevent operator contact
Prevent environmental risk

An effective enclosed system is:
- Simple to use
- Fast
- Tamper proof
- Free of spillage at all stages
- Able to shut-off and reseal during mid transfer
- Self emptying
Environmental issues

All nematicides are harmful or dangerous to wildlife

Care required to ensure that granules must not be left on the soil surface
Environmental Risk Assessment

Why should we do one before application?
Environmental Risk Assessment

- Ground conditions
- Water courses
- Buffer zones
- Drains
- Wildlife
- Weather

- Public access
  - Hedgerows
  - Housing
  - Warning signs

Why do we do it?
How do nematicides get left on the soil surface?

Any ideas?
How do nematicides get left on the soil surface?

- Spillage
- Applicator breakdown
- Poor incorporation - where
- Drift?
- Poor disposal
- Clean down
How do nematicides get left on the soil surface?

Through poor applications

Poorly maintained/designated machinery
Environmental Issues - what size of spill is important?

Any and all
Environmental issues

Wildlife poisonings are the result of something going wrong:

• **Filling area**
  » *closed container system prevents spillage during transfer to hopper*
  » *headland filling*

• **Nematicides left on soil surface**
  » *must cultivate all granules off the surface before leaving the field*
  » *In-furrow applications - end of rows*
  » *poorly placed fishtails*
Preventing granules being left on the soil surface

Service applicators annually replacing pipe work and bungs before they perish and break.

Effective shutoff system
- Pneumatic lift on land-wheel
- Clutch to disengage rotor drive shaft - do you use it?

Potatoes (in-furrow)
- Ensure granules are not left exposed on the surface at the end of rows.
- Use a one pass application and incorporation system

All crops (overall)
- Ensure cultivation is effective in removing granules from the surface
- Check filling areas and ends of rows before leaving the field
Environmental issues - headland management

Cover any exposed granules at the final row ends manually
Preventing granules being left on the soil surface

*It is essential that any nematicide applied to a seedbed is well incorporated into the soil and that there are no granules left on the surface.*
Preventing granules being left on the soil surface

Machinery Failure

Kinks in delivery tubes can cause granules resulting in a build up of granules in the tubes.
Preventing granules being left on the soil surface

Any other ideas?
Nematicides and Surface water

Theoretically it is possible that nematicides could be found in water. In the UK no detections have been found.

*It must stay that way*

Take care in windy conditions especially close to water if using an overall application that is not incorporated immediately - granules will drift

On slopes do not ridge in a way which will allow runoff

Do not over-irrigate
Cultivations
Do’s and Don’ts

- Bed Tillers
- Power Harrows
- Deep Ridgers
- Webb Separators
- Rotavators
- Planters
- Star Separators
Cultivations
Do’s and Don’ts

✓ “To effectively protect the crop, granular nematicides need to be incorporated at exactly the right concentration and in the right place within the seedbed.”

✓ “Once our potatoes are in the ground we just have to live with the consequences.”

✓ Peter Jones: Agrii regional roots development manager
Old but maintained!
Power Harrows.
two passes are required as the power harrow does not effectively mix soil vertically!

BUT
Application before deep ridging will not give optimum results.

Soil does not move uniformly on both sides of the ridging bodies resulting in uneven distribution of granules across the bed.

Planting may also become delayed due to weather etc.
Application on a rotovator is ideal
But check fishtails are not too low!

Adjust depth of application between 10 and 15cm
Fish tail often difficult to place
When using a stone/clod separator fit fish tails close to the

It will be necessary to adjust the position according to the soil type and conditions!!

It is important that the applicator is positioned so that the granules are uniformly incorporated to a depth of 10–15 cm. INCORPORATION TO A GREATER DEPTH WILL CAUSE A REDUCTION IN CONTROL.
Applied and planted in one-pass
Applicators nematicides

Storage procedures

Maintenance practices
Pre-Operation Checklist

• Ensure rotors are correct for desired application.

• Ensure all hydraulics are coupled correctly and securely and that all power and data connections to the machine and in the cab are connected correctly

• Ensure that the speed sensor is fitted and properly calibrated

• Ensure that the boom/delivery pipes/outlets are all fitted securely and hoses are routed ‘out of harm’s way’

• Check settings of the Pre-Start function on the RDS Wizard box

• Ensure that the applicator has been properly calibrated for the product being used
Applicators - storage procedures

Remove excessive soil in field

Always keep dry
- store in barn

Never leave granules in hopper for any extended period
- absorb moisture and corrode rotors

Lightly spray oil over grub screws and rotor drive shaft

Keep lids on hoppers
- Store undercover and safely away from children and animals
Daily Maintenance

- Ensure hopper is completely empty and brush out any excess granules/dust
- If fitted, turn on the fan to disperse any product left in the delivery pipes
- Inspect delivery pipes for blockages, remove if necessary
- Generally check machine and components for any sign of damage
Maintenance

Weekly Maintenance

• Perform usual daily maintenance checks as listed above
• Check for any chipped paint and touch up as necessary
• Clean ends of hydraulic quick release fittings
• Apply anti-corrosive fluid to hydraulic fittings if necessary
• Remove the rotor assembly from the metering unit housing. Check for wear of components and use a soft brush to remove any excess granules or dust
Maintenance

At the End of the Season

- Perform all other checks as described above
- Touch up any paint chips
- Remove metering shaft/cassette assemblies, clean thoroughly with a brush and store
- Brush out inside of hoppers, prop lids open for storage to avoid build up of moisture inside
- Blow out delivery hoses using an airline and store
- Store entire machine kit in a dry place. Cover if possible
Applicators - maintenance practices

keep dry

correct rotors

Check rotors are correctly set

Check output tubes and fishtails are not blocked

Ensure moisture can not penetrate hopper and rotor mechanism
Rotors

Fit cartridges but the correct one for the product

Much easier and more accurate than using individual rotors
Cartridges

- **Cartridge fitting instructions**
- **Replaces 10 parts**
- Remove old metering parts
  - Retain the drive shaft, shaft sealing washers and shaft collars
- Fit the new cartridge into the metering chamber with *small openings in hopper.*
- centre the *small openings* equally in the chamber.

Use end screws to lock the cartridge into place.

Check that the cartridge rotates freely

Multiple hoppers must be aligned in all planes to avoid tightening or jamming.
Calibrations - General

Application rates generally given as

- Kg/Ha (overall measure) - PCN

- Gms/100m of row (linear measure) - sugar beet
Calibrations - what you need to know/have

If land-wheel driven - circumference of the wheel

If computer controlled - what output reading is required

• Width of applicator in metres
• Condition of the rotors
• Dose rate required
• Where the instruction book is!
• Calculator
• Scales
• Collecting tubes
Calibrations - Land-wheel

How many times does the land-wheel turn in 100 metres?

- Mark out 100m in field with similar characteristics of application and count revolutions
- or

- number of turns/100m = \[
\frac{100}{\text{Wheel diameter (M) x 3.142}}
\]

- (standard HF spider wheel turns 42.25 times per 100m)
Calibrations

42.25 turns/100m

? turns/100m
Calibrations - In-row

Visually check condition of rotors then -

Collect and weigh granules from each outlet
Repeat 3 times

Compare with dose required
– Is it correct?
– Are all outputs within 5% of the average
– if not can rotors be adjusted?
– repeat procedure

Record details
– rotor size
– pulley sizes (driver (on wheel) and Driven)
– output rates
Calibrations - Overall

Collect and weigh together granules from all outlets
Repeat 3 times
  – Is it correct?
  – Are all outputs within 5% of each other
  – if not check machine for wear or blocked rotor flutes
  – repeat procedure

Output in Kg/ha is calculated by \[
\frac{\text{total weight of product}/100\text{m}}{10 \times \text{effective bout width}}
\]

Record details
  – rotor size
  – pulley sizes (driver (on wheel) and Driven)
  – output rates
Changing output - In-row

To obtain required dose change to a new pulley setting

- New pulley ratio = \( \frac{\text{dose required}}{\text{dose obtained}} \times \text{old pulley ratio} \)

- Example - in-row

- dose obtained per output = 56g/100m
- dose required per output = 70g/100m
- Pulley ratio (driven/driver) = 4/7 = 0.57

- New pulley ratio = \( \frac{70}{56} \times 0.57 = 0.71 = 5 \text{ driver } 7 \text{ driven} \)
Calibrations - standard pulley ratios

Calculated by dividing the driver (land-wheel) by the driven

<table>
<thead>
<tr>
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<th>Driven</th>
<th>Ratio</th>
</tr>
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<tbody>
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<td>1.75</td>
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<tr>
<td>5</td>
<td>4</td>
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<td>4</td>
<td>0.57</td>
</tr>
<tr>
<td>3.25</td>
<td>7</td>
<td>0.46</td>
</tr>
</tbody>
</table>
Changing output - overall

- dose obtained per output = 22.6 kg/ha
- dose required per output = 33.6 Kg/ha
- Pulley ratio (driven/driver) = 4/7 = 0.57

To obtain required dose change to a new pulley setting

- New pulley ratio = \( \frac{33.6}{22.6} \times 0.57 = 0.85 = 4 \text{ driver : 5 driven} \)

NB set applicator to under-dose rather than over-dose
Calibrations - standard pulley ratios

*Calculated by dividing the driver (land-wheel) by the driven*

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Nematicide Application Stewardship

Now a bit of practical
A poorly set applicator increases risk to:

– You the operator
– Your environment
– Your customer
– your pocket
What have we learnt

Operator handling
   All nematicides require careful handling
   How to reduce residue risk

Areas of spillage
   Headlands
   Filling areas
   Mid field stopping

Correct Placement
   Cultivation
   soil type
   machinery set up
   hot spots

Applicator machinery
   Set up
   Storage

   Calibration
   Cassettes/Cartridges
   Changing application rate
Environmental Issues - summary

The greatest hazard to the public, wildlife is caused by spillage/ granules left on soil surface

Spillage occurs through:
- poor filling practices
- poorly maintained machinery

Small and large in-field spillages should be removed