Forest Research

Hylobius Management (plant protection, fallow, HMSS & biocontrol)

Forestry and Timber Knowledge Exchange event, Wales, 13th June 2024

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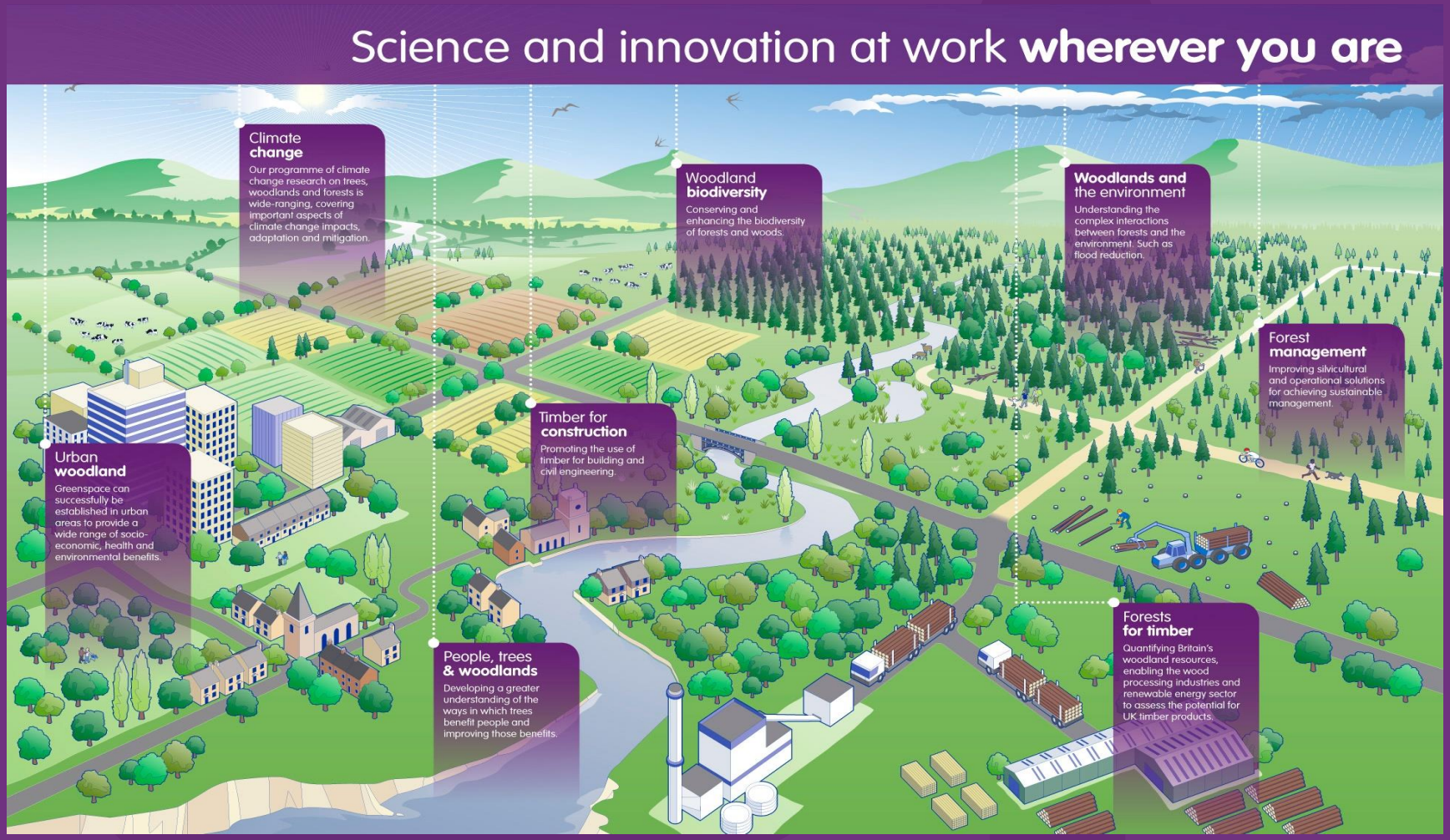
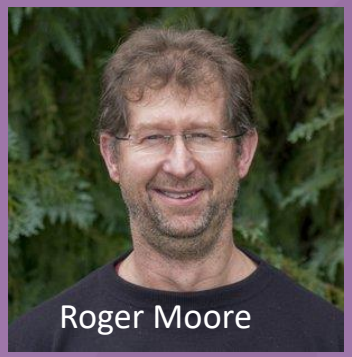


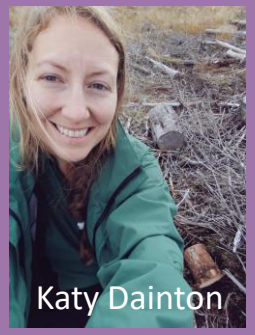
"Forest Research is Great Britain's principal organisation for forestry and tree related research and is internationally renowned for the provision of evidence and scientific services in support of sustainable forestry." (https://www.forestresearch.gov.uk/)

Forest Research

NRS Entomology team


Roger Moore


Katherine Lester


Katy Dainton


Kyle Miller


Molly Davidson


Imogen Ryan

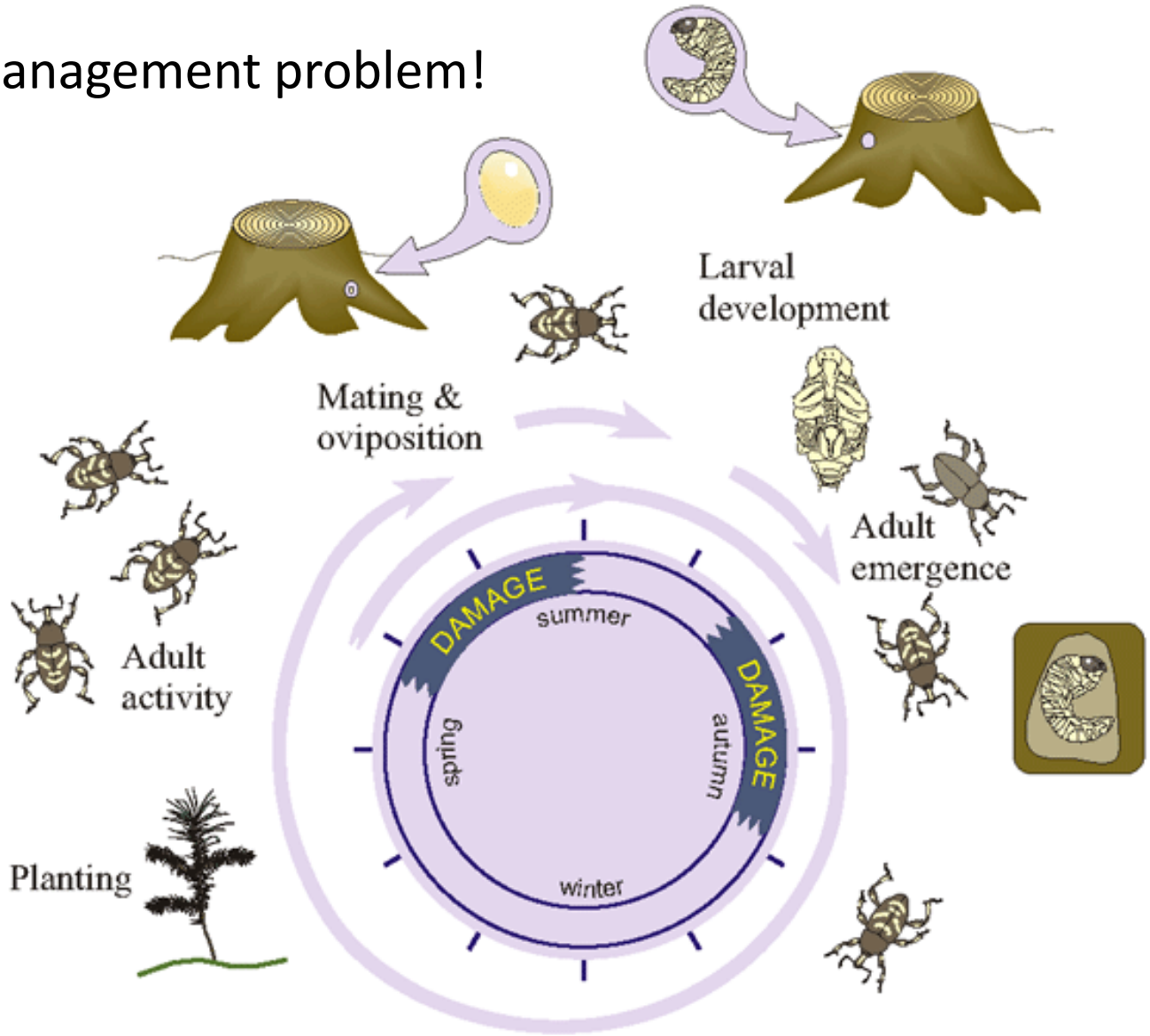

Tom Kendall


Sonja Steinke

Large pine weevil (*Hylobius abietis*):

- Native (UK/Europe)
- Adults feed on restock saplings causing tree damage and mortality
- Immatures in stumps (non-damaging)
- Economically significant pest of commercial forestry, management costs est. £4-8million/yr in the UK

Forest management problem!



Why it is a pest?

Breeds in conifer stumps
Adults emerge (0-120 per stump) and feed on saplings
Clearfell of 700 stumps/ha = av.21,000 (2,100- 84,000) weevils/ha
UK populations very high
Particularly problematic in some areas because:

- Abundance of breeding material:
  - Continuous felling of conifers, especially pine (e.g. for Dothistroma needle blight)
  - Increased storm damage
- Proximity of clear-fells to each other
- Insecticide reliance = plant protection rather than population control

c.7 times higher than Scandinavian countries, explains failure of alternative control measures e.g. physical barriers

Management history

Forestry pest >100years

Early years: fallow, mass trapping, hand-picking

1960's – 2000's: heavily reliant on insecticides, including DDT, Lindane, permethrin, cypermethrin (Forester)

Since 2016 - acetamiprid (Gazelle SG)

*But can still get damage / mortality

Gazelle SG – acetamiprid – MAPP 13725

- HSE – CRD refused re-approval Jan 23 for use in forests/ forest nurseries (ornamental plant production)
- Final top up sprays Spring 2024 (i.e. now)
- Product must be used up and disposed of by end July 2024
- Approval holders, Certis Belchim, are committed to reapplying for extensions of authorization for minor use (EAMU) to cover:
  - use in forest nurseries on tree crop production pre-lifting; *- submitted*
  - use on lifted trees (pre planting pre-treatment); *- working on this*
  - use in the forest (top-up spraying). *- working on this*
  - Confor/ FR working on behalf of the forest industry to support all these applications.

Current insecticide situation (cont.)

Chlorantraniliprole

- Forest Research have applied for two extensions of authorization for minor use (EAMU) on behalf of the forest industry and hope to have an answer in the next couple of months. Confor have supported applications on a parallel approach.

Cypermethrin

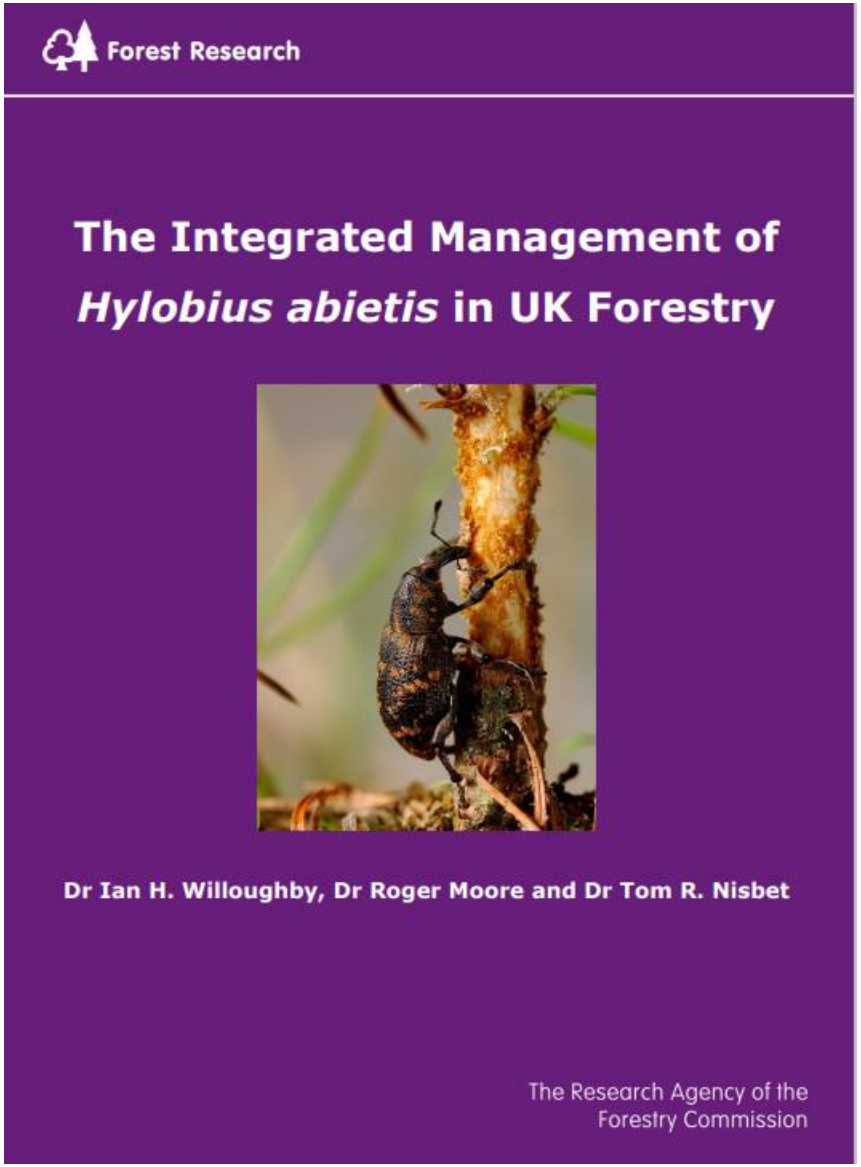
- Full on label approval until 2031 (currently) for use as a ‘top up’ spray in the forest.
- No approval for use as a pre planting pre-treatment.
- FR and Scottish Forestry worked with FSC UK to produce a national environmental and social risk assessment (ESRA) that can be used to help meet certification requirements if cypermethrin applications are planned for FSC certified estates.

Physical protection

- Tree shelters, coatings (Kvaae® wax; Flexcoat; Conniflex), barriers (MultiPro®, Biosleeve®, WeeNets®)
- Successful elsewhere in Europe where population pressure lower
- Issues – cracking, splitting, blow over, too loose, impact tree growth, application and storage issues (nursery and planting)

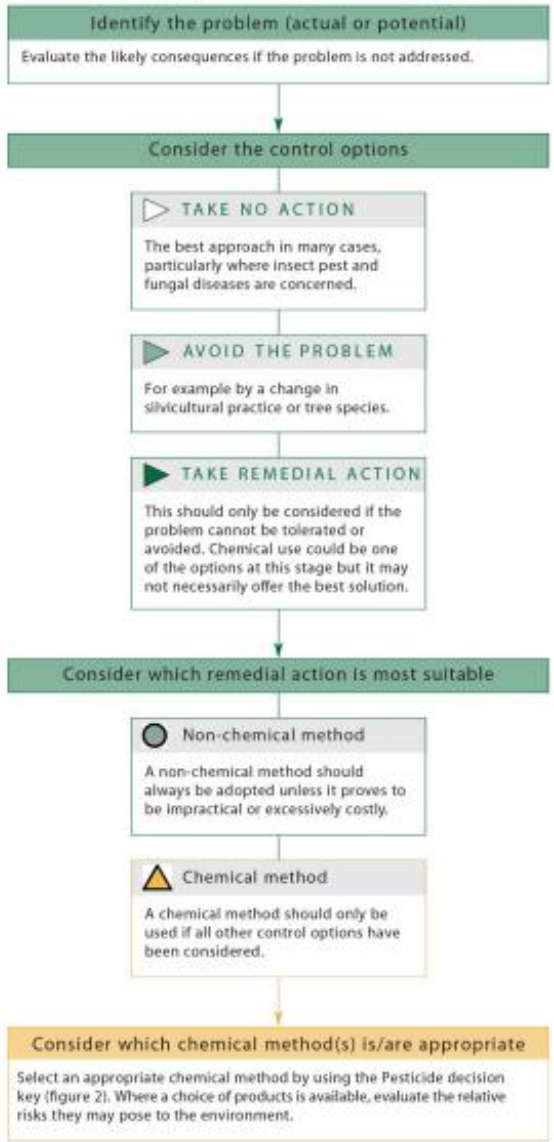



So… what are the alternatives?



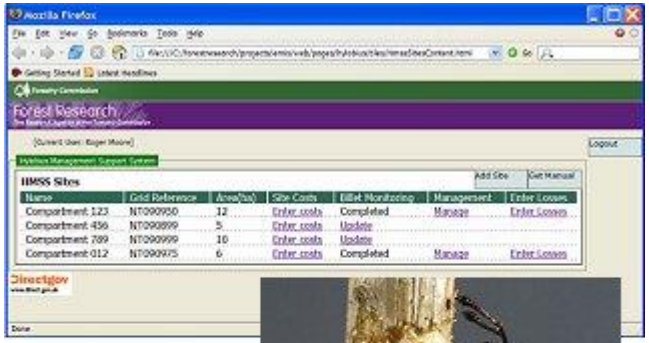
Forest Research, 2022

Figure 3. The Core decision key (adapted from FC Practice Guide 15; www.forestresearch.gov.uk)



Monitor

- Ad hoc site checks: staff costs, access / timing issues, subjective – relies on experience
- FR's Hylobius Management Support System (HMSS): billets (4 weeks) pre-planting, forecasts weevil damage, gives management options, subscription cost (£3.50-£7/Ha depending on no. of sites)
- Spotta pods: remote monitoring, dashboard, repeat counts, not linked to damage atm



Take no action

- High risk strategy
- Possible 100% losses

Avoid the problem

- Alternative silvicultural systems (e.g. CCF)
  - Wind risk too high on some sites
- Alternative species (e.g. replace with broadleaves)
  - Not suitable or desirable on all sites

Fallow strategy

- Leave unplanted for 3-5years
- Issues:
  - Weevils migrating from other clear-fells (1km separation required)
  - Impacts on water courses - nitrate releases, phosphate leaching, flood risks
  - Vegetation growth on fertile sites (herbicide requirements)
  - Windthrow risk to adjacent blocks
  - Reduction in timber production, revenues and carbon sequestration

Ground preparation

- Mounding / scraping to expose mineral soil surrounding saplings
- Leave woody vegetation as alternative food sources
- Not reliable in high weevil population situations
- Issues with soil erosion, leaching, etc.

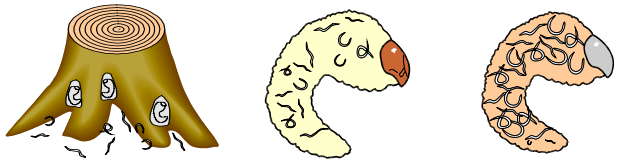
Planting stock

- Larger (root collar >6mm), more vigorous saplings are more robust

Take remedial action

Biological control – entomopathogenic nematodes

- Stump applications (June-July)
- Reduces weevil populations
- Used for many years in Wales
- Issues:
  - Large water volumes required
  - Higher success on pine than spruce (c. 80% vs 20% mortality)
  - Impractical on remote, steep or soft ground sites- *drone applications being trialled by FR*
  - Weevil migration from nearby sites



Stump removal / mulching

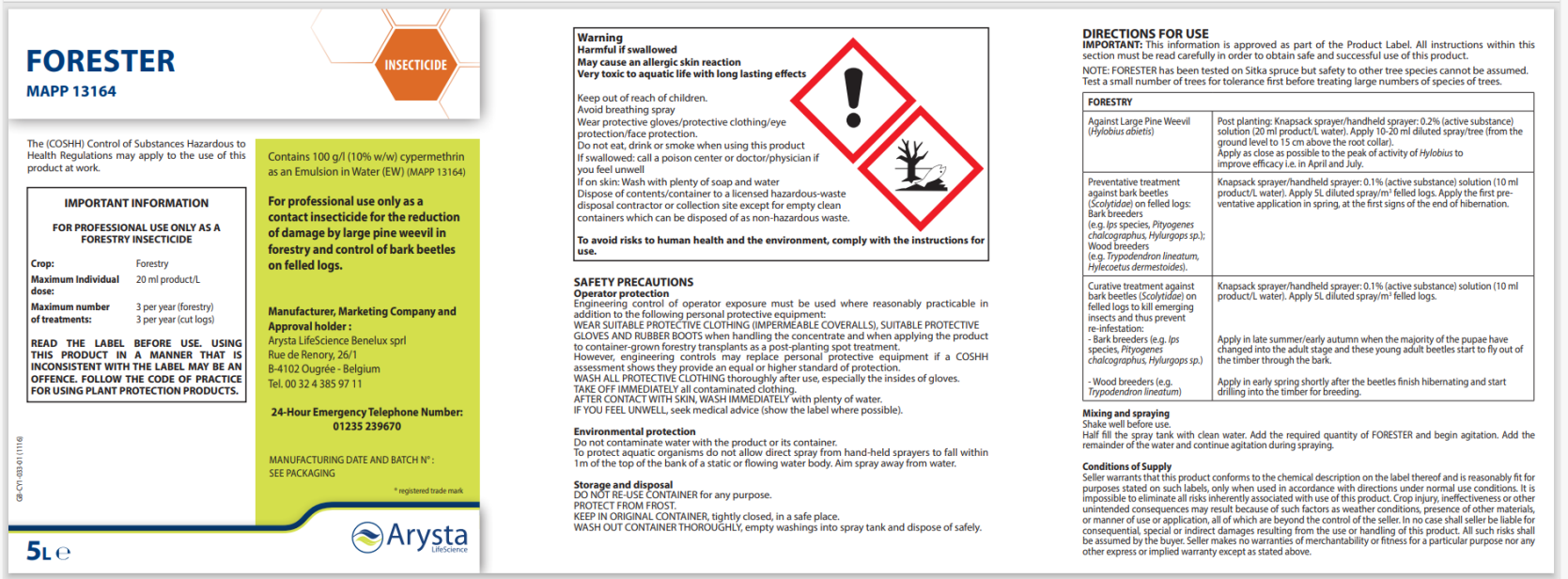
- Removes breeding material
- Reduces weevil populations
- Issues:
  - Timing is key – prior to first emergence
  - High energy / labour requirements
  - Site disturbance can pose environmental risks
  - Any remaining breeding material = weevils

Summary of Current options

- Monitor sites (HMSS- best method)
- Use combination of alternative methods (fallow, planting stock etc., nematodes) where possible
- Last chance to use Acetamiprid (Gazelle SG)
  - Current EAMU (off-label approval) expires end July 2024
  - Seeking approval for pre-treat and TUS
    - Decisions pending?
    - If approved - new terms of use, potential dose reduction
- Chlorantraniliprole (Acelepryn or Coragen)
  - Seeking approval for pre-treat and TUS
  - Decision pending?
  - Effective but expensive – double cost

Current options (con)

- Top-up sprays (TUS) - Forester (cypermethrin) has approval until 2031, can be used under an ESRA (environmental and social risk assessment) if Coragen / Acelapryn not online.
  - BUT – very toxic to aquatic species, highly restricted by UKWAS, operator skin sensitivity



FORESTER
MAPP 13164

INSECTICIDE

The (COSHH) Control of Substances Hazardous to Health Regulations may apply to the use of this product at work.

IMPORTANT INFORMATION

FOR PROFESSIONAL USE ONLY AS A FORESTRY INSECTICIDE

Crop:	Forestry
Maximum Individual dose:	20 ml product/L
Maximum number of treatments:	3 per year (forestry) 3 per year (cut logs)

READ THE LABEL BEFORE USE. USING THIS PRODUCT IN A MANNER THAT IS INCONSISTENT WITH THE LABEL MAY BE AN OFFENCE. FOLLOW THE CODE OF PRACTICE FOR USING PLANT PROTECTION PRODUCTS.

Contains 100 g/l (10% w/w) cypermethrin as an Emulsion in Water (EW) (MAPP 13164)

For professional use only as a contact insecticide for the reduction of damage by large pine weevil in forestry and control of bark beetles on felled logs.

Manufacturer, Marketing Company and Approval holder :
Arysta LifeScience Benelux sprl
Rue de Renory, 26/1
B-4102 Ougrée - Belgium
Tel. 00 32 4 385 97 11

24-Hour Emergency Telephone Number: 01235 239670

MANUFACTURING DATE AND BATCH N° : SEE PACKAGING

* registered trade mark

5L e

Arysta LifeScience

Warning
Harmful if swallowed
May cause an allergic skin reaction
Very toxic to aquatic life with long lasting effects

Keep out of reach of children.
Avoid breathing spray
Wear protective gloves/protective clothing/eye protection/face protection.
Do not eat, drink or smoke when using this product
If swallowed: call a poison center or doctor/physician if you feel unwell
If on skin: Wash with plenty of soap and water
Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste.

To avoid risks to human health and the environment, comply with the instructions for use.

SAFETY PRECAUTIONS

Operator protection
Engineering control of operator exposure must be used where reasonably practicable in addition to the following personal protective equipment:
WEAR SUITABLE PROTECTIVE CLOTHING (IMPERMEABLE COVERALLS), SUITABLE PROTECTIVE GLOVES AND RUBBER BOOTS when handling the concentrate and when applying the product to container-grown forestry transplants as a post-planting spot treatment.
However, engineering controls may replace personal protective equipment if a COSHH assessment shows they provide an equal or higher standard of protection.
WASH ALL PROTECTIVE CLOTHING thoroughly after use, especially the insides of gloves.
TAKE OFF IMMEDIATELY all contaminated clothing.
AFTER CONTACT WITH SKIN, WASH IMMEDIATELY with plenty of water.
IF YOU FEEL UNWELL, seek medical advice (show the label where possible).

Environmental protection
Do not contaminate water with the product or its container.
To protect aquatic organisms do not allow direct spray from hand-held sprayers to fall within 1m of the top of the bank of a static or flowing water body. Aim spray away from water.

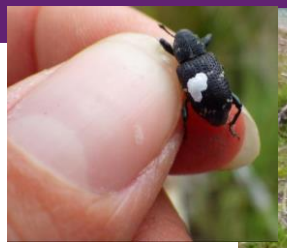
Storage and disposal
DO NOT RE-USE CONTAINER for any purpose.
PROTECT FROM FROST.
KEEP IN ORIGINAL CONTAINER, tightly closed, in a safe place.
WASH OUT CONTAINER THOROUGHLY, empty washings into spray tank and dispose of safely.

DIRECTIONS FOR USE
IMPORTANT: This information is approved as part of the Product Label. All instructions within this section must be read carefully in order to obtain safe and successful use of this product.
NOTE: FORESTER has been tested on Sitka spruce but safety to other tree species cannot be assumed. Test a small number of trees for tolerance first before treating large numbers of species of trees.

FORESTRY	
Against Large Pine Weevil (*Hylobius abietis*)	Post planting: Knapsack sprayer/handheld sprayer: 0.2% (active substance) solution (20 ml product/L water). Apply 10-20 ml diluted spray/tree (from the ground level to 15 cm above the root collar). Apply as close as possible to the peak of activity of *Hylobius* to improve efficacy i.e. in April and July.
Preventative treatment against bark beetles (*Scolytidae*) on felled logs: Bark breeders (*e.g. Ips* species, *Pityogenes chalcographus, Hylurgops* sp.); Wood breeders (*e.g. Trypodendron lineatum, Hylecoetus dermestoides*).	Knapsack sprayer/handheld sprayer: 0.1% (active substance) solution (10 ml product/L water). Apply 5L diluted spray/m³ felled logs. Apply the first pre-ventative application in spring, at the first signs of the end of hibernation.
Curative treatment against bark beetles (*Scolytidae*) on felled logs to kill emerging insects and thus prevent re-infestation: - Bark breeders (*e.g. Ips* species, *Pityogenes chalcographus, Hylurgops* sp.) - Wood breeders (*e.g. Trypodendron lineatum*)	Knapsack sprayer/handheld sprayer: 0.1% (active substance) solution (10 ml product/L water). Apply 5L diluted spray/m³ felled logs. Apply in late summer/early autumn when the majority of the pupae have changed into the adult stage and these young adult beetles start to fly out of the timber through the bark. Apply in early spring shortly after the beetles finish hibernating and start drilling into the timber for breeding.

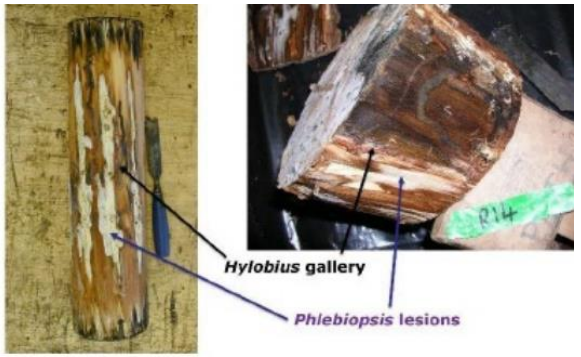
Mixing and spraying
Shake well before use.
Half fill the spray tank with clean water. Add the required quantity of FORESTER and begin agitation. Add the remainder of the water and continue agitation during spraying.

Conditions of Supply
Seller warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such labels, only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or manner of use or application, all of which are beyond the control of the seller. In no case shall seller be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the buyer. Seller makes no warranties of merchantability or fitness for a particular purpose nor any other express or implied warranty except as stated above.



Aim / research focus

- An IPM method that
  - Reduces weevil populations – less than half current levels
  - Allows restocking without pesticides (e.g. physical barriers)
  - Works across UK forest sites – geography, tree species, terrain / access
  - Possible methods - lure and kill, mass trapping, biocontrol stump treatments (e.g. nematodes, fungi, PG suspension (*Heterobasidion* butt rot)) to reduce larval development



Need industry investment, currently low-level public sector funded – [Hylobius Research Fund (scottishforestrytrust.org.uk)]

Questions?