Cyfoeth Naturiol Cymru
Natural Resources Wales

Board Paper

28th September 2016

Paper Title:	**Alternatives to Cypermethrin – an update on our commitment to cease the use of alpha-cypermethrin and cypermethrin on the Welsh Government Woodland Estate (WGWE) by October 2017**
Paper Reference:	**B B 59.16**
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Purpose of Paper:	**Information**
Recommendation:	To note progress on delivery of our adaptive management approach to plant protection from the beetle *Hylobius abietis (Hylobius)* and measures required to continue to deliver the Sustainable Management of Natural Resources (SMNR) on the WGWE.

Impact: To note – all headings might not be applicable to the topic	How do the proposals in this paper help NRW achieve the Well-Being of Future Generations Act principles in terms of: **Looking at the long term:** R&D investment in a range of non-chemical alternatives that are practical and effective to continue the reduction in the overall level of chemical use in our land management activities. Continual improvement of our knowledge of the predicted effects of climate change on *Hylobius* life cycle and population dynamics. **Taking an integrated approach:** an integrated forest management approach is guiding UK research and development with effective actions identified across the forest management cycle. **Involving a diversity of the population:** forestry, fishing and environmental stakeholders have been involved in development and kept informed of our progress. **Working in a collaborative way:** we contribute to and benefit from a UK-wide research and knowledge exchange programme that involves growers and managers across the forest sector.

	<u>Preventing</u> issues from occurring: improved knowledge based measures across the forest management cycle support better decision making combined with forest management measures such as a reduction in the use of clearfell and replanting management systems are an important part of limiting loss of, and damage to, newly planted trees from *Hylobius*.

Issue

We are committed to reducing the use of chemicals on land that we manage to safeguard the environment from unacceptable risk. In 2014 the Board agreed with a recommendation from an internal review (Annex 1) that we would stop using alpha-cypermethrin and cypermethrin in our WGWE plant protection programme by 31st October 2017. A specific action plan guides progress towards the review recommendations (Annex 2). Good progress has been made to find alternative measures but, despite over a decade of UK-wide research investment, operational trials and transfer of effective measures to funded forest management programmes, there is no full and effective replacement for some use of chemical control. Significant challenges remain if we are to support the package of short, medium and long term measures required for a full plant protection programme.

Background

The *Hylobius* beetle is widely recognised as the most serious pest of newly planted trees in the UK which can lead to 100% losses of planted conifer, broadleaf and natural regeneration. The broad spectrum insecticides alpha-cypermethrin and cypermethrin are classified by the Chemical Regulation Directorate as legal and safe to use in forestry to limit the damage from *Hylobius.* However, these chemicals are on the Forest Stewardship Council (FSC UK) 'highly hazardous list' and, whilst this does not have a legal status, it does mean that they can only be used on the WGWE in compliance with the conditions of a derogation due to expire in on 31st October 2017. FSC UK had extended its initial derogations due to the lack of cost-effective alternatives and whilst a further extension is unlikely the Committee's processes are currently under review.

The life cycle of *Hylobius* is particularly influenced by the felling and restocking of coniferous stands of trees which largely determine the beetles' spatial distribution and development. Clearfelled sites can see emergence of up to 84000 adult beetles from cut or dying stumps which are then able to travel and feed on woody plants up to 80km away but more usually 10km. Average losses over a replanted site with an active suite of control measures will be between 5-25%. Without an active and effective suite of control measures costly remedial planting is required to meet minimum best practice stocking density. The productivity of sites can be drastically affected where uneven establishment reduces yield at thinning and maturity and poorer quality timber adding to a reduced return on investment. The delivery of broader woodland resource benefits, such as carbon storage, will suffer.

Hylobius is recognised as a serious and widely distributed pest of European forestry but population pressure is particularly acute in the UK and makes comparison of control measures with other European countries difficult because:

- our history of forest decline and the relatively rapid establishment of woodland since 1945 is entirely different from our European neighbours;
- much of our post-war planting has been coniferous plantation and as this resource has reached maturity the predominant management system has been to clearfell and replant; and because,
- our climate is more favourable to *Hylobius abietis* than that of our European neighbours.

Cypermethrin use on the WGWE in 2012 was estimated to account for 5.2% of use as an approved plant protection product in Wales with the majority being used in agricultural, horticultural and amenity applications and does not include approved veterinary and biocidal uses. Chemicals form only part of our plant protection programme for the WGWE and alongside research into other chemicals there is growing confidence in an effective combination of alternative measures: physical, biological and knowledge based. Some of the non-chemical alternatives have proven very effective such as nematodes and paper sleeves, though the former are limited by terrain and the latter only effective at low population levels. Others measures such as natural repellents, sand, glue and wax coatings are largely ineffective. A neonicotinoid alternative to cypermethrin, acetamiprid, is part of the UK research programme with active trials across the UK including Wales.

Forest Enterprise England (FEE) and Forestry Enterprise Scotland (FES) comply with the same FSC UK derogation though neither has made a public commitment to cease use of cypermethrin. Post-2017 FEE will be planting trees pre-treated by nursery supplier with alpha-cypermethrin as will FES. FES are considering an application for a further derogation for post-planting 'top-up' treatments in the field with cypermethrin whilst FEE will be replacing cypermethrin with the neonicotinoid alternative, acetamiprid. Several of the larger forestry companies are likely to submit an application for a derogation extension to continue using alpha-cypermethrin and cypermethrin but will also use acetamiprid as it becomes available. Some forestry companies are considering application to the Programme for the Endorsement of Forest Certification (PEFC UK) in preference to FSC UK where use of cypermethrin is not an issue.

Assessment

In early September 2016 the Executive Team (ET) reviewed progress towards the 2014 review Action Plan and agreed to implement the most effective and affordable combination of Integrated Forest Management measures. Annex 3 details the agreed package of integrated forest management measures showing how they help us deliver the SMNR on the WGWE and the residual challenges. The integrated approach, using a combination of current management techniques and available control methods includes:

- Adoption of the Hylobius Management Support System (HMSS) across the whole programme, to inform management decisions;
- Adoption of a no-treatment regime, when the HMSS predicts that this is a sensible approach;
- Adoption of a five year fallow period on high altitude, less fertile coupes and where other management considerations do not take precedence;
- Continue to use physical barriers, where weevil populations are predicted to be low to medium;
- Continue to use nematodes, where sequential treatment in discrete forest blocks, offers the best value from this expensive treatment;
- Adopt the use of acetamiprid, as a method of last resort and as soon as application methods have been proven.

This approach can be further monitored and adapted as we learn and develop new methods and solutions.

Data shows that although the use of cypermethrin has declined by nearly half in the last six years chemical control methods remain significant when we expereince high beetle population pressure and unsuitability of alternatives across the suite of sites in the programme. Based on progress to date the integrated use of non-chemical alternative measures offer only partial plant protection with failure to achieve best practice restocking across 20 to 40% of the replanting programme very likely.

Recommendation

The Board is asked to note:

- progress on delivery of the recommendations arising from the 2014 review of the use of cypermethrin on the WGWE
- that we are continuing with our integrated forest management approach to limit the damage from *Hylobius* to newly planted trees on the WGWE; and that,
- we will continue to learn and adjust our work programmes as challenges arise including the affordability of measures; and that,
- we remain committed to ceasing the use of cypermethrin and minimising the use of alternative chemical control measures.

Key Risks

In meeting our commitment to cease the use of cypermethrin in our plant protection programme after 31st October 2017 residual risks are:

- only **partial plant protection** measures being available in the short term as we satisfy ourselves that the environmental risk from new chemical delivery systems can be mitigated and because current non-chemical alternatives are not capable or effective across all site types requiring treatment
- To stop using cypermethrin will **increase the cost** of our plant protection programme. The combination of chemical and non-chemical approaches are more expensive and require changed working practices, new skills and training to mitigate risks and ensure effectiveness.
- **Damage to our reputation**. Although we are committed to ceasing use of cypermethrin by October 2017, the replacement of one chemical with another, despite reduced chemical use overall, may “transfer” the concerns of fisheries and environmental groups rather than tackle them.
- **Damage to our reputation**. If we only provide partial plant protection without a chemical option, our commitment to provide quality timber and other resource benefits from woodland will risk SMNR and will raise market concerns in the forestry sector.
- We will **displace environment risk** by increasing the need for herbicide treatment to successfully establish woodland on some sites (following extended fallow). Extended fallow may risk increased ‘fly in’ of adult beetles to other forest growers who may prefer chemical treatments.
- **Failure to reduce the background population** of *Hylobius* to levels where control measures are more effective and chemical use can be minimised. Whilst not a panacea, greater commitment and investment across the forest sector to the increase the planning, use and monitoring of Lower Impact Silvicultural Systems (LISS) will help tackle the cause (lots of breeding material) rather than just treat symptoms (epidemic beetle population levels).

- Changed (and in some cases) unknown **environmental risk** from increased use of a new chemical, acetamiprid, requiring supervisor and contractor training together with environmental monitoring and assessment of adherence to best practice.
- **Maintenance of certification to the UK Woodland Assurance Standard** as we rise to the challenge of using the best combination of control measures with a minimum of chemical use.

Financial Implications

The cost of our plant protection programme is around £515,000 which varies from year to year dependent on site characteristics, population pressures predicted or observed and actual tree losses. The total additional cost is estimated at nearly £360,000 arising from the agreement to:

- Proceed with full adoption of the decision support regime (Hylobius Management Support System or HMSS) increasing field work, data input and analysis;
- Increase expenditure on herbicide treatment as a result of woody weed growth following lengthened fallow periods;
- Maximise use of waxed paper sleeves for ~10% of the programme;
- Target use of nematode treatment for ~20% of the programme;
- Minimise use of the more expensive acetamiprid as a pre-plant treatment and post-plant top-up treatment, and only when necessary; and,
- Replace the plant losses arising should acetamiprid not be operationally ready by October 2017.

A proportion of additional costs can be tackled in the short to medium term through maximising returns from timber sales (via our Timber Marketing Plan 2017-21) though this is dependent on currently rising timber prices. In the long term costs may be met by making changes to our management practice to reduce the need for expensive control measures. However funding for other activities will come under pressure as we seek to meet the cost and benefits arising from the implementation of a full plant protection programme and successful re-establishment of woodland following felling.

Equality impact assessment (EqIA)

An equality impact assessment has been completed (Annex 4). The initial screening exercise concluded that a full equality impact assessment was not required.

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Annex 1: 2014 review executive summary

Annex 2: Updated cypermethrin Action Plan (as of June 2016)

Annex 3: Agreed package of integrated forest management measures showing how they help us deliver the Sustainable Management of Natural Resources on the Welsh Government Woodland Estate and the residual challenges

Annex 4: EqIA screening

Annex 1
Agreed package of integrated forest management measures showing how they help us deliver the Sustainable Management of Natural Resources on the Welsh Government Woodland Estate and the residual challenges

SMNR principle	Active / agreed measures:	Residual challenges include:
Adaptive management	• Adopt the use of the Hylobius Management Support System (HMSS) across the whole programme, to inform management decisions. • Integrated forest management approach well established with action plan to review progress • Flexible portfolio of control methods as some are limited by terrain, location or beetle population levels. • The replanting sub-group of the land management BAR has carefully considered alternative re-establishment techniques for the current 3 year programme	• Changes in weather patterns affect *hylobius* population pressure during the year and from year to year (temperature and wind speed affect emergence) • Affordability of some measures especially levels of investment required to establish adequate health, safety and environmental protection levels and support the use of the HMSS • We will already have 3.55 year land-bank in 17/18, and whilst some sites can be restocked straight after felling, some can be delayed for five years, without significantly adding to the land-bank – but this is an issue that requires careful monitoring.
Scale	• The HMSS responds to site characteristics and predicted site population pressure through field work. • The continuation of collaborative research in the UK and its dissemination will help all forest managers take advantage of integrated forest management control methods across the forest management cycle. • A reduction in the use of clearfell systems will help regulate *Hylobius* population pressure	• A stronger corporate commitment and investment in the planning, use and monitoring of Lower Impact Silvicultural Systems (LISS) which will help tackle the cause (lots of breeding material) rather than just treat symptoms (epidemic beetle population levels). • Lack of spatially mapped data and system support for HMSS use
Collaboration and engagement	• Active and funded UK research and development programme with dissemination across the forest sector and available to the public • Our 2014 review has been shared with England, Scotland	• Our actions have implications for other growers especially our neighbours. • Divergent approaches between growers will reduce the effectiveness of some control measures and may increase the

	and Northern Ireland.	need for chemical control.
Public participation	We have engaged with forestry, fishing and environmental stakeholders on Action Plan progress and issues.	• The use of alternative chemicals is not welcomed by fishery and environmental groups. • Forest growers are concerned by the partial package of integrated effective alternatives as October 2017 approaches.
Evidence	• 2014 review • UK research and development programme • Habitats Regulation Assessment (HRA) of annual plant protection programme • Results from our across our environmental monitoring programme • Use of HMSS	• The research budget allocated to *Hylobius* control alternatives is at capacity yet gaps in evidence remain • There is limited capacity to fill the funding gap to secure minimum stocking densities and could affect Wales' future timber availability • Confidence needs to be increased across the forest sector in the efficacy of alternatives to chemical treatment • Improvement required for detection and monitoring of chemical control measures in our water quality programmes and to inform future HRA
Multiple benefits	• We have a duty to successfully establish replanted woodland sites which deliver a range of benefits for the economy, environment and people. • We respect that our actions have implications for other woodland owners and managers especially our neighbours. • Take advantage of natural regeneration where appropriate to meet site objectives.	• With no or partial plant protection there will be significant trade-offs for the flow of investment and return with impacts on the future productive potential of the estate. • Other benefits could be optimised but the WGWE currently supplies 60% of Wales' current timber availability.
Preventative action	• Adopt a no-treatment regime, when the HMSS predicts that this is a sensible approach. • Adopt a five year fallow period, when this practice is predicted to be effective by the HMSS and other management objectives do	• Achieving a balance of sites suitable for rapid planting and five year fallow to manage the 'land bank'. • Affordability of some measures especially levels of investment required to establish adequate

	not take precedence. • Continue to use physical barriers, where weevil populations are predicted to be low to medium. • Continue to use nematodes, where sequential treatment in discrete forest blocks, offers the best value from this expensive treatment. • Adopt the use of acetamiprid, as a pre-plant treatment and post-plant top-up treatment as soon as application methods have been proven but as a method of last resort. • Maximise use of waxed paper sleeves • Replace plant losses, to achieve minimum stocking density standards	health, safety and environmental protection levels and support the use of the HMSS • The introduction of new chemicals and control measures requires investment in contractor and staff training to safeguard health, safety and the environment. • We remain heavily reliant on chemical treatment to achieve full plant protection, mainly due to the limitations of alternatives particularly on steep ground, *Hylobius* population pressures, and financial constraints. • Nemotodes limited by terrain, location and restricted contractor resource and not usually effective as a stand-alone measure. • Only transfer to full use of acetamiprid when confident of operational delivery systems and environmental risk mitigation. A continued need to support operational trials. • Increased requirement for herbicide use as weed control on lengthened fallow sites becomes an issue.
Long-term	• Our action plan sets a framework of short, medium and long term measures. • We have a duty to successfully establish replanted woodland sites • Reduce the reliance on clearfell which will reduce highly concentrated patches of breeding material and help regulate *Hylobius* populations.	Whilst progress is being made it is slow and requires larger scale co-operation and commitment between land owners and managers.
Building resilience	• The UK Forestry Standard sets out the requirements for good forestry practice • We have three good practice guides to encourage resilience in Welsh woodlands: structural	Whilst progress is being made it is slow and requires larger scale co-operation and commitment between land owners and managers.

	diversity, tree species choice and genetic conservation and diversity.	