WRAG – UK

Recent publications: Herbicide resistance risks - precision application & amenity



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BCPC Weeds Review 2026 — 19 November 2026

Join the WRAG group

https://www.linkedin.com/groups/12757011/

Weed Resistance Action Group
https://ahdb.org.uk/wrag

WRAG UK - resistance management

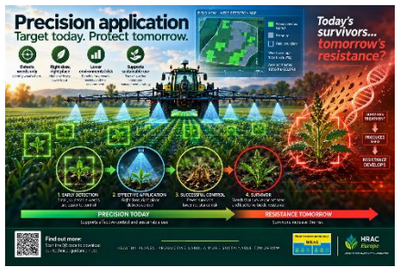
Current & emerging challenges for weeds & resistance

Glyphosate & sectoral challenges (incl. amenity & perennial crops)

Rotational weed management & IWM

Precision application & resistance risk

WRAG: collaboration



HRAC Europe



Amenity Forum (UK)

Weed Resistance Action Group
https://ahdb.org.uk/wrag

WRAG objectives



to provide a forum for **information exchange** between people actively involved in research into herbicide resistance;



to discuss resistance **test methodologies** and agree standards;



to discuss and **promote strategies** to avoid resistance and to manage resistant populations;



to agree **statements for the media**, whether in response to queries or as unsolicited news releases;



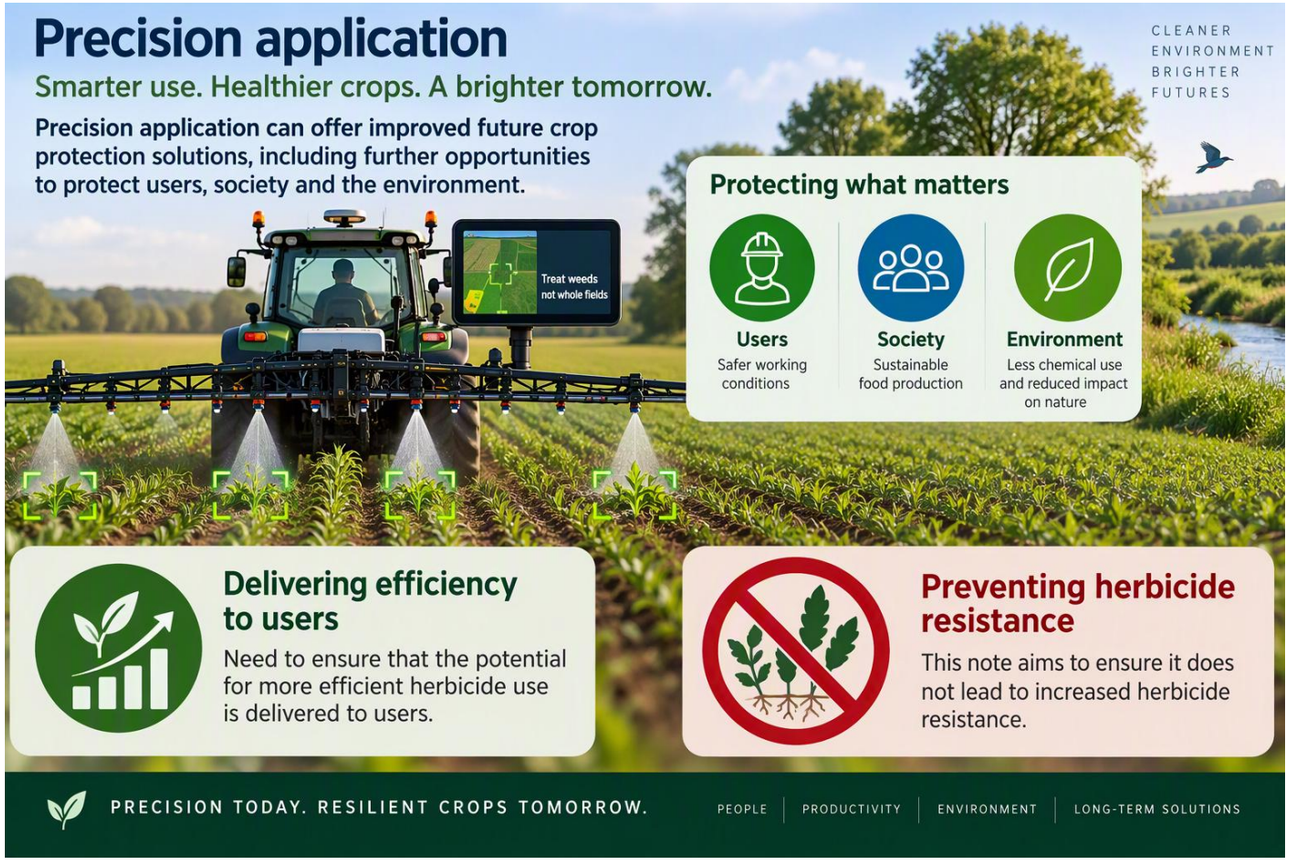
to define **research needs**;



to maintain **communication** with similar groups which have been established successfully in other countries.

Precision application and herbicide resistance risks

- Precision application can offer **improved future crop protection solutions**, including further opportunities to protect users, society and the environment.
- Need to **ensure** that the potential for more **efficient herbicide use is delivered** to users.
- The technical note aims to ensure it **does not lead to increased herbicide resistance**.



Precision application must follow the rules

Smarter technology. Responsible use.
Sustainable farming.

Target weeds. Protect what matters.

- SAFER PEOPLE
- HEALTHIER ENVIRONMENT
- MORE RESILIENT CROPS



Greater precision for a more sustainable tomorrow

1 Water volume restrictions still apply



Restrictions on application volumes (water rate per treated area) set out in authorisations and manufacturer recommendations still apply to precision applications.

2 Do not exceed authorised application rates



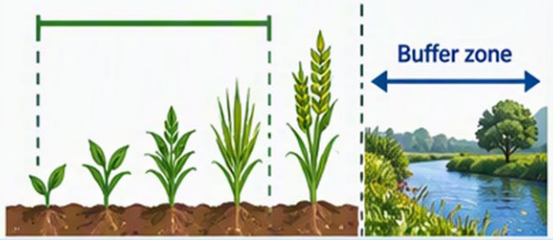
Application rates (of a.s.) indicated (in l/ha) should not be exceeded on the basis that a smaller proportion of the total field area is treated.

3 Use only on authorised crops



Precision application cannot be used to apply products to crops for which they are not authorised.

4 Growth stage limits and buffer zones still apply



Restrictions placed on the use of a pesticide, such as crop growth stage limits and buffer zones, still apply unless explicitly stated in an authorisation.

Precision application improves targeting, not regulatory limits.

- EFFICIENT USE OF INPUTS
- PROTECTS USERS AND SOCIETY
- HELPS SAFEGUARD THE ENVIRONMENT
- SUPPORTS SUSTAINABLE FOOD PRODUCTION

FARMING TODAY FOR TOMORROW

Precision application

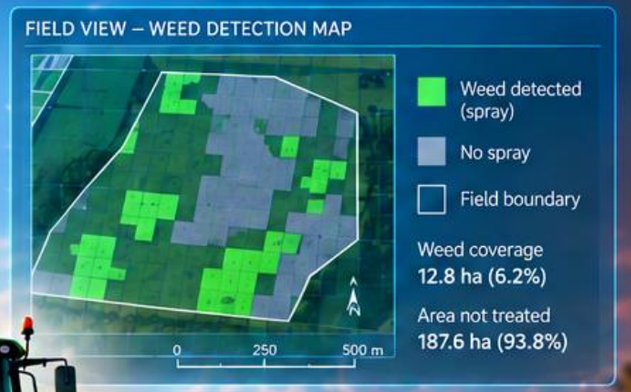
Target today. Protect tomorrow.

Detects weeds only
Identify what's there

Right dose, right place
Higher efficacy, lower input

Lower environmental risk
Benefits for growers, society and the environment

Supports sustainable use
Part of a wider integrated management strategy



Today's survivors... tomorrow's resistance?

SURVIVES TREATMENT
↓
PRODUCES SEED
↓
RESISTANCE DEVELOPS

1. EARLY DETECTION
Small, vulnerable weeds are easier to control

2. EFFECTIVE APPLICATION
Right dose, right place delivers control

3. SUCCESSFUL CONTROL
Fewer survivors lower resistance risk

4. SURVIVOR
Weeds that survive can set seed and lead to herbicide resistance

PRECISION TODAY
Supports effective control and sustainable use

RESISTANCE TOMORROW
Survivors increase the risk

Find out more:
Scan the QR code to download our technical guidance note.

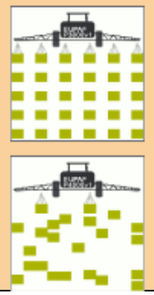
HEALTHY PLACES. PRODUCTIVE LAND. A MORE SUSTAINABLE TOMORROW.

Weed Resistance Action Group
WRAG

HRAC Europe
HERBICIDE RESISTANCE ACTION COMMITTEE

Precision application and herbicide resistance risks

Potential effect of precision application on possible herbicide resistance risk.

	Application Method	Description of application	Concern of resistance risk compared to Baseline	Areas of concern
Broadcast		To the whole field	Baseline	
Band		To either crop row or inter-row	= / ↗	Reduced efficacy on weeds at spray edge. Alternative control methods, cultural or chemical, are needed for untreated areas that support good Integrated Weed Management (IWM) practice.
Patch		To defined weed patches	↗	Poor weed detection may result in untreated weeds from one product in a sequence. Inaccurate application of weed patches may result in reduced efficacy at spray edge. Alternative control methods, cultural or chemical, are needed for untreated areas that support good IWM practice.
Spot (regular/irregular)		To discrete weed targets	↑	Poor weed detection may result in untreated weeds from one product in a sequence. Inaccurate application / variation in weed growth stage may result in sublethal doses being applied. IWM practices compromised due to an increased risk of over-reliance on a single active substance or mode of action to control weeds in spots.

	Application Method	Description of application	Concern of resistance risk compared to Baseline	Areas of concern
Single plant		To target individual plants	↗	Poor weed detection may result in untreated weeds from one product in a sequence. Inaccurate application / variation in weed growth stage may result in sublethal doses being applied. IWM practices compromised due to an increased risk of over-reliance on a single active substance or mode of action to control individual weeds.
Variable Rate Application (VRA)		Using above methods, however, dose rate varies spatially	↑↑	Weed detection and application accuracy must ensure that the required effective dose is applied to give effective control of the weed population. IWM practices compromised due to increased risk of over-reliance on a single active substance or mode of action for weed control. Alternative control methods, cultural or chemical, are needed for underdosed areas.

↗ *Small Increase;* ↑ *Moderate increase;* ↑↑ *Large increase; = Similar; all based on expert opinion*

Weed Resistance Action Group

https://ahdb.org.uk/wrag

Opportunities for machinery developers to consider



Application accuracy

Deliver the right dose, including at zone edges. Use adequate buffers and give users evidence of accuracy.



Better weed detection

Improve detection to support reliable precision application.



Monitor survivors

Check after application and identify possible resistance early.



Control surviving weeds

Enable follow-up treatment with effective authorised herbicides from different modes of action, or non-herbicide methods.

Actions for advisers and farmers



Justify precision use. Improve control without increasing survivors, within an integrated weed management plan.



Apply the full effective dose. Do not reduce doses where weed species, density or growth stage are uncertain.



Respect product labels. They apply to all methods. Do not overdose.



Inspect and control survivors. Check missed or expanding patches. Plan follow-up treatment or non-herbicide control.



Find the cause. Distinguish resistance from missed plants, poor application or detection.



Review repeated herbicide use. Escalate concerns about repeated modes of action. Use WRAG and HRAC sampling and testing guidance.

Sustainable use of precision application remains possible if growers and advisers follow four core principles



Maintain efficacy

Apply the full effective dose to target weeds. Good application quality and spray coverage are vital for control.



Avoid survivors

Plan follow-up control of missed weeds using alternative methods.



Integrated weed management (IPM)

Combine cultural control with residual and contact herbicides that have different modes of action.



Monitor outcomes

Track patch development and survivors after treatment. Use genetic analysis where appropriate.

Integrated approaches for sustainable amenity weed control

PEOPLE | PLACES | BIODIVERSITY | A MORE SUSTAINABLE TOMORROW

Right approach today... continued control tomorrow



Glyphosate resistance is now present in UK agriculture.



Risk of glyphosate resistance in amenity situations is high.

NON-CHEMICAL CONTROL
Mechanical, thermal and other methods

RIGHT HERBICIDE USE
Right dose, right place, right time

INTEGRATED VEGETATION MANAGEMENT (IPM)
Combine methods for long-term control

MONITOR AND ACT
Look for survivors and take action

PROTECT THE FUTURE
Reduce resistance risk for people, places and the environment

SURVIVORS CAN LEAD TO RESISTANCE

Repeated use can allow resistant weeds to survive and multiply.

CLEANER
GREENER
SAFER
COMMUNITIES

Find out more
Scan the QR code for guidance and resources on managing glyphosate resistance risk in amenity weed control (UK).

INTEGRATED ACTION. LASTING BENEFITS.
HEALTHY PLACES FOR PEOPLE, PLANTS AND WILDLIFE.

Amenity forum

Weed Resistance Action Group
WRAG

KNOWLEDGE | COLLABORATION | RESILIENT PLACES

Summary and actions



Promote both leaflets

Share both leaflets through your networks.



Share new evidence

Send new or emerging evidence to help refine and update the leaflets.



Policy and regulation

Resistance risk needs clearer guidance & evidence standards.



Research

How precision application affects herbicide resistance

Thank you

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WRAG website

LinkedIn group

Precision application leaflet

Amenity leaflet

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