Why control weeds?

Competition for resources
  • Water
  • Nutrition
  • Light

Spread disease – Virus PVY/PVLR TRV and disease *P. infestans, rhizoctonia solani*

However in low levels weeds e.g. flowering weeds can increase beneficial insects populations – improve aphid control (Companion Crops)
Weed Control options

- Mechanical – Organic production (conventional production)
- Plant protection products
- Novel options (electric)

CARBON losses
COST increases
Weed Control options – Mechanical options

Widely used in organic production but also some conventional production

1. Thermal control prior to emergence

Vanhocke thermal weeder
Weed Control options – Mechanical options

Widely used in organic production but also some conventional production

1. Thermal control prior to emergence

2. Breaking ridge down (at rosette stage) –
   • Rake harrows – Opico, Trefler, Hachembichler
Weed Control options – Mechanical options

Widely used in organic production but also some conventional production

1. Thermal control prior to (pre-emergence)
2. Breaking ridge down (at rosette stage)
3. **Star/finger rotary weeders (20% ground cover)**
Weed Control options – Mechanical options

Widely used in organic production but also some conventional production

1. Thermal control prior to (pre-emergence)
2. Breaking ridge down (at rosette stage)
3. Star/finger rotary weeders (20% ground cover)
4. **Combination tines/disc ridgers (20% ground cover)**
Weed Control options – Mechanical options

Widely used in organic production but also some conventional production

1. Thermal control prior to (pre-emergence)
2. Breaking ridge down (at rosette stage)
3. Star/finger rotary weeders (20% ground cover)
4. Combination tines/disc ridgers (40% ground cover)
5. **High clearance Re-ridger**
   (up to 80% ground cover)
Weed Control options – Herbicide Timings (plant protection products)

- Pre crop
  - Creeping thistle
  - Couch grass
  - Volunteer potatoes

- Pre-emergence Residuals and Contacts

- Post emergence Limited BLW control, graminicides (not blackgrass)
## Residuals Herbicides

<table>
<thead>
<tr>
<th>Active</th>
<th>Trade Names</th>
<th>Weed control</th>
<th>Restrictions on Soil types</th>
<th>Varietal interactions</th>
<th>Following crop restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>aclonifen</td>
<td>Emerger</td>
<td>Fat Hen, S.Nettle, charlock, runch, mayweed</td>
<td></td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>clomazone</td>
<td>Gamit 36 CS</td>
<td>Cleavers, Groundsel</td>
<td></td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>metobromuron</td>
<td>Praxim</td>
<td>Knotgrass, b.bindweed, charlock, runch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>metribuzin</td>
<td>Sencorex flo</td>
<td>Charlock, runch, annual grasses, groundsel</td>
<td></td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>pendimethalin</td>
<td>Stomp</td>
<td>b.bindweed, fumitory, Fat hen, Red shank</td>
<td></td>
<td></td>
<td>yes</td>
</tr>
<tr>
<td>prosulfocarb</td>
<td>Defy</td>
<td>Cleavers, B.Bindweed, Nightshade</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flufenacet & metribuzin | Artist | Blackgrass, cleavers in addition to metribuzin | Nightshade              | yes | yes | yes
Potential new active (approval for potatoes) 2024??
improved groundsel, w.campion and nightshade control – pre-emergence in combination with other actives

Demonstration Trials 2022
# BCPC Weed Review – Weed control in Potatoes

## Residuals – Current Regulatory position

<table>
<thead>
<tr>
<th>Active</th>
<th>Trade Names ***</th>
<th>PSD expiry</th>
<th>EU 1107/2209 expiry</th>
<th>EU Notes</th>
<th>persistance in soil (DT_{50} days)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>aclonifen</td>
<td>Emerger</td>
<td>31/01/2026</td>
<td>31/07/2023</td>
<td>Candidate for substitution’ PBT**</td>
<td>long (80)</td>
</tr>
<tr>
<td>clomazone</td>
<td>Gamit 36 CS</td>
<td>30/04/2025</td>
<td>31/10/2023</td>
<td>Endocrine assessment 3/9/21*</td>
<td>moderate (27)</td>
</tr>
<tr>
<td>metobromuron</td>
<td>Praxim</td>
<td>30/06/2027</td>
<td>31/12/2024</td>
<td></td>
<td>moderate (22)</td>
</tr>
<tr>
<td>metribuzin</td>
<td>Sencorex flo</td>
<td>30/01/2026</td>
<td>31/07/2023</td>
<td>Candidate for substitution’ PBT**</td>
<td>moderate (19)</td>
</tr>
<tr>
<td>pendimethalin</td>
<td>Stomp Aqua</td>
<td>not set - default 2099</td>
<td>30/11/2024</td>
<td>Candidate for substitution’ PBT**</td>
<td>long (101)</td>
</tr>
<tr>
<td>prosulfocarb</td>
<td>Defy</td>
<td>30/04/2025</td>
<td>31/10/2023</td>
<td></td>
<td>short (10)</td>
</tr>
<tr>
<td>Fluenacet &amp; metribuzin</td>
<td>Artist</td>
<td>30/04/2024</td>
<td>31/10/2023</td>
<td>Endocrine assessment 3/9/21*</td>
<td>moderate (39)</td>
</tr>
</tbody>
</table>

*Active only available in a co-form*

** Potential future issues within EU with a number of actives**

* EU approval extension 3/9/21  ** University of Hertfordshire 'Pesticide Properties Database'  *** Other Trade names with same active
EU Future Proposals – plant protection products

‘Sustainable use of plant protection products Regulation 2021/2115’ 22nd June 2022

To revise and improve the SUD - Sustainable Use of Pesticides Directive (as stated in ‘A Farm to Fork Strategy’ and ‘European Green Deal’)

Options

- Reduce pesticide use within EU by 50% by 2030 – legally binding EU
- Reduce pesticide use within EU by 50% by 2030 – legally binding EU and Nationally – Own National targets
Consultation on the ‘Revised National Action Plan for the Sustainable Use of Pesticides (Plant Protection Products)’ December 2020 - DEFRA

Support the development and uptake of Integrated Pest Management (IPM)

*We will develop improved metrics for IPM uptake and updated environmental indicators for pesticides to provide a suitable baseline against which we can establish appropriate reduction targets*

*We will establish a set of clear targets to support the reduction of risk associated with pesticide use by the end of 2022.*

- Consultation completed February 2021
- DEFRA response expected by end 2022
BCPC Weed Review – Weed control in Potatoes

Potato Herbicide Programs

Two Application Program

1. Residual approx. 14 days pre-emergence (generally products with 7 day pre-emergence recommendations) +/- glyphosate

2. Additional residual + contact @ up to 10% emergence

Single application (traditional) Program

Residual mix + contact @ up to 10% emergence

Post emergence only if required (either strategy)
Residuals – phytotoxicity
Particularly an issue with sands/light soils

Metribuzin phytotoxicity symptoms
BCPC Weed Review – Weed control in Potatoes

Residuals – phytotoxicity
Particularly an issue with sands/light soils

Clomazone

Pendimethalin
Conclusions – Residual Herbicides

- Options for Linuron replacement exist but costs will increase

- Knowledge of weed spectrum present will aid cost effective control – target actives

- *Metribuzin* is the most cost effective *a.i.* for many weeds, include in most programs - **BUT** be careful of soil types and variety susceptibility

- 3 A.I. mixes provide a broader range of control of weed spp. particularly when only low rates of metribuzin can be used
## Non-Selective Contact

<table>
<thead>
<tr>
<th>Active</th>
<th>Trade Names*</th>
<th>Weed control</th>
<th>Weakness</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>carfentrazone</td>
<td>Shark</td>
<td>BLW</td>
<td>no grass weed control, poor mayweed, groundsel</td>
<td>upto 10% emergence</td>
</tr>
<tr>
<td>pyraflufen-ethyl</td>
<td>Gozai</td>
<td>Cleavers, Groundsel</td>
<td>no grass weed control</td>
<td>upto 10% emergence</td>
</tr>
<tr>
<td>glyphosate**</td>
<td>Roundup</td>
<td>broadspectrum inc. blackgrass</td>
<td>s.nettle (if beyond cotyledon)</td>
<td>7 days pre emergence</td>
</tr>
<tr>
<td></td>
<td>Powermax</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Other Trade names with same active  ** Ware crops only
Non-Selective Contact

AHDB Contact herbicide trials 2019-2020

- Assessment of contact options following loss of diquat – increased damage
- Delayed canopy expansion with late applications of PPO inhibitors
Problem Weeds – Hairy nightshade *Solanum physalifolium*

- Observed across UK but particularly Norfolk/Suffolk
- Widespread in carrot crops (loss of linuron)
Problem Weeds – Hairy nightshade *Solanum physalifolium*

- Highly susceptible to ‘late’ blight
Problem weeds

B. Bindweed (non metribuzin tolerant varieties)
Companion Crops – Integrating Herbicides
BCPC Weed Review – Weed control in Potatoes

Novel Approaches – Band spraying – reduce AI loading
BCPC Weed Review – Weed control in Potatoes

Novel Approaches – Electric Weeding?
Thank you