Weed control in sugar beet herbicide changes/impact and issues
Pamela A Chambers
03.11.22
Why is weed control necessary in sugar beet?

Annual broad-leaved weed control 2012 BBRO Trials

- Untreated Yield t/ha
- Treated Yield t/ha
- Weeds/m2

BBRO WP: 61.8, 19.3
BBRO BH: 79.2, 35
BBRO HF: 97.9, 15.9
BBRO CP: 98, 10, 192.8
Weed control in sugar beet spring 1961
Weed control time-line

1950 & 60’s beet herbicides were introduced

Initially herbicides were used in conjunction with tractor hoeing and hand weeding

Band spraying was used in the early 1960’s

Low dose techniques became popular as from the 1970’s

Overall spraying used extensively in the early 1980’s onwards

Hand pulling for weed beet, tractor hoeing and weed wiping still used

2019 Conviso One authorisation granted

<table>
<thead>
<tr>
<th>Active</th>
<th>Year of introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>chloridazon</td>
<td>1964</td>
</tr>
<tr>
<td>chlorpropham</td>
<td>1951</td>
</tr>
<tr>
<td>cycloate</td>
<td>1966</td>
</tr>
<tr>
<td>desmedipham</td>
<td>1969</td>
</tr>
<tr>
<td>lenacil</td>
<td>1965</td>
</tr>
<tr>
<td>phenmedipham</td>
<td>1967</td>
</tr>
<tr>
<td>trifluralin</td>
<td>1961</td>
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</table>
# Herbicides for annual broad-leaved weeds (2022)

<table>
<thead>
<tr>
<th>Active (s)</th>
<th>Residual</th>
<th>Contact</th>
<th>Pre</th>
<th>Post</th>
<th>HRAC (2020)</th>
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</thead>
<tbody>
<tr>
<td>clopyralid</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>4</td>
</tr>
<tr>
<td>dimethenamide - p</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>15</td>
</tr>
<tr>
<td>ethofumesate</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>15</td>
</tr>
<tr>
<td>foramsulfuron*</td>
<td>✔</td>
<td>✔</td>
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<td>Lenacil</td>
<td>✔</td>
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<td>✔</td>
<td>✔</td>
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<tr>
<td>Metamitron</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>5</td>
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<tr>
<td>Phenmedipham</td>
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<tr>
<td>Quinmerac</td>
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<td>✔</td>
<td>✔</td>
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<tr>
<td>thiencarbazone-methyl*</td>
<td>✔</td>
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<tr>
<td>triflusulfuron-methyl</td>
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</tr>
</tbody>
</table>

* Conviso One chemistry
## Renewal status of annual broad-leaved beet actives (2022)

<table>
<thead>
<tr>
<th>Active Substance</th>
<th>Date introduced (Global)</th>
<th>Date EC 1107/220 inclusion expires</th>
<th>Date GB approval expires</th>
</tr>
</thead>
<tbody>
<tr>
<td>clopyralid</td>
<td>1977</td>
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<td>dimethenamid-p</td>
<td>1999</td>
<td>31.08.34</td>
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<tr>
<td>ethofumesate</td>
<td>1969</td>
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<td>foramsulfuron*</td>
<td>1995</td>
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<td>metamitron</td>
<td>1975</td>
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<td>31.08.25</td>
</tr>
<tr>
<td>phenmedipham</td>
<td>1967</td>
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<td>31.07.24</td>
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<tr>
<td>quinmerac</td>
<td>1993</td>
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</tr>
<tr>
<td>thiencarbazone-methyl*</td>
<td>2008</td>
<td>30.09.24</td>
<td>30.09.24</td>
</tr>
</tbody>
</table>

* Conviso One chemistry
Annual broad leaved weed control - key actives

- **phenmedipham**
  - Contact

- **metamitron**
  - Residual & Contact

- **ethofumesate**
  - Mainly residual

- **triflusulfuron-methyl**
  - Mainly contact
Position regarding triflusulfuron-methyl (TSM)

European Regulation - Rapporteur Member State (RMS) – France

May 2022  European Food Safety Authority (EFSA) conclusions published following the peer review. TSM meets the cut-off criteria for non-approval concerning endocrine disruptor (ED)

    Derogation under Article 4.7 requested regarding the necessity of TSM to control a serious danger to plant health. This is supported by a number of Member States.

July 2022  An extension of the current approval which expires 31.12.22 was in principle agreed but has not yet been published

    The Commission is supposed to submit the draft regulation within 6 months of receiving the EFSA conclusion at the (Standing Committee of Plants, Animals, Food and Feed (SCoPAFF) which they received in May

December 2024  Approval of active expires in G.B.
Position regarding phenmedipham (PMP) EU process

European Regulation - Rapporteur Member State (RMS) - Finland

May 2022 concluded that phenmedipham meets the criteria for an endocrine disruptor (ED)

June 2022 PMP Task Force (TF) Bayer Crop Science and UPL Europe Ltd issued a statement disagreeing with the conclusion of RMS

PMP has been sufficiently tested and does not meet the ED criteria

August 2022 public comment/consultation closed

2023 European Food Safety Authority (EFSA) conclusion due to be published. The commission then has 6 months to submit a draft regulation after publication

Derogation under Article 4.7 could be requested regarding the necessity of phenmedipham to control a serious danger to plant health if EFSA conclude non-renewal
Position regarding phenmedipham (PMP) G.B. process

Following Brexit, G.B. approval of phenmedipham was granted a three-year extension in line with transitional provisions

**July 2021**
GB renewal application submitted by UPL/Bayer Task Force to meet CRD deadline

**January 2022**
Submission of renewal dossier in G.B. (only submission of EU dossier required at this stage)

**December 2024**
Approval of active expires in G.B

The G.B. renewal programme is currently under development. Further guidance expected from HSE to clarify whether any dossier updates are then required to support active substance reviews in GB.
Herbicide resistance – ALS chemistry

ALS inhibitors used in sugar beet in G.B are foramsulfuron and thiencarbazone-methyl as in Conviso One and triflusulfuron-methyl.

In order to pro-actively minimize or manage the risk for the development of ALS resistance it is advised to follow Integrated Weed Management Principles (IWM)
EU Sugar Beet Acreage – impact on herbicide availability

**Graph 1 - EU Sugar Beet Acreage**

UK Sugar Beet Acreage 95K ha
2023/24
France, Germany and Poland could influence decisions

Source: FAS EU Posts based on Eurostat data.
Government policies and the impact on pesticide use

The demand for greater sustainability in agriculture and stricter regulatory conditions for Plant Protection Products are driving the development of novel weed control technologies.

The European Union’s Farm to Fork Strategy (FTF) and the EU Biodiversity Strategy envisages cutting the use of pesticides in half by 2030.

**Future Live** – Robotic weeding in the field. A partnership between University of Göttingen and the German sugar beet research institute IfZ together with KWS
- 80% reduction in herbicide use compared to conventional spraying
- 70% reduction in weed population

**FarmerSpace** – supported by funds of the Federal Ministry of Food and Agriculture (BMEL) based on a decision of the Parliament of the Federal Republic of Germany. A trial field for digital crop protection in sugar beet
- Remote sensing and drone technology
- Robotics

**IIRB** Seminar 2021 “Advancing weed control in sugar beet with sensors and field robotics”
Figure 5. Overview of sensors with suitable icons, application and implementation options with drafts of the working methods, that should be possible to be controlled via ISOBUS-Connection.

Source: Agronomy 2022, 12, 1620. Precision Chemical Weed Management Strategies: A review and a Design of a New CNN-Based Modular Spot Sprayer
Currently available digital-mechanical and spot systems in crop production

**Digital-mechanical weed control**

- **Autonomous**
  - RTK-supported recess of the crop
- **Tractor-carried**
  - Optical detection of weeds

**Smart / Spot-Spraying**

- Online procedure (one-step)
  - Image recognition of weeds and direct herbicide application
- Discontinuation procedures (two-step)
  - Image recognition of weeds and herbicide application in two stages

Source: S. Streit, Farmerspace digitaler pflanzenschutz
Summary

Threats

• Legislation and loss of actives will continue to be an issue
• Resistance to herbicides
• Small acreage of sugar beet compared to Germany, France and Poland will dictate product availability in G.B.
• Pressure to use less crop protection products

The future?

• New technology is becoming more feasible, need to keep informed and be aware of advances in other beet growing regions of the world and assess what is best suited to G.B.

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Weed control in EU

2021

2030+

Chemical only
Chemical + mechanical
Precision weeding

Source: KWS SAAT SE & CO. KGaA