Current weed control strategies in sugar beet

BritishSugar

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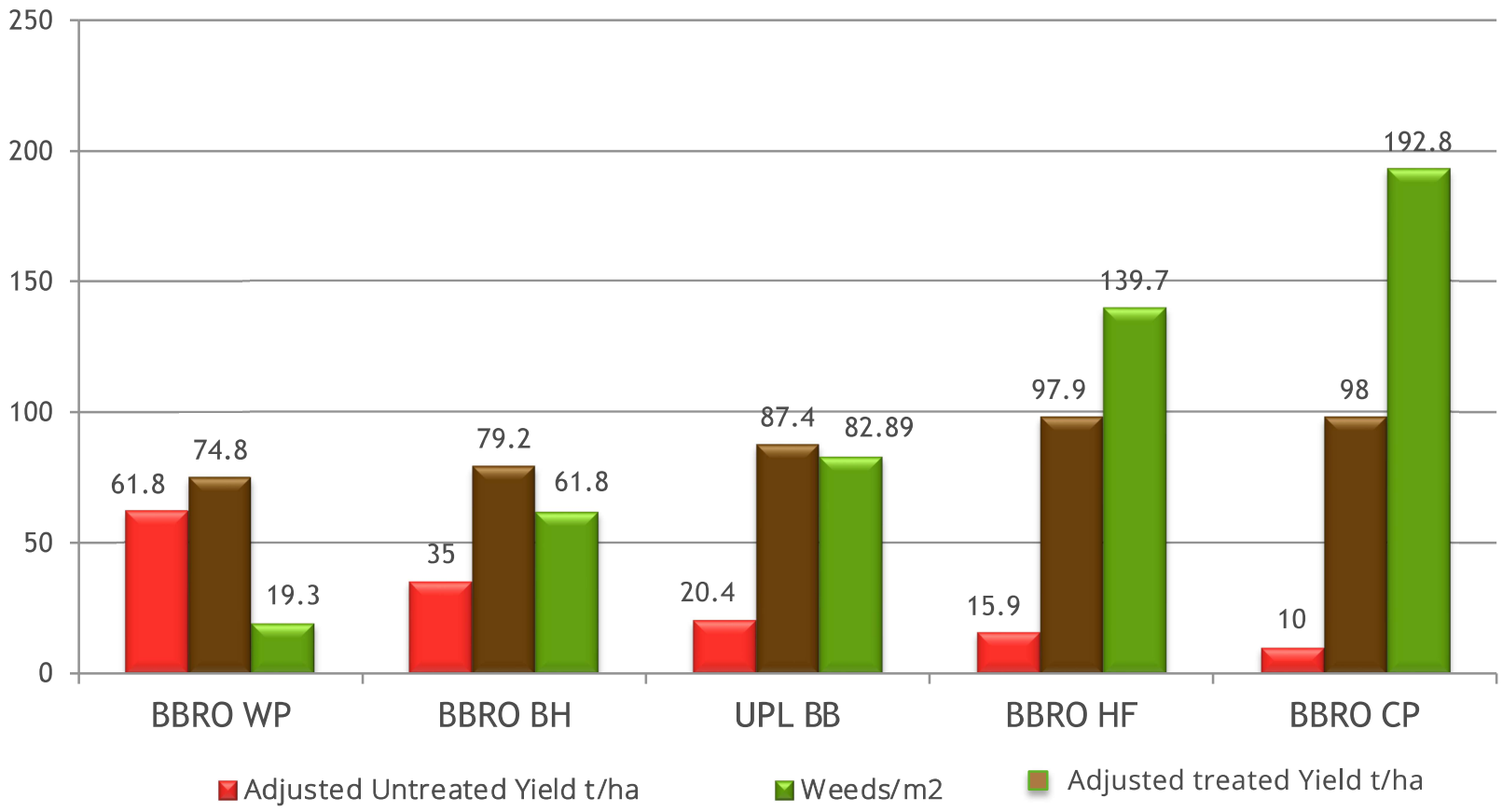
Why is weed control important?



Weed control time line

1950’s and 60’s 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

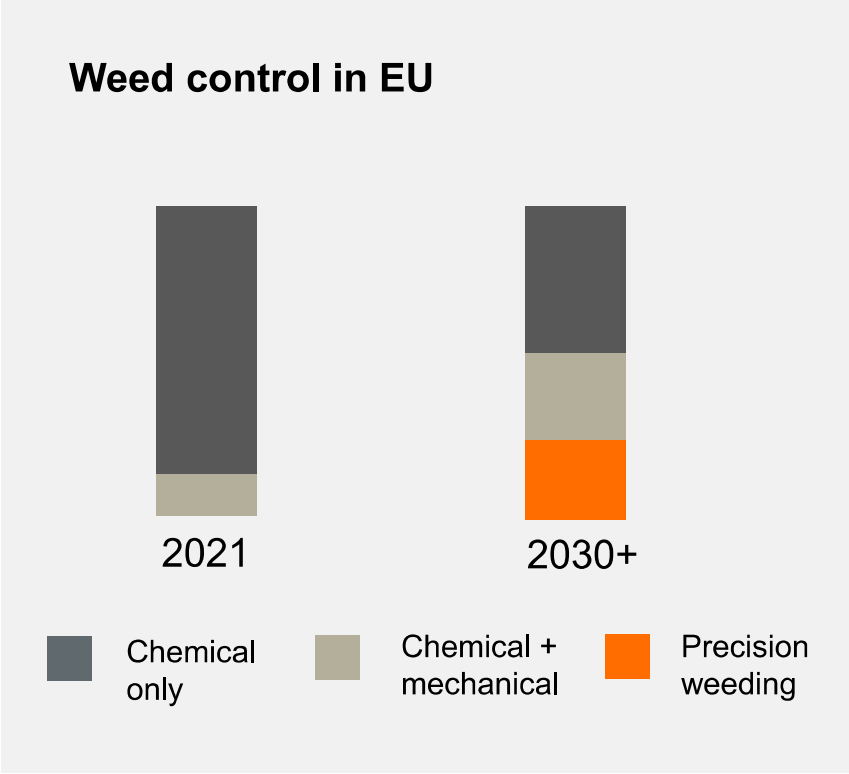
Overall spraying used extensively in the early 1980’s onwards

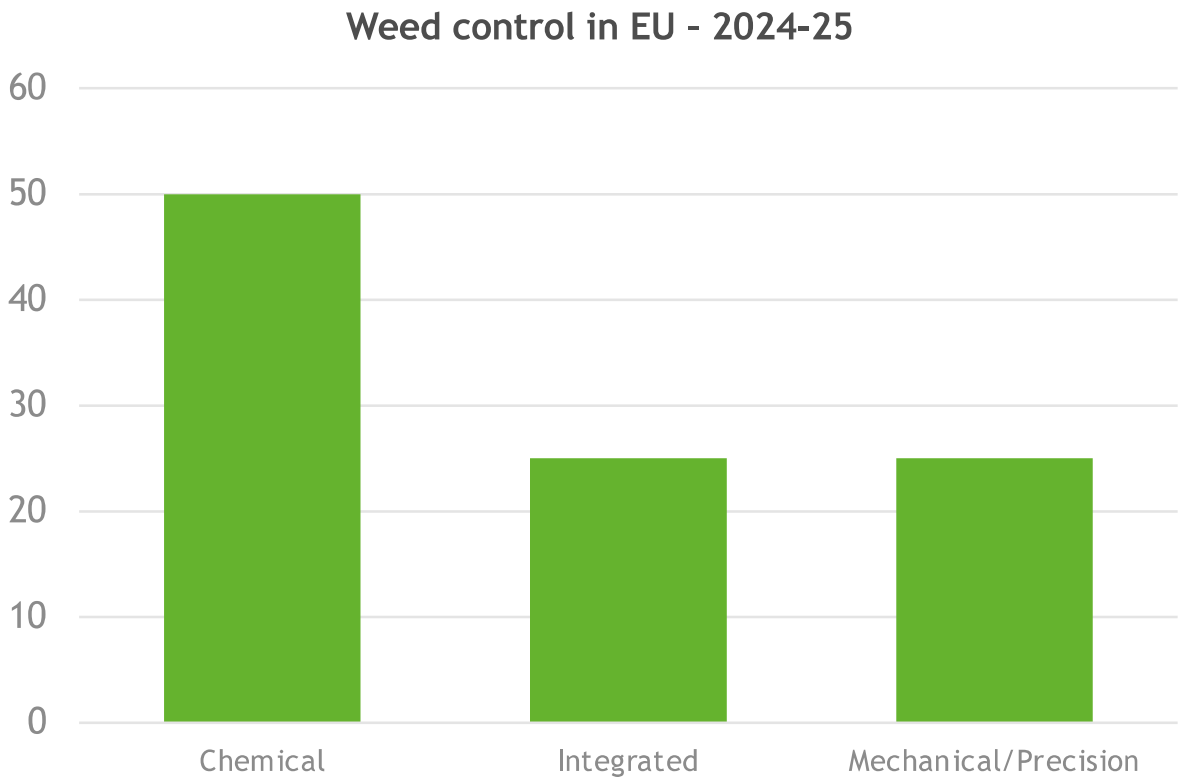
Hand pulling for weed beet, tractor hoeing and weed wiping still used

2019 Conviso One authorisation granted

Active	Year of introduction
chloridazon	1964
chlorpropham	1951
cycloate	1966
desmedipham	1969
lenacil	1965
phenmedipham	1967
trifluralin	1961

Current weed control in sugar beet

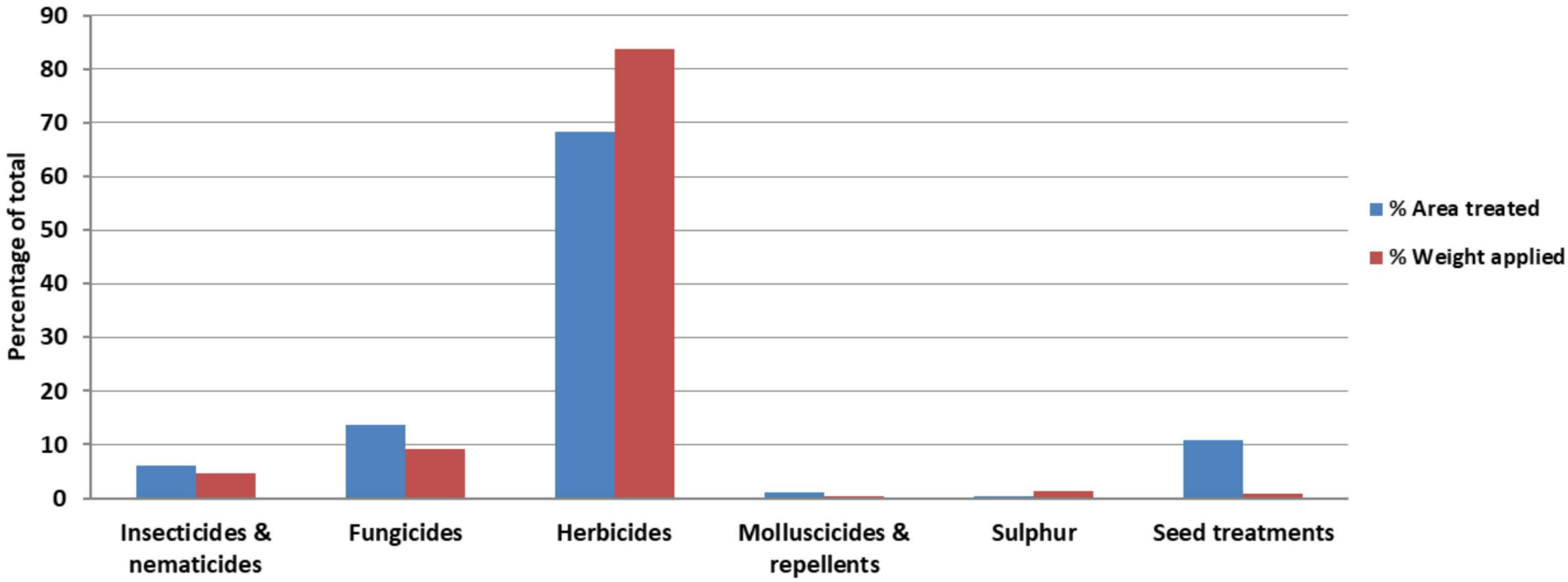




Source: KWS SAAT SE & CO. KGaA

Usage of pesticides on sugar beet - 2024

Figure 61 - Usage of pesticides on sugar beet - 2024



Source: Pesticide usage survey report 320

Sugar beet - herbicides

Sugar beet – Herbicides

- **Formulation area treated: 1,100,342 hectares**
- **Weight of formulations applied: 400.0 tonnes**
- **The five most common formulations were:**

	Formulation area treated (ha)	Weight of formulation applied (kg)	Proportion of herbicide – treated area	Proportion of June Survey area treated	Average number of applications (where applied)	Average proportion of full label rate
Metamitron	216,036	135,710	0.20	0.80	2.56	0.43
Phenmedipham	156,604	38,069	0.14	0.72	2.10	0.48
Ethofumesate	124,773	25,751	0.11	0.60	1.92	0.37
Ethofumesate/phenmedipham	108,976	46,236	0.10	0.49	2.15	0.74
Triflusulfuron-methyl	101,831	1,062	0.09	0.64	1.49	0.69

Key changes since last report

- Clopyralid made an appearance in 2022 with 99,038 ha treated but not in top five for 2024
- Triflusulfuron-methyl has gone up by 14,857 ha
- The formulated mix ethofumesate/phenmedipham is a new entrant for 2024
- Weight of formulations applied has increased by 64.6 tonnes

Herbicide actives for annual broad leaved weeds (2026)

Active (s)	Residual	Contact	Pre	Post	HRAC (2020)
clopyralid		✓		✓	4
clomazone	✓		✓	✓	13
dimethenamid - p	✓			✓	15
ethofumesate	✓	✓	✓	✓	15
foramsulfuron*		✓		✓	2
lenacil	✓			✓	5
metamitron	✓	✓	✓	✓	5
phenmedipham		✓		✓	5
quinmerac	✓		✓	✓	4
thiencarbazone-methyl*	✓	✓		✓	2
triflusulfuron-methyl		✓		✓	2

* Conviso One chemistry

Pipeline actives					
florpyrauxifen-benzyl		✓		✓	4

Including graminicides over 500 products registered for use on sugar beet!

Weed control systems

System	Components	Management	Weed Size	Flexibility
Standard managed approach	Contact + Residual	High (selected for weeds present)	Expanded cotyledon	10-14 days between sprays
FAR	F – Phenmedipham A – Activator R – Residual Low rates	Low (Some input on later sprays)	Early cotyledon	Meticulous timing every 7 (early on) to 10 days
'Active' – manufacturer programmes	Formulated products several a.i's + residual	Medium (Broad spectrum)	Cotyledon	Wider spray window
Broadacre	TSM + high rates contact + residuals	Medium (Broad spectrum)	First true leaves 1cm of the crop	2 'hits' 14 days apart
Conviso One	SMART variety + ALS chemistry	Medium/Low	Fat hen 2-4 true leaves	Perceived to be high
Spot Spraying	Conventional +/- ALS chemistry Low rates overall	Medium/Low (Broad spectrum	First true leaves	High

Standard managed approach

Include oil at an appropriate rate.
Vary rates of actives according to

- weeds present
- size of weeds
- climatic conditions

Consider using other actives for specific weeds

metamitron
700 g a.i./ha at all timings

ethofumesate
150 g a.i/ha at all timings

phenmedipham
320 g a.i/ha at all timings

Around £120/ha

Conviso SMART v Conventional

Variety	Seed Cost £/ha	Chemical Cost £/ha	Application Cost/ha	Total Cost £/ha
BTS915	£297.57	£140	£36.00	£440
BTS SMART 9485	£507	£63.97	£12.00	£582
				£142

Notes

Based on 1.2 units/ha

£144/ha higher cost for Conviso SMART

If you include a conventional spray - the costs will be higher!

Integrated weed control - large scale demonstration 2025

2025 – Yaxley, Suffolk

- BTS 9485 SMART variety
- 12m wide plots x field length x 2 reps
- Conventional and ALS chemistry
- Over-all and band spraying
- Lemken
- ARA/Ecorobotix

Key objectives

- Follow on work from 2024
- 2025 Field, demonstration day

Ara/Ecorobotix

4ha/hr – 7.2 km/hr

£24/ha

Weed control plots - 14.10.25 - herbicide costs

Untreated

Conventional

Conviso One

ARA/ECO

Conventional B/S + Hoe

Conviso B/S + Hoe

Hoe

BBRO Navenby 2025

Untreated

PMP + ETO + MTM + Lenacil + Oil

BBRO Brettenham 2025 - drone view

Source: Blackthorn arable

Emerging weed problems

Velvet leaf - *abutilon theophrasti*

Nut sedge

Barnyard grass/Cockspur - *echinochloa crus-galli*

Mugwort - *Artemisia vulgaris*

Native to the UK, common but becoming more of an issue in sugar beet

Ara/Ecorobotix - controlling common burdock

F78-39-30

F78-39-30

Active ingredients	Florpyrauxifen-benzyl
Formulation	Emulsifiable Concentrate 25.05g/l EC (80MLS = total dose 2GAI/ha)
Crops	Sugar Beet & Fodder Beet
Dose	Max total dose = 80ml/ha (delivering a total of 2gai/ha/season) Max individual dose = 40ml/ha Dose by application: • 4 applications of 20 ml/ha • **3 applications of 26.6 ml/ha** • 2 applications of 40 ml/ha
Application timing	Post-emergence: from cotyledon to beginning of leaf cover
Key strengths	• New chemical herbicide family to the sugarbeet market • Control of key and difficult to control sugarbeet weeds such as Fat hen, Fools Parsely, Cleavers, Annual Mercury, Umbelliferous species. • No label following crop restrictions • No physical, chemical or biology compatibility issues with other PPP • Good management tool to prevent and control ALS, and Photosynthesis inhibitor herbicide resistance weeds in sugarbeet (CHEAL)

F78-39-30 BBRO: Navenby 24.06.25 - total weed control

PMP x 3
45.17 weeds/m^2

F78 x 3
67.17 weeds/m^2

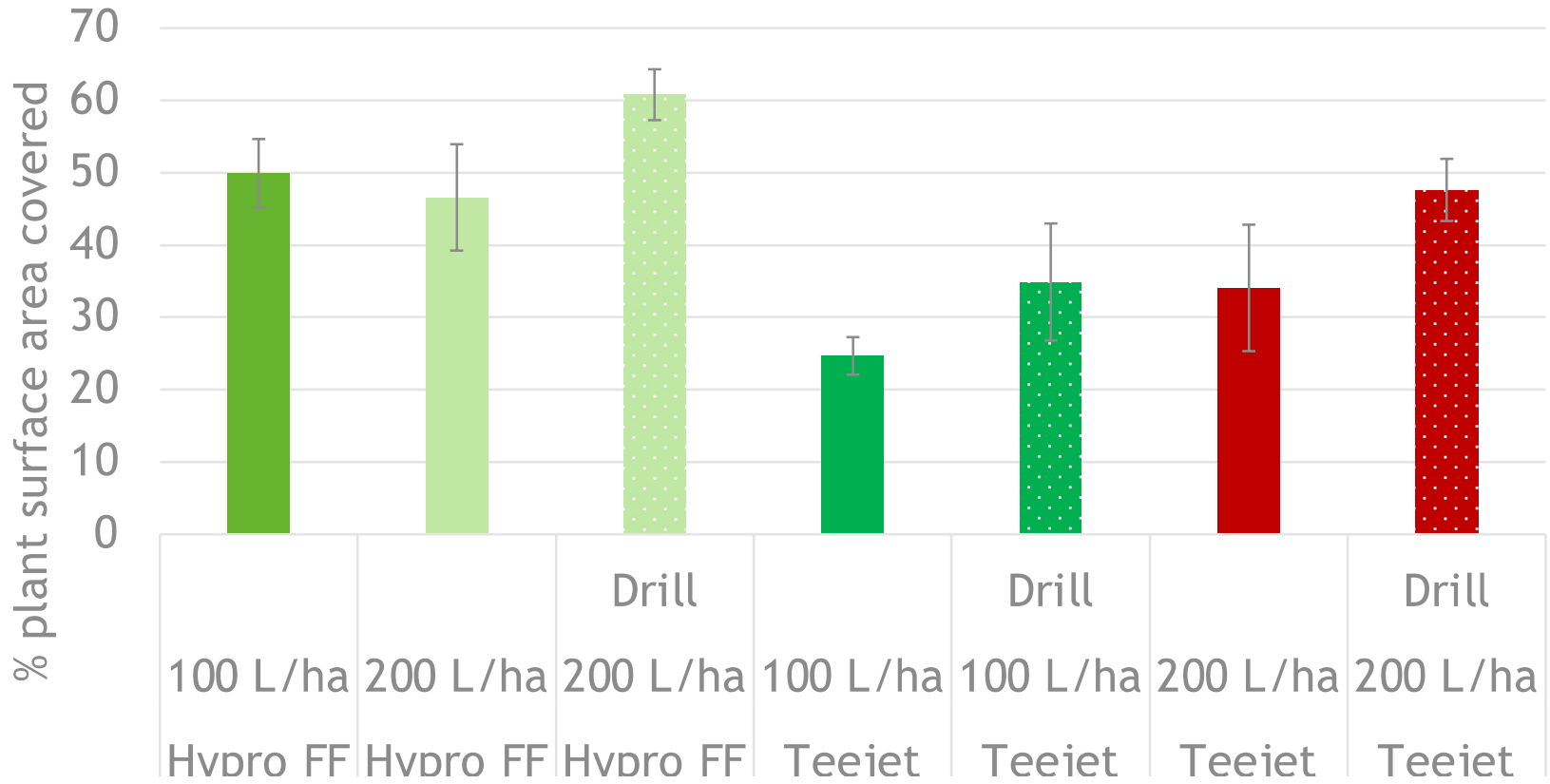
PMP + ETO +
MTM + LEN
7.33 weeds/m^2

F7B + PMP + ETO
10.17 weeds/m^2

All treatments had Phase II 0.5 L/ha

Nozzle technology

Nozzle technology



Error bars show standard deviation

[1]CRD Adjuvant Approval No. – A0544 An emulsifiable concentrate formulation containing 63.34 % w/w oil (rapeseed fatty acid esters) (EAC 1), 15.0 and 7.5 % w/w oil (tall oil fatty acids) (EAC 3); DRILL

Nozzle technology

Traditional G.B 1992
Yellow (02) flat fan 110 degree

Produce fine to medium sized droplets

Morley Research
”Most beet herbicides need to be applied as fine sprays (and this is true for the treatments we used)”

Netherlands 2025
120.03 Lechler ID (Blue)

Air-aspirating flat-spray nozzle
Produces fine to medium/coarse droplets
200 to 300 l/ha water
6 to 8 km/hr

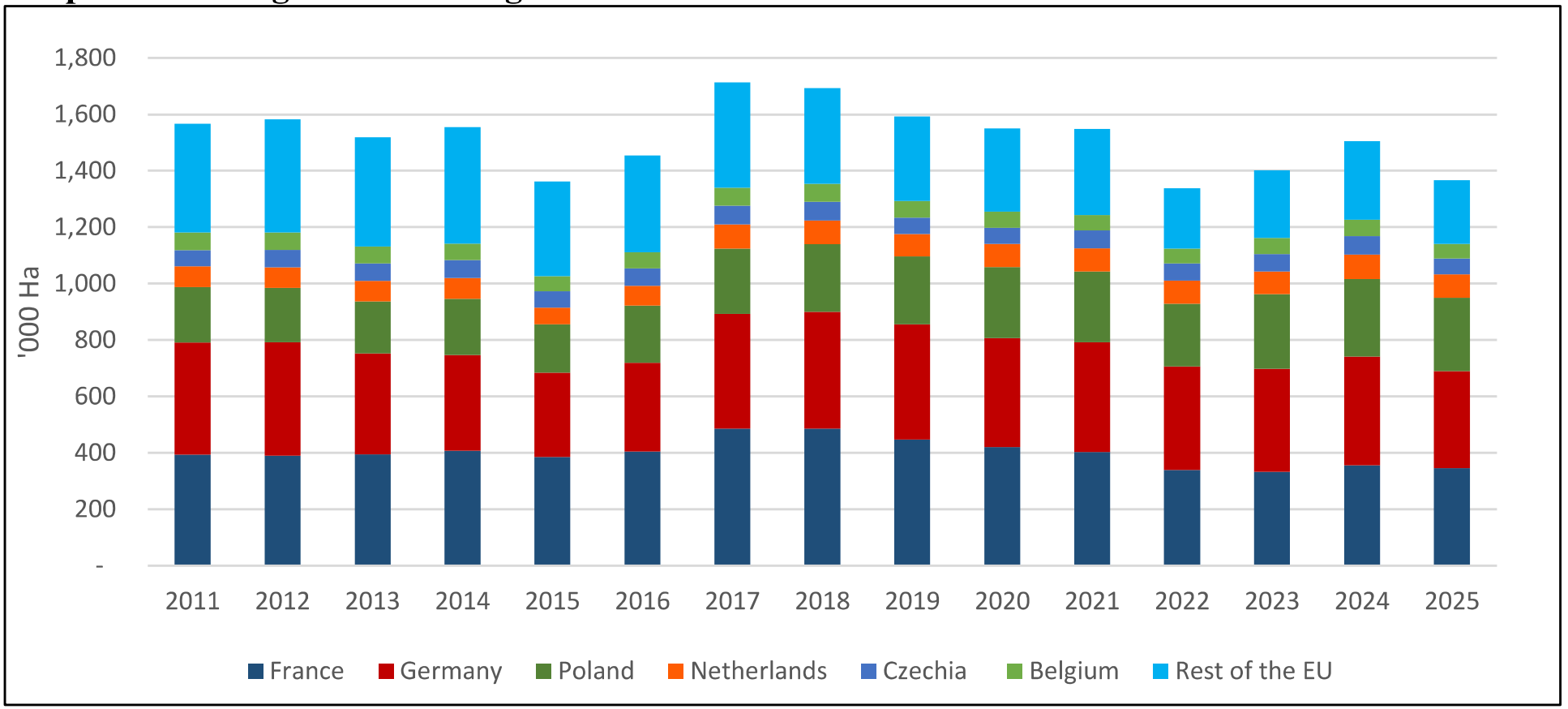
Sprayer workshops 2026
Suggested:
Hypro Defy 3D 30^0

100 l/ha 12-14 km/hr
Angled nozzle
Produces medium droplets

How will weed control strategies change and why?

The size of the G.B. sugar beet crop

Graph 1 – EU Sugar Beet Acreage



Source: FAS EU Posts and Eurostat data.

Precision application - spot spraying

ARA from Ecorobotix

6m wide, 7 Km/hr
4 ha/hr

See & Spray™ Select from John Deere

36.6m wide, 24 Km/hr
65-70 ha/hr

German research

Ecological and economic evaluation of conventional and new weed control techniques in row crops

Olga Fishkis [a], Jessica Weller [b], Jörn Lehmhus [b], Franz Pöllinger [c], Jörn Strassemeyer [c], Heinz-Josef Koch [a] (Source: Agriculture,Ecosystems and Environment 360 (2024)108786)

- Hoeing did not impair yield, soil erosion or number of insects, spiders and earthworms.
- No weed control method proves to be completely environmentally friendly.
- Conventional hoeing causes 150% higher greenhouse gas emissions as broadcast spraying.
- The new herbicide CONVISO ONE, while beneficial in many ways, causes the highest aquatic toxicity over other methods.
- FarmDroid hoe robot combined with spot-spraying is a low-toxic, a climate-friendly and an inexpensive technique.

German research

Combined Mechanical-Chemical Weed Control Methods in Post-Emergence Strategy Result in High Weed Control Efficacy in Sugar Beet

Jakob Berg [1],* , Helmut Ring [2] and Heinz Bernhardt [1]. (Source: Agronomy 2025 15 879)

Comments from abstract

In comparison to three consecutive broadcast herbicide applications, the mechanical–chemical combinations resulted in a similar or even superior weed control efficacy while enabling herbicide reductions of up to 65.59%.

- 2023 – 39 weeds/m^2
- 2024 – 19 weeds/m^2

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 may dictate product availability in G.B.
- Pressure to use less crop protection products
- Labour shortages
- PFAS

The future?

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

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Brettenham 2025 video
https://www.youtube.com/watch?v=jR4sUi2VmvM

Navenby 2025 video
https://www.youtube.com/watch?v=6-rS0Dx48mw