Weed Control

Key Points:

- Yields can be reduced by 11% or more by just one tall weed (e.g. volunteer oilseed rape, fat hen or redshank) for each 1m² of crop.
- For a 70t/ha crop an 11% yield loss would result in a £169/ha reduced revenue at £22.00/t* beet price for 2017.
- Results from BBRO trials in 2012 showed a 15% yield loss from mixed populations of 19 weeds/m² in untreated plots.
- 5 volunteer potatoes/m² can reduce yield by 16.5 t/ha (£363/ha at 2017*).
- Severe weed infestations in untreated plots can reduce yields by up to 90%.

** Beet price before any market bonus.*

Weed Competition

Sugar beet is very sensitive to weed competition. Weeds that emerge within eight weeks of crop emergence and those that grow above the crop and shade it, causing large yield reductions.

A good, evenly established crop is a great help with weed control. Do not under estimate the contribution the sugar beet canopy can make to weed suppression.

Ensure you control the most competitive weeds e.g. knotgrass, black bindweed, fat-hen, cleavers, volunteer oilseed rape and volunteer potatoes.
Woody weeds such as fat-hen and fibrous weeds such as knotgrass can be a problem at harvest.

Weeds in the clamp can reduce airflow and cause additional storage losses.

Ahead of drilling apply a non-selective herbicide for:

- Perennial weeds or volunteer potatoes just before or after cereal harvest.
- Weeds (2 true leaf stage +) present prior to seedbed cultivations.
- Volunteer cereals and black-grass.

Consider a pre-emergence application straight after drilling when the soil is moist:

- Gives flexibility in timing of post-emergence sprays.
- Helps where large populations of troublesome weeds are expected (e.g. black-grass).

Adopt a post-emergence system matched to spray capacity, management input and weed species present.

Main pre-emergence choices

Active(s)	Product example	Strengths
chloridazon	Takron (Not suitable for use on coarse sands, sand and fine sands)	Relatively inexpensive
chloridazon + quinmerac	Fiesta T	Cleavers, Fool's Parsley
chloridazon + metamitron	Takron + Goltix 70 SC	Knotgrass
ethofumesate + metamitron	Ethosat 500 + Goltix 70 SC	Black-grass

Adjuvant oils:

- Can improve weed control but can also reduce selectivity of herbicide products.
- Are of most benefit when weeds are large or 'waxy' (most likely to occur after periods of hot dry weather).
- Should always be used as recommended on the label (e.g. metamitron [Goltix 70 SC] alone, cycloxydim [Laser]). Oil adjuvants are also recommended in most FAR and Broadacre type systems.
- Can increase risk of crop damage when beet under stress (e.g. after wind blow, frost, pest or previous herbicide damage).
- As temperatures increase, so does risk of damage – use table on the right as guide for dose of oil.
- Current formulations of broad-leaved herbicides are generally well constructed and do not require an adjuvant to improve weed control (e.g. Betanal maxxPro) but these will often have a recommendation for addition of an adjuvant when low doses are used or weeds are likely to be particularly difficult to control.

Vary dose of oil according to temperature	
Max. temp (ºC) on day of spraying	Dose of adjuvant oil l/ha
Up to 14	1.0
14 to 18	0.75
18 to 21	0.50
Above 21	Not recommended

Pages 55 to 58 give detailed guidance on herbicide selection and they note treatments where adjuvant oils are part of the recommended treatment.

Weed Control

Actives for post-emergence mixes

Actives (s)	Product examples	Strengths
ethofumesate	Efeckt, Ethosat 500, Oblix 500	Cleavers, Knotgrass, Black bindweed
lenacil	Venzar Flowable	Brassica species, Black bindweed, Knotgrass
metamitron	Bettix Flo, Goltix 70SC,	Mayweeds, Knotgrass, Small nettle, Fat-hen, Annual meadow grass
phenmedipham	Betasana SC, Beetup Flo	Black bindweed, Fat-hen, Charlock, Ivy-leaved speedwell
triflusulfuron-methyl	Debut, Shiro	Brassicas, Fool's parsley, Cleavers, Mayweeds
desmedipham phenmedipham	Beetup Compact, Betanal Turbo, Rifle	desmedipham is useful in dry, cold conditions
clopyralid	Dow Shield 400, Vivendi 200	Volunteer potatoes, Thistles, Mayweeds

For more detailed information refer to page 50 onwards.

Post-emergence herbicide systems outline

System	Components	Management	Weed size	Flexibility
Standard managed approach	Contact + Residual	**(High)** Selected for weeds present	Expanded cotyledon Pre-em often used	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	Early true-leaf stage	Flexible Wider spray window
Broadacre	Debut + high rates contact & residuals	**(Medium)** Broad Spectrum	First true-leaves 1cm	Aim to use 2 'big hits' 14 days apart

Resistant black-grass control in sugar beet

- Sugar beet provides an excellent rotational opportunity to target black-grass control.
- Aim for an integrated approach combining cultural and herbicidal methods.
- After harvest allow black-grass seedlings to chit and remove them before winter ploughing.
- Apply glyphosate pre-drilling to remove black-grass prior to seedbed preparation.
- Tri-allate can be useful as part of a 'stacked' programme on soils with less than 10% OM (limited data).
- Also consider using pre-emergence sprays of ethofumesate and metamitron.
- Post-emergence treatments containing triflusulfuron-methyl (e.g. Debut) and ethofumesate appear to show useful increased black-grass control (limited data).
- In your overall programme aim to combine at least 2-4 different modes of action.
- Target post-emergence black-grass control at small plants (1 to 2 leaf stage). Control is dramatically reduced once black-grass plants have begun to tiller.

ACCase black-grass

- ACCase inhibitor graminicides may still offer some control, depending on degree of resistance, when used as part of a programme. For more information see the Weed Resistance Action Group (WRAG) website, www.pesticides.gov.uk.
- Use a pre-emergence minimum dose of ethofumesate* at 500 g a.i./ha + metamitron at 1400 g a.i./ha. Hold some ethofumesate** in 'reserve' for post-emergence applications.
- Use a post-emergence programme which includes ethofumesate* and metamitron.

Sugar beet herbicides with activity against 'ACCase' black-grass

Group	**MOA** (mode of action)	**Chemical Family**	**Active Ingredient**	**Product (examples)**
B	Inhibition of acetolactate synthase ALS	sulfonylureas	triflusulfuron-methyl	Debut Shiro
C_1	Inhibition of photosynthesis at photosystem II	triazinones	metamitron	Bettix Flo Goltix 70SC
N	Inhibition of lipid synthesis	benzofurans	ethofumesate *	Efeckt Ethosat 500 Oblix 500

* a maximum permitted total dose of 1.0kg of ethofumesate over a three year period on the same field.

** check ethofumesate product labels for permitted maximum individual doses as these to vary.