Identification and control of brome grasses

Information Sheet 31
Spring 2014

An infestation of barren brome in wheat.

Latest information

- There should be an 88–90% decline in the seedbank with a single year's fallow.
- An 18-month fallow, covering two autumn periods, should result in complete depletion of the seedbank if seed return is prevented.

Action

- Map brome patches in June/July.
- Identify brome to group or species.
- Shallow cultivate barren and great brome seeds to bury them as soon as possible after harvest, unless chopped straw provides good seed cover.
- Leave meadow, soft and rye brome seeds to ripen for one month before cultivating.
- Brome emerges quickly in moist soil and dormancy has little effect on emergence. Wait until brome has emerged and spray off with glyphosate pre-drilling.

Always read product labels, consider your local conditions and consult a professional agronomist, if necessary.

Identification

There are five species of brome grasses that grow as arable weeds in the UK, belonging to two different groups. As different control measures apply to each group, identification is important. Species are easier to identify once seed heads are visible (usually June/July).

All species can reduce yield and quality. At high populations, all species, especially barren (sterile) and great brome, can slow harvesting.

See page 2 for information on identification.

Control

Incidence may be reduced by:

- good ploughing (complete inversion of the furrow)
- late sowing (November)
- break crops in the rotation
- spring cropping
- cleaning machinery between fields
- stale seedbeds

The significance of these factors varies with species.

See pages 3 and 4 for information on control.

Biology

Most populations of all species have weak and/or shortlived initial dormancy when seed is shed. Some with stronger initial dormancy have extended seedling emergence (Figure 1). Although very few seeds (less than 1%) may become dormant, dormant seed surviving on or in soil can guarantee some survival from year to year.

Most seeds of all species will germinate when moist, either in the soil or on the surface in chopped straw.

Anisantha species – barren and great brome

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Flowering		■	■	■								
Seed shed		■	■	■	■	■	■					
Emergence				■	■	■	■	■				

Bromus species – meadow, soft and rye brome

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Flowering	■	■	■									*
Seed shed			■	■	■							
Emergence	*			■	■	■	■	■				*

*Soft brome only – flowers slightly earlier than meadow brome.

Figure 1. Aspects of weed development vary between the two species groups. Dormancy of the seed will be affected by the weather and will affect the proportion of freshly shed and older seed that will emerge in any given season.

Identification

Anisantha species

The two *Anisantha* species have long awns and loose floppy panicles (flowering heads).

Barren or sterile brome
Anisantha sterilis

Very competitive – 3 plants/m² causes 2.4% yield loss in winter wheat.

Awns 15–30 mm.

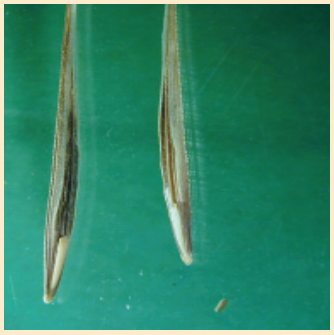
Great brome
Anisantha diandrus

3 plants/m² can cause up to 2% yield loss in winter wheat.

Awns 35–60 mm.

Head | Ligule | Seed







Bromus species

The three *Bromus* species have short awns and tighter neater panicles (flowering heads).

Meadow brome
Bromus commutatus

3 plants/m² can cause up to 2% yield loss in winter wheat.

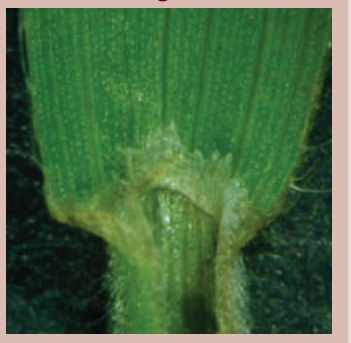
Soft brome
Bromus hordeaceus

3 plants/m² can cause up to 2% yield loss in winter wheat.

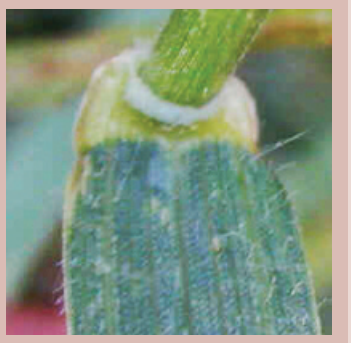
Rye brome
Bromus secalinus

3 plants/m² can cause up to 0.5% yield loss in winter wheat at high densities.

Head | Ligule | Seed








See **www.hgca.com/awe** for more images and information.

Cultural control

Preventing seed spread

Most infestations begin in headlands and field margins. Cultivating close to the boundary drags seed further into the field. Harvest and subsequent cultivations can move seed up to 50 metres.

Brome can be introduced via contaminated seed, feeding contaminated hay in the field or by spreading contaminated manure. Adopt zero tolerance in seed – certified or home-saved.

Meadow, soft and rye brome ripen later than barren and great brome and any straw removed may contain substantial quantities of viable meadow, soft and rye brome seed.

Using the whole rotation

A non-cereal break crop enables use of a wider range of herbicides (Table 2).

A spring crop allows stale seedbed or fallow techniques and encourages germination. Seedlings can be killed using a non-selective herbicide pre-drilling.

Use of glyphosate is very effective in fallow breaks.

Maximising seed loss pre-drilling

Seeds buried by ploughing to 15 cm depth cannot emerge, so ploughing provides effective control (Figure 2). However, high levels of brome are difficult to bury as seeds clump together and can be flicked up during ploughing onto freshly ploughed land.

Slow ploughing results in better burial. Annual ploughing can be effective but a small proportion of seeds can survive at plough depth from one autumn to the next.

Early drilling – before germination of brome – results in weeds in the crop; delayed drilling significantly improves control.

Wait for a flush of weeds before drilling.

Increase seed rate to maximise crop competition.

Managing field margins

Bromes quickly colonise bare patches in hedge bottoms or field boundaries. Sow a perennial grass mixture in these areas to prevent bromes establishing.

Mow bromes within 2–6 days of flowering to prevent viable seed forming (April onwards). Ideally, mow before panicles begin to emerge. Mowing is permitted under cross compliance at any time; cutting before 1 March and after 31 July provides reasonable control but avoids bird nesting.

Cultivating, or spraying off, a strip between crop and margin initially reduces populations but provides an area for new seeds to germinate.

Do not use uncultivated strips where brome is confined to field margins. Avoid herbicide spray drift into margins, as this creates bare patches.

Soft and barren brome can survive in field boundary swards with perennial grasses; mow to prevent seeding.

Ploughing the outer few metres of the field at the first signs of infestation could help minimise risk of spread.

Chemical and cultural control should be integrated to provide an effective weed control strategy.

Anisantha species

Exposure to light induces dormancy (seed survives for up to two years).

- Plough for good control.
- Shallow cultivate to bury seeds as soon as possible after harvest and encourage germination – unless chopped straw provides good seed cover.
- Spray off with glyphosate pre-drilling.
- Delay drilling to significantly improve control.
- Wait for a weed flush, in dry periods, before drilling.

Bromus species

At harvest, seeds are usually underripe. Seed burial immediately after harvest enforces dormancy in some seeds and so increases seed survival.

- Leave seeds to ripen on soil surface for one month before cultivating.
- Shallow cultivate, after a month, to place seeds in moisture; then spray off emerged weeds with glyphosate.

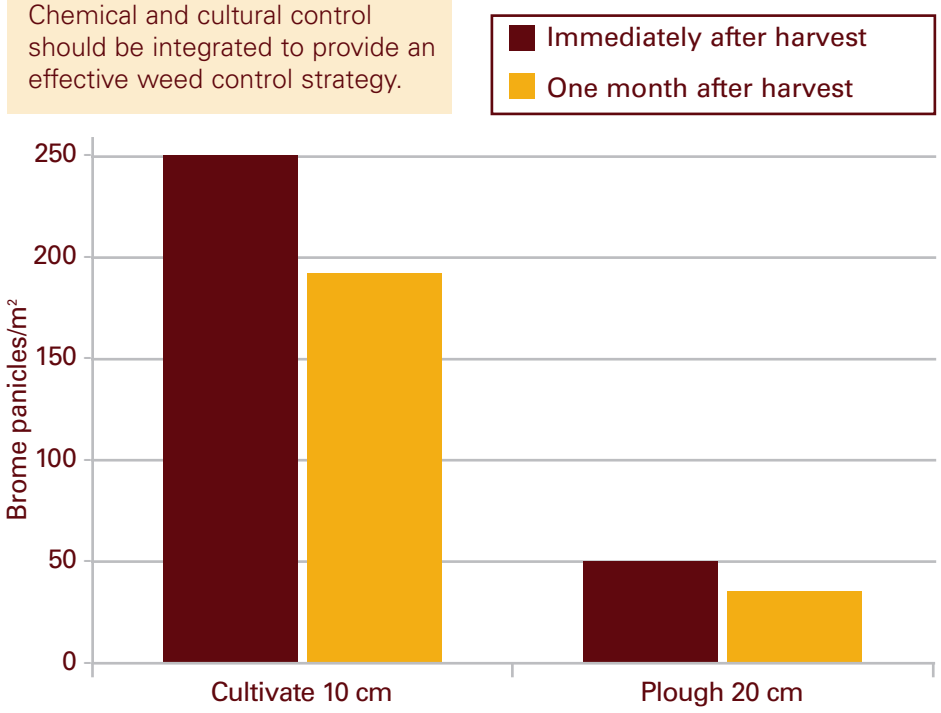


Figure 2. Effect of cultivation depth and delaying cultivation on barren brome (*Anisantha sterilis*) panicle (flowering head) number.

Chemical control

A limited range of herbicides is available to control bromes in cereals (Table 1).

Table 1. Herbicide use in cereals

Pre-emergence			
Active substance	Example product	Crops – On-label	Crops – EAMU
prosulfocarb	Defy	ww, wb	wr, tr, sb, dw, sw
diflufenican + flufenacet	Liberator	ww, wb	wr, tr, dw
pendimethalin + picolinafen	PicoPro	ww, wb	sb, sw
flufenacet + pendimethalin	Crystal	ww, wb	sb
triallate	Avadex	ww, wb, dw, wr, tr	

Post-emergence (winter wheat only)			
Active substance	Example product	Application window	Brome GS
florasulam + pyroxsulam	Broadway Star*	GS11–32	To GS24
flupyrsulfuron-methyl + pyroxsulam	Unite*	GS11–31	To GS24
pendimethalin + pyroxsulam	Broadway Sunrise*	GS11–30	To GS24
iodosulfuron-methyl-sodium + mesosulfuron-methyl	Pacifica	1 February–GS39	To GS33
propoxycarbazone-sodium	Attribut	1 February–GS33	Pre-GS31
sulfosulfuron	Monitor	1 February–GS39	To GS32

ww = winter wheat, wb = winter barley, dw = durum wheat, wr = winter rye, tr = triticale, sb = spring barley. *Barren brome/great brome in autumn; others in autumn and spring.

A wider range of herbicides is available for use in non-cereal break crops (Table 2).

Table 2. Combinable break crops allow wider range of herbicides

Active ingredient	Combining peas	Linseed	Spring beans	Spring rape	Winter beans	Winter rape
carbetamide		EAMU			✔	✔
clethodim						✔
clomazone + metazachlor						✔
cycloxydim	✔	✔	✔	✔	✔	✔
dimethenamid-p + metazachlor + quinmerac						✔
fluazifop-P-butyl	✔	✔	✔	✔	✔	✔
metazachlor		EAMU		✔		✔
metazachlor + quinmerac		EAMU				✔
propaquizafop	✔	✔	✔	✔	✔	✔
propyzamide					✔	✔
prosulfocarb		EAMU	EAMU		EAMU	
quizalofop-P-ethyl	✔	✔	✔	✔	✔	✔
quizalofop-P-tefuryl	✔	✔	✔	✔	✔	✔
tepraloxydim	✔	✔	✔		✔	✔
triallate	✔	EAMU	✔	EAMU	✔	EAMU

For up-to-date information on Extensions of Authorisation for minor use in the UK, see: **https://secure.pesticides.gov.uk/offlabels/search.asp**

– A minimum two-spray programme, including pre- and post-emergence, should be used. All post-emergence chemicals are ALS inhibitors. They can only be applied once in any programme; only pyroxsulam can be autumn-applied.

– Apply glyphosate at up to the soft dough stage of brome to ensure no fertile seed is set.

– There is no treatment for control of soft brome in spring barley.

– Brome control in cereals can be variable; it is often affected by growth and weather conditions.

Further information

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G61: Managing weeds in arable rotations – a guide (HGCA, 2014)

G47: Encyclopaedia of Arable Weeds HGCA/BASF (2009) www.hgca.com/awe

This Information Sheet collates data from a number of Defra and HGCA-funded R&D projects over several years

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