

The biology and non-chemical control of Soft Brome (*Bromus hordeaceus* L.)

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Soft brome

(blubber grass, lop-grass, soft chess)

***Bromus hordeaceus* L.**

(*B. mollis*)

Occurrence

Soft brome is a tufted winter annual or sometimes a biennial grass native in waste places, meadows and on dunes (Clapham *et al.*, 1987). It is common throughout the UK and is recorded up to 1,800 ft (Salisbury, 1961). Soft brome occurs in a range of grassy and open habitats, mostly those managed by man (Grime *et al.*, 1988). It is common in pasture and along paths. It is now frequent on arable land and is becoming more of a problem weed (Andersson *et al.*, 2002).

In a survey of cereal weeds in central southern England in 1981-2, soft brome was found in 1% of winter wheat fields but was not recorded in winter or spring barley (Chancellor & Froud-Williams, 1984). In a survey of the incidence of *Bromus* spp. in winter cereals in mainland Britain in 1989, soft brome occurred in up to 10% of fields (Cussans *et al.*, 1994). It frequently infests continuous winter wheat crops.

Soft brome varies both genotypically and phenotypically (Grime *et al.*, 1988). Four subspecies have been recognised, 3 native and 1 introduced (Stace, 1997).

The Seed Act requires dealers to declare the presence of this grass in seed offered for sale if contamination exceeded 1% in clovers and 2% in grasses (Morse & Palmer, 1925). The sale or use of seed containing more than 5% is illegal.

Biology

The flower heads appear from May to July and seed is set from May to early August (Grime *et al.*, 1988). The flowers are wind pollinated. There are around 350 seeds per panicle and 3,400 to 9,400 seeds per plant (Burghardt & Froud-Williams, 1997). The average seed number per plant is given as 765 (Pawłowski *et al.*, 1970). Plants cut down when in flower did not ripen seeds but plants cut at the milk stage produced seed with germination levels of over 80% (Gill, 1938). Fully ripe seed gave 96% germination.

Ripe seeds are said to need an after-ripening period before becoming ready to germinate (Abram, 2004). In laboratory studies, germination decreased at low temperatures but light quality had no effect (Froud-Williams, 1981). Andersson *et al.* (2002) found there was a high level of seed germination in the dark. Seed from different populations demonstrated some light inhibition but all gave 39 to 85% germination in the light.

In the field, seeds germinate in spring and autumn (Grime *et al.*, 1988). Soft brome seed sown in July in pots of soil kept outdoors and stirred periodically emerged almost completely in the month it was sown and over the following 2 months

(Chancellor, 19--). No further seedlings emerged. Over 90% of seed mixed in a 75 mm layer of soil in cylinders sunk in the field and stirred periodically emerged within 12 months (Roberts, 1986). Less than 1% emerged subsequently in years 2 and 3.

Soft brome becomes established and grows very quickly (Chancellor, 1979). The time from emergence in autumn to flowering the following year is around 190-200 days (Burghardt & Froud-Williams, 1997). It remains winter green but vegetative growth occurs mainly in autumn and spring (Grime *et al.*, 1988).

Persistence and Spread

Seeds have minimal dormancy and are short-lived in soil (Chancellor, 1979; Andersson *et al.*, 2002). Seed buried in mineral soil at 13, 26 or 39 cm depth and left undisturbed retained 3, 11 and 2% viability respectively after 1 year but none was viable after 4 years (Lewis, 1973). Seed buried in a peat soil at 26 cm was not viable after 1 year. Seed stored under granary conditions exhibited 30% viability after 1 year but none was viable after 4 years.

In clover and grass seed samples tested in Denmark for the period 1966-69, 1955-57, 1939 and 1927-28, soft brome seed was a contaminant in 13.7, 7.5, 8.9 and 14.4% of samples respectively (Olesen & Jensen, 1969). In grass seed tested in 1960-61, soft brome was found as an impurity in 17.1% of perennial ryegrass of English origin, 96.5% of the seeds of Irish origin and 7.3 % of Scandinavian seed samples (Gooch, 1963). It was also found as an impurity in sainfoin seed (Salisbury, 1961).

Management

In grassland, mow hay early and cut pastures in early June to prevent seeding (Morse & Palmer, 1925). Soft brome is able to become a more dominant component of the vegetation when grassland suffers disturbance (Burke & Grime, 1996).

Soft brome sheds its seeds early in the summer and it can become a problem in succeeding crops of cereals. Seed is best left on the soil surface for a month after cereal harvest before ploughing. The remaining seed should be ploughed at least 15 cm deep. The drilling of autumn cereals should be delayed long enough to allow a flush of brome seedlings to emerge and be controlled. Growing spring crops will help to eradicate the weed.

The germination of seeds in pots of moist soil heated with warm air for 6 hours was reduced by 6% at 46°C and 97% at 48-49°C (Laude, 1957).

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