

The biology and non-chemical control of Hairy Bittercress (*Cardamine hirsuta* L.)

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Hairy bittercress

(hairy cress, popping cress)

Cardamine hirsuta L.

Occurrence

Hairy bittercress is a winter or rarely summer annual to biennial plant native in open and cultivated ground, rocks, dunes, scree and walls, throughout the UK (Clapham *et al.*, 1987). Hairy bittercress is recorded up to 3,800 ft in Britain (Salisbury, 1961). It is a common weed of gardens, greenhouses, paths, railways and waste ground (Rich, 1991; Copson & Roberts, 1991). Hairy bittercress is a particular problem in herbaceous container raised plants but does not have much effect on the growth of containerised woody plants (Berchielli-Robertson *et al.*, 1990).

A cosmopolitan plant, hairy bittercress is variable in size and leaf shape. Waved bittercress (*C. flexuosa*) closely resembles hairy bittercress and is also variable in habit (Morse & Palmer, 1925). It is usually annual or biennial but occasionally perennial. A related introduced weed New Zealand bittercress (*C. corymbosa*), has become troublesome in polytunnels (Anon, 1999). It has the same explosive seedpods and is similar in appearance to hairy bittercress but is generally smaller.

Biology

Hairy bittercress flowers all year but mainly from March/April to July/August (Rich, 1991; Stace, 1997). It is one of the earliest flowering winter annuals and is automatically self-pollinated. Seed is shed in May and June and sometimes into the autumn (Grime *et al.*, 1988). There are around 20 seeds per seedpod. The average seed number per plant is 600 but a large plant may yield several thousand seeds (Salisbury, 1961). Plants can be found in fruit for 8 months of the year (Salisbury, 1962).

There is little germination of fresh seeds (Baskin & Baskin, 1986). The seed after-ripens at high temperatures but not at 5°C. The higher the after-ripening temperature the greater the temperature range at which subsequent germination will take place. In an alternating temperature regime, increasing the amplitude of temperature fluctuations increased germination in the light up to an amplitude of 25°C (Thompson & Whatley, 1983). In the dark, germination increased up to an amplitude of 15°C but then decreased if this rose to 20 or 25°C. Germination is increased by a period of dry storage (Grime *et al.*, 1988).

Seed sown in an unheated greenhouse in April began to emerge within 14 days (Salisbury, 1962). There was a flush of emergence from May to June. With seed sown in May there was a distinct flush in June with intermittent emergence through July. Seed mixed into the surface 25 mm of soil in boxes out of doors and stirred periodically, emerged from April to December (Chancellor, 1979). Peaks of emergence occurred in July-August and November-December but there was some

variation between different years. Hairy bittercress seeds typically germinate in the autumn according to Grime *et al.* (1988).

Hairy bittercress can complete its life-cycle in 5-6 weeks but the cycle takes longer in rich soils and is shorter in poor ones. Seedlings can survive the severest frost.

Persistence and Spread

Thompson *et al.* (1993) suggest that based on the seed characters, hairy bittercress seed should persist longer than 5 years. However, the seeds do form a persistent seedbank (Grime *et al.*, 1988).

The seeds become sticky when wet which aids dispersal (Salisbury, 1961). The seeds are dispersed explosively for up to 1 m when the seedpods mature fully or if the plants are shaken by the wind or disturbed by weeding (Personal experience). Gardeners and field workers are at risk from hairy bittercress seeds that may enter the eyes when mature plants are hand-pulled.

Management

Hairy bittercress seedlings should be destroyed by spring cultivations to prevent flowering and seeding (Morse & Palmer, 1925). Stem fragments are capable of re-rooting following cultivation in moist conditions (Grime *et al.*, 1988). Hairy bittercress seedlings must be removed from container plants before seeds are set. The standing areas should be kept weed-free. Improved drainage may discourage this moisture-loving weed.

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