The biology and non-chemical control of Hogweed (*Heracleum sphondylium* L.)

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Hogweed
(cow parsnip)
***Heracleum sphondylium* L.**

Occurrence
Hogweed is a biennial, or monocarpic to polycarpic perennial native in grassy places, along hedges, on rough ground, roadsides and banks (Stace, 1997). It may show a preference for chalk. Although common in the hedge bottom it is rarely found further than 2.5 m into the arable field (Marshall, 1989). Hogweed can encroach onto arable land from the hedgerow or headland but is chiefly a problem on pasture (Morse & Palmer, 1925). It is associated with meadow habitats (Gibson, 1997). In a 3-year set-aside, hogweed frequency declined with increasing distance from the field edge (Rew *et al.*, 1992). In a survey of weeds in conventional cereals in central southern England in 1982, hogweed was found in 2, 3 and 1% of winter wheat, winter barley and spring barley fields respectively (Chancellor & Froud-Williams, 1984). It can be a weed of perennial crops such as fruit.

Hogweed is a variable species and 9 geographical variants have been recognised (Grime *et al.*, 1988). Two of the nine subspecies occur in Britain (Clapham *et al.*, 1987). Subspecies *sphondylium* is widespread but ssp. *sibiricum* occurs only in parts of East Anglia and may have been introduced. Hybrids occur between the giant hogweed (*H. mantegazzianum*) and the common hogweed (Anon, 1982; Lovett Doust & Lovett Doust, 1982).

The leaves of hogweed are much esteemed by herbivorous animals (Clapham *et al.*, 1987). The emerging shoots may be dug up by rabbits in June but the growing plant is generally avoided (Gillham, 1955).

The willow carrot aphid *Cavariella aegopodii* can overwinter on hogweed (Heathcote, 1970).

Biology
Hogweed flowers from June to September (Barker, 2001). The flowers are self-compatible and usually insect pollinated (Grime *et al.*, 1988). There are several hundred seeds in each flower umbel. The average seed number per plant in a ruderal situation is given as 5,030 (Pawlowski *et al.*, 1967). Seed is shed slowly from August until winter.

The ripe seeds contain only rudimentary embryos. Growth of the embryos within the seeds proceeds more rapidly at 2^{o}C to 5^{o}C than at room temperature (Stokes, 1952). The seeds require 2-3 months at low temperatures to after-ripen (Roberts, 1979). Hogweed seed gave 3% germination after 14 days at 5^{o}C and 69% after 96 days. There was no germination of seed kept at room temperature (Lovett Doust & Lovett Doust, 1982). Seeds do not after-ripen fully at higher temperatures (Toole *et al.*, 1956). There was 50% germination of hogweed seeds during a 3-month period of

moist storage at 5°C (Grime *et al.*, 1981). After a 50 week period of soil burial, seeds germinated only when the soil was disturbed in the light not in darkness (Wesson & Wareing, 1969).

Seed mixed into the surface 25 mm of soil in boxes outdoors and stirred periodically, emerged from January to June with a peak in March-April (Chancellor, 1979). Seed sown in a 75 mm layer of soil in cylinders sunk in the field and cultivated at intervals, emerged mainly from January to May with no seedlings outside this period (Roberts, 1979). The majority of seedlings emerged in the first year with only the odd seedling appearing in the years that followed until year 5, the end of the study. Seed sown into short turf in October emerged from March to June with a peak in late-March (Thompson & Baster, 1992). Around 50% of seedlings survived into the summer. In closed communities, seedlings may emerge but not develop until an opening occurs (Grime *et al.*, 1988). Due to its relatively large seeds, hogweed is able to establish in grassland even where disturbance is minimal (Burke & Grime, 1996).

The plant has a stout taproot (Grime *et al.*, 1988). Stems and foliage die down in winter.

Persistence and Spread

Hogweed does not form a persistent seedbank. Thompson *et al.* (1993) suggest that based on the seed characters, hogweed seed should persist for less than 5 years.

The seeds are winged and flattened, and may be scattered short distances by the wind (Grime *et al.*, 1988).

Management

The taproots may be dug out and should be collected up after ploughing (Morse & Palmer, 1925). There was an increase in hogweed seedling numbers in cereals following a change to minimum cultivations and direct drilling (Makepeace, 1982a; 1982b).

In grassland, hogweed is favoured by liming and increased levels of potassium (Williams, 1976).

The leaf canopy is vulnerable to cutting and grazing. In pasture the weed should be cut regularly to prevent seeding. Hogweed is readily eaten by cattle and other animals. In roadside verges increasing the cutting frequency reduces the frequency of hogweed (Parr & Way, 1988).

Acknowledgement

This review was compiled as part of the Organic Weed Management Project, OF 0315, funded by DEFRA.

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