

## **The biology and non-chemical control of Hemlock** (*Conium maculatum* L.)

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### **Hemlock**

(common hemlock, poison hemlock, poison parsley)

***Conium maculatum* L.**

### **Occurrence**

Hemlock is an erect foetid annual, biennial or monocarpic perennial, native in damp ground, ditches, roadsides, hedgerows, rubbish tips and other waste ground (Clapham *et al.*, 1987; Stace 1997; Tutin 1980; Baskin & Baskin, 1990). Hemlock is common throughout most of Britain. It is not recorded above 1,000 ft (Salisbury, 1961). In many countries it is a pasture weed and also infests cereals, vegetable crops and orchards (Mitich, 1998). It also occurs on dry ground, usually on field borders, roadsides and dry ditches (Frankton & Mulligan, 1970). In a survey of conventional winter oilseed rape in central southern England in 1985, hemlock was found in 3% of fields (Froud-Williams & Chancellor, 1987). Plants establish readily on disturbed sites (Mitich, 1998) and are highly competitive with other vegetation (Weber, 2003).

The entire plant is poisonous and can cause fatalities in stock when growing among other herbage. The active principles are several alkaloids, all of which are poisonous but the most important is coniine (Forsyth, 1968). Hemlock is toxic to cattle, sheep, goats, pigs and poultry, with cattle being the most sensitive. Growing conditions can affect the level of toxicity but hemlock is not as toxic as hemlock water-dropwort (*Oenanthe crocata*) (Mitich, 1998). Stock does not normally eat hemlock unless it is the only green plant available in winter. Poisoning of livestock is mainly in spring when the new leaves emerge and the pastures are short, but the young growth is less poisonous than the mature plant. The odd animal may get a taste for it but most are put off by the strong mousey odour of the fresh plant. Animals are more readily poisoned through eating contaminated hay or silage, although, it is said that the alkaloid content is gradually lost by slow drying (Forsyth, 1968). Hemlock is more palatable when wilted after cutting but remains toxic. Roots left laying on the soil surface after ditch clearance may be eaten by animals with fatal results. Hemlock is also poisonous to man (Frankton & Mulligan, 1970). Many medicinal and therapeutic uses are listed for hemlock (Barker, 2001).

### **Biology**

Hemlock flowers from June to July (Clapham *et al.*, 1987). A plant may produce 38,000 seeds that fall around the parent plant or are dispersed by water, rodents and birds (Mitich, 1998). Some of the seeds cling to the parent plant and dispersal takes place over several months (Baskin & Baskin, 1990). The embryos are not fully developed in the ripe seeds and seeds have morphological dormancy when shed. The embryos therefore require a short period of maturation after imbibition and prior to germination. Sometimes embryos can develop physiological dormancy when fully grown.

Seeds germinate mainly in autumn and winter (Salisbury, 1961). Seeds sown in a 75 mm layer of soil in cylinders sunk in the field and stirred periodically emerged mainly from January to April and July to September (Roberts, 1979). Most seedlings emerged in year 1 of the 5-year experiment then there was a rapid reduction in seedling numbers each year until year 5 when very a few viable seeds remained. Seedlings can emerge at any time of year (Baskin & Baskin, 1990). Seeds sown into turf at the end of October failed to germinate apart from 8 seedlings that did not survive beyond January of the following year (Thompson & Baster, 1992).

Hemlock develops a long whitish taproot (Mitich, 1998).

### **Persistence and Spread**

Thompson *et al.* (1993) suggest that based on seed characters, hemlock seed should persist for longer than 5 years in soil. Seeds may remain viable in soil for several years (Weber, 2003). Seeds in dry storage persist for 5 years (Brenchley, 1918). Seed recovered from house demolitions and archaeological digs and dated at 50 and 150 years has been reported to germinate (Ødum, 1974).

### **Management**

Hand pulling may be effective prior to seed set (Weber, 2003). Mowing in spring kills mature plants, a second mowing in late summer kills emerged seedlings and any regrowth. Constant cutting of the leaves and grubbing up of the roots will eradicate hemlock (Fenton, 1931). Plant debris must be disposed of safely.

Hemlock is not eaten by rabbits (Tansley, 1949).

### **Acknowledgement**

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