The biology and non-chemical control of Hedge Mustard (*Sisymbrium officinale* (L.) Scop.)

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Hedge mustard

(Common sisymbrium)
***Sisymbrium officinale* (L.) Scop.**

Occurrence

Hedge mustard is an erect annual or overwintering plant, native in waste places on rough and cultivated ground (Stace, 1997). Hedge mustard also grows in disturbed sites such as gardens, roadsides and field margins (Clapham *et al.*, 1987). It is very common throughout the UK and is recorded up to 1,000 ft (Salisbury, 1961).

In a survey of weeds in conventional winter oilseed rape in central southern England in 1985 hedge mustard was found in 7% of the fields surveyed but was largely confined to the field margins (Froud-Williams & Chancellor, 1987). However, this may have been the result of herbicide application within the cropped area. It is one of the commonest crucifers in Britain (Rich, 1991). A study of changes in the weed flora of southern England between the 1960's and 1997 suggests that hedge mustard has become more common (Marshall *et al.*, 2003).

Hedge mustard has some therapeutic and medicinal uses (Barker, 2001).

Biology

Hedge mustard flowers from May to October according to Listowski (1966), June to July according to Clapham *et al.* (1987) and all year but mainly in summer according to Rich (1991). Each seedpod contains an average of 15 seeds (Salisbury, 1961). The seed number per plant 2,700 (Hanf, 1970). A large plant may produce 9,500 seeds. The average seed number per plant in ruderal situations is given as 4,623 (Pawlowski *et al.*, 1967).

Light and nitrate levels are limiting factors for seed germination (Hilhorst & Toorop, 1997). Nitrate level in the seeds has been positively correlated with germination level. For optimal germination in the laboratory, hedge mustard required a combination of chilling at 2^{o}C, light and nitrate prior to transfer to an incubation temperature of 24^{o}C (Karssen & De Vries, 1983). A 2-month period of moist storage at 5^{o}C did not promote seed germination (Grime *et al.*, 1981).

The germination response of buried seeds is subject to seasonal changes (Bouwmeester & Karssen, 1993). Temperature is the main factor regulating the changes. Dormancy is relieved in periods of low temperature and induced in periods of high temperature unless conditions are exceptionally dry (Karssen, 1980/81a). Fresh and recently buried seeds germinate at elevated temperatures whereas seeds buried for longer germinate better at low temperatures. Buried seeds exhumed at intervals and tested for germination, had a light requirement at burial but lost this with time during burial (Bouwmeester & Karssen, 1989). Germination was improved by

nitrate and by desiccation. Increased levels of soil moisture can stimulate the development of secondary dormancy in buried seeds (Karssen, 1980/81b).

In the field, seedlings emerge from autumn to early spring. Seed mixed into the surface 25 mm of soil in boxes out of doors and stirred periodically emerged from December to June (Chancellor, 1979). There was some variation between different years in the peak periods of emergence. Seed sown in early-May germinated in 7 days (Long, 1938). In a sandy loam soil, field seedlings emerge from the top 0 to 35 mm of soil with the majority emerging from the surface 25 mm (Unpublished data).

Hedge mustard overwinters as a rosette of leaves (Salisbury, 1961).

Persistence and spread

Seed recovered from excavations and dated at 30 years old has been found to germinate (Ødum, 1974). Seed in dry-storage gave 100% germination after 5 years (Comes *et al.*, 1978). Seed submerged in water did not germinate after a 3-month period. However, in studies with seeds buried at 2.5, 10.0 or 17.8 cm deep in soils with different water tables, seeds of hedge mustard did not deteriorate as quickly as those of other species (Lewis, 1961). Most seeds survived 1 month of burial but germination levels were much less after a further month. Waterlogging appeared to induce dormancy and prevent sprouting in situ.

Management

Hedge mustard plants growing along the field margin should be cut down and plants that encroach onto arable land should be hoed out (Morse & Palmer, 1925). Seeding must be prevented (Long, 1938).

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