The biology and non-chemical control of Cut-leaved Crane's-bill (*Geranium dissectum* L.)

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Cut-leaved crane's-bill

(Cut-leaved geranium, jagged-leaved crane's-bill)
***Geranium dissectum* L.**

Occurrence

Cut-leaved crane's-bill is a native annual or biennial common throughout the UK on grassy and stony ground, waste places, hedgebanks and cultivated land, (Stace, 1997; Clapham *et al*., 1987). It can act as a biennial or winter annual (Salisbury, 1961). Cut-leaved crane's-bill is found in leys on heavy land, but is also common on calcareous and loamy soils (Long, 1938). In grassland grazed by horses, cut-leaved crane's-bill is often associated with latrine areas (Gibson, 1997). It is recorded up to 1,250 ft in Britain.

In early surveys of Bedfordshire, Hertfordshire and Norfolk it was associated with heavy soils but was also characteristic of light and sandy soils (Brenchley, 1911; 1913). It was especially associated with temporary grass or clover seed crops (Brenchley, 1920). In a survey of weeds in conventional winter oilseed rape in central southern England in 1985 it was found in 13% of the fields surveyed but was largely confined to the field margins (Froud-Williams & Chancellor, 1987). This may have been the result of herbicide application within the crop area. A study of changes in the weed flora of southern England between the 1960s and 1997 suggests that cut-leaved crane's-bill has become more common (Marshall *et al.*, 2003).

The seeds of cut-leaved crane's-bill are scheduled as injurious under the 1951 Regulations made under the Seeds Act, 1920(Chancellor, 1959).

Biology

Cut-leaved crane's-bill flowers from May to August (Clapham *et al*., 1987) and into October (Hanf, 1970). Guyot *et al.* (1962) gives the seed numbers per plant as 50 to 200. A large plant may produce 10,000 to 20,000 seeds (Salisbury, 1961).

Germination occurs mainly in August and September (Salisbury, 1961). Seed scarification increased the level of seed germination from 25 to 100% (Grime *et al.*, 1981). Seedlings from seeds sown in a 75 mm layer of soil in cylinders sunk in the field and stirred periodically, emerged from April to September (Roberts & Boddrell, 1985). Very few seedlings emerged the rest of the year. Most seedlings emerged in years 1 and 2 then emergence gradually reduced to year 5 of the study.

Persistence and Spread

Seed longevity in soil is given as 2 years (Guyot *et al*, 1962). Seed buried in mineral soil at 13, 26 or 39 cm depth and left undisturbed retained 1 to 15% viability after 1 year but was no longer viable after 4 years (Lewis, 1973). Seed buried in a peat soil at 26 cm retained only trace viability after just 1 year. In studies with seeds buried at 2.5, 10.0 or 17.8 cm deep in soils with different water tables, seeds of cut-leaved

crane's-bill deteriorated relatively quickly (Lewis, 1961). Few seeds were recovered after 1 month of burial and germination levels were low after 1 or 2 months burial. Dry-stored seed gave more than 90% germination after 5 years (Kjaer, 1940). Seed stored under granary conditions after 1, 4 and 20 years retained 99, 60 and 46% viability respectively.

Cut-leaved crane's-bill seed was a common impurity in home grown clover seed (Salisbury, 1961; Horne, 1953). The seed was found in red clover, crimson clover and trefoil seed (Long, 1938). In seed samples tested in 1960-61, cut-leaved crane's-bill seed was a contaminant in 2% of ryegrass seed samples of English origin and up to 12% of Irish seed samples (Gooch, 1963). It was found in 2% of white clover and 5-20% of red clover seed samples. It was also found in 2-5% of vegetable brassica seed samples tested. In clover and grass seed samples tested in Denmark for the period 1966-69, 1955-57, 1939 and 1927-28, cut-leaved crane's-bill seed was a contaminant in 3.9, 20.4, 17.5 and 9.6% of samples respectively (Olesen & Jensen, 1969).

Management

It is easily dealt with in crops that are hoed (Long, 1938). In leys the weed may be hand picked to prevent seeding (Morse & Palmer, 1925). Care should be taken to sow only pure crop seeds.

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