

The biology and non-chemical control of Stinking Chamomile (*Anthemis cotula* L.)

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Stinking chamomile

(dog-binder, dog daisy, hog's fennel, jayweed, maithen, mathes, murg, stinking mayweed, poison daisy)

Anthemis cotula L.

Occurrence

Stinking chamomile is a native, annual or biennial weed sometimes troublesome on arable land particularly in cornfields on heavier soil (Long, 1938; Stace, 1997). It is found on rough ground especially on stiff soils but does not thrive in undisturbed habitats. Stinking chamomile is prevalent on poor land deficient in lime and out of condition from wet and bad cultivation (Morse & Palmer, 1925). While it is more frequent on heavy clay and clay-loam soils it also occurs on calcareous and neutral soils but is usually rare or absent from light soils. It is considered an indicator of loam (Hanf, 1970).

There is evidence that stinking chamomile was a weed of crops in the Iron Age (Greig, 1988). In early surveys of Bedfordshire, Hertfordshire and Norfolk, stinking chamomile was recorded on both heavy and light soils but was not common in the survey area (Brenchley, 1911; 1913). Stinking chamomile remains locally common especially in central and southern England on heavier soils (Clapham *et al.*, 1987). It prefers the relatively dry climate and warmer summers of these regions (Kay, 1971). However, it is only moderately drought resistant (Gealy *et al.*, 1985).

Stinking chamomile is phenotypically plastic and plants of different sizes and habits can be found growing on farmland (Kay, 1971). It will hybridise with scentless mayweed (*Tripleurospermum inodorum*) and corn chamomile (*Anthemis arvensis*) but the hybrids are sterile. Stinking chamomile is described as vulnerable in the BSBI species status list 2005.

The plant has a distinct smell when bruised and the crushed foliage may cause blistering on the hands (Long, 1938). It often caused abscesses on the hands of workers handling sheaves of corn, as well as on the noses of sheep grazing in the stubble (Morse & palmer, 1925). The ripe seeds (achenes) are also said to cause blistering (Kay, 1971). Stinking chamomile, either fresh or dried in hay, can taint milk if eaten by dairy cows. The smell has led to it being used as an insect repellent in the past. The dried flower heads have insecticidal properties, the plant is also a mouse repellent (Barker, 2001). In pasture, stinking chamomile is potentially allelopathic to Italian ryegrass (*Lolium multiflorum*) (Martin & Smith, 1994).

Biology

Stinking chamomile flowers mainly from July to September (Clapham *et al.*, 1987). The first flowers open in mid-June and flowering reaches a peak in July (Kay, 1971). Spring germinated plants do not begin flowering until July and continue until August. A further flush of flowering may occur from September to October on shoots that

develop from the stumps of plants cut down in cereal stubble. The flowers on individual plants are self-incompatible and rely on insect pollinators. One flower head may produce 50-75 seeds on average. The typical plant will produce from 600 to 12,000 seeds but a plant with 27,000 seeds has been recorded.

Combinations of light and alternating temperatures have given the best germination in the laboratory (Kay, 1971). Small seeds appear to germinate more readily than large ones (Gealy *et al.*, 1985). Seeds with the pericarp removed germinate better than intact achenes. Acid scarification encourages germination if treatment is not too prolonged. Seeds germinate best between 10 and 30°C with peak germination at 20°C. In the field, emergence takes place mainly in autumn and spring but odd seedlings can emerge at anytime (Roberts & Neilson, 1981; Gealy *et al.*, 1985). Seed sown in May emerged in 14 days (Long, 1938). Germination was not greatly affected by soil pH but was better at pH 6.8 than at pH 5.0 or 8.0 (Gealy *et al.*, 1984).

Stinking chamomile is frost hardy at the rosette stage and can grow as a winter annual in Britain (Kay, 1971). Growth recommences in March and the flowering stems begin to elongate in early May

Persistence and spread

In soil, 6% of seeds were still viable after 11 years (Kay, 1971). Only a small number of viable seeds remained after 5 years in a cultivated soil (Roberts & Neilson, 1981). Seed was able to germinate after 25 years burial in undisturbed soil (Crocker, 1938). Porter (1944) also gives the longevity of seeds in soil as 25 years.

In a survey of grass seed contamination during 1960-61, stinking chamomile seed was found in 1% of perennial ryegrass, 3.1% of meadow fescue, 5% of Timothy and 2.2% of Italian ryegrass seed samples of English origin that were tested (Gooch, 1963). In a survey of weed seed contamination in cereal seed in drills ready for sowing on farm in spring 1970, stinking chamomile seed was found in 1% of samples (Tonkin & Phillipson, 1973). All of this was home saved seed.

Management

Control is by the use of surface cultivations in spring and summer and preventing seeding. The inclusion of root crops in the rotation also helps (Long, 1938). The application of lime may improve control on deficient land (Morse & Palmer, 1925).

Conservation tillage that reduces moisture loss and keeps seeds near the soil surface appears to favour the weed (Gealy *et al.*, 1985).

The pathogen, *Botrytis cinerea* Fr. sometimes damages stinking chamomile severely in a wet autumn (Kay, 1971). The larvae of *Apion sorbi* F. (Coleoptera) attack the flower head and eat the receptacle. The larvae of *Cucillia chamomillae* (Sciff.) (Lepidoptera) will also feed on stinking chamomile.

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