

The biology and non-chemical control of Cat's-ear (*Hypochoeris radicata* L.)

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Cat's-ear

(long-rooted cat's ear, long-rooted hypochoere, spotted cat's-ear)

***Hypochoeris radicata* L.**

(*Hypochaeris radicata*, *Achyrophorus radicans*)

Occurrence

Cat's-ear is a native perennial found in grassy places throughout the UK (Stace, 1997). It is recorded up to 2,000 ft (Salisbury, 1961). It occurs in meadows, pastures, waysides and grassy dunes (Clapham *et al.*, 1987). It has spread worldwide but the major areas of distribution are the cooler, temperate regions (Turkington & Aarssen, 1983). Cat's-ear is a plant of frequently cut or grazed neutral grassland, grassland on sandy soils and of various man made grassland communities such as pasture, lawns, roadside verges, waste places and spoil heaps. It is found on soils within the pH range 3.9 to 8.6, from light sands to clays and also on peat. Cat's-ear grows most vigorously on slightly basic soils in open sites. The deep root system makes it a relatively drought tolerant and troublesome lawn weed (Aarssen, 1981). It can invade thin, overgrazed and underfed pastures. It also appears in sporadically grazed grassland as scattered, isolated plants or small groups of 2 to 7 plants that are probably from the same clone. It only occurs as a casual on arable land (Grime *et al.*, 1988). Where there has been some soil disturbance it forms relatively large plants. Cat's-ear occurs on the dry sandy soils of dunes as well as moist but well drained land but is absent from soils subject to prolonged waterlogging. It prefers an open site and does not occur in woodland. There is some difference of opinion on its shade tolerance.

Cat's-ear exhibits considerable variability and several subspecies, varieties and forms are described (Turkington & Aarssen, 1983). It varies in leaf shape, flower form, and general morphology. It may hybridize naturally with smooth cat's-ear (*H. glabra*) when the plants grow together but the hybrids are short-lived and of low fertility. Where seeds are formed these are usually the result of back-crosses to cat's-ear.

Cat's-ear has some medicinal uses (Barker, 2001). The milky sap is bitter and the plant is suspected by some of being unwholesome as fodder (Aarssen, 1981). However, others consider it is a palatable and productive plant. It is high in protein and low in fibre. The calcium content is exceptionally high and it is rich in copper, sulphur, phosphorus and chloride. The seed is an important constituent in the diet of many farmland birds including linnets (*Carduelis cannabina*) (Moorcroft *et al.*, 1997).

The stem nematode, *Ditylenchus dipsaci*, can infest cat's-ear (Franklin, 1970). The presence of the nematode-infested weed can result in the failure of a red clover crop.

Biology

Cat's-ear flowers from June to September (Clapham *et al.*, 1987). There is a spring and an autumn flush of flowers (Turkington & Aarssen, 1983). Peaks of flowering

occur in June and September but flowers can appear sporadically throughout the summer. The autumn flower heads tend to be smaller than those formed earlier in the year. The flowers are cross-pollinated and normally self-incompatible but some self-pollination can occur. Numerous insects visit the flowers. Seeds are produced from mid May to late September. Seed number per flower head range from 44 to 136 (Salisbury, 1961). There may be 2,329 seeds per plant. Viable seeds do not develop on cut down flower stems (Gill, 1938).

The germination of fresh seed is not promoted by light (Wesson & Wareing, 1969a). However, according to Turkington & Aarssen (1983), while freshly shed seed is not dormant light is required for germination. A period of dry storage reduces germination levels. In Petri-dish tests with seed maintained under high or low light intensity or in darkness, seed gave 97% germination in the light and 81% germination in the dark (Grime & Jarvis, 1976). In the field, there are peaks of seed germination in spring and in autumn. After a 50 week period of soil burial, seeds germinated only when the soil was disturbed in the light not in darkness (Wesson & Wareing, 1969b). Around 17% of seeds sown in a 75 mm layer of soil in open cylinders in the field and stirred periodically emerged soon after sowing in autumn (Roberts, 1986). In the following year most seedlings emerged in April and May. A decreasing number of seedlings emerged in subsequent years but none after year 4. Plants can flower from seed within 2 months.

Cat's-ear has a branching stock and fleshy roots (Clapham *et al.*, 1987). In mild winters it overwinters as a basal rosette (Turkington & Aarssen, 1983). In very cold weather the aerial parts dieback leaving perennating buds at ground level. It regrows from the hard, thickened overwintering base in late March and continues active growth until early June (Grime *et al.*, 1988).

Persistence and Spread

Cat's-ear does not appear to form a persistent seedbank (Grime *et al.*, 1988). The seeds did not persist beyond 4 years in cultivated soil (Roberts, 1986). After 1 and 2 months dry storage at room temperature the germination level was 58 and 4% respectively (Turkington & Aarssen, 1983). Germination was 31% after storage at 5°C for 12 months.

The feathery pappus facilitates wind dispersal to distances of 2 m at wind speeds of 16.4 km/hr (Turkington & Aarssen, 1983). Seeds may then continue to blow around until the pappus becomes detached. Cat's-ear seeds have rough coats and may be carried on bird plumage. Ants have been seen carrying the seeds. Seed has also been found as a contaminant of commercial grass seed. In ryegrass seed samples tested in 1960-61, cat's-ear seed was found in 2% of ryegrass samples of English origin and 26% of samples of Irish origin (Gooch, 1963).

In short turf, plants become multi-crowned (Turkington & Aarssen, 1983). Vegetative propagation involves plants splitting at ground level and forming small clumps from the same clone. Crown fragments can regenerate but not root fragments that have no crown tissue attached.

Management

Cat's-ear competes well with grassland species and can readily displace other plants including white clover (*Trifolium repens*) (Turkington & Aarssen, 1983). It is often associated with heavily-grazed grassland (Gibson, 1996). It may have an allelopathic effect on other plants as well as on nearby cat's-ears plants (Aarssen, 1981). It can destroy a pasture within 3 years. In pot studies leachate from cat's-ear plants was found to inhibit the growth of other cat's-ear plants (Newman & Rovira, 1975).

Cat's-ear has a prostrate rosette habit that survives mowing and grazing (Turkington & Aarssen, 1983). The wiry flower stems bend then spring back to avoid being cut. Defoliation stimulates new leaf development. The presence of old leaves suppresses the growth of new ones. In mown lawns the leaves are close to the ground and in uncut grass the leaves are more upright.

Severe infestations may be controlled by ploughing up the sward, followed by annual cropping for a year or two before reseeding (Turkington & Aarssen, 1983). Individual plants can be dug out below the crown in spring when the leaves appear (Weber, 2003; Aarssen, 1981). It is then important to encourage the growth of surrounding vegetation (Morse & Palmer, 1925).

Cat's-ear shoots are eaten by sheep, pigs, birds and slugs (Turkington & Aarssen, 1983). Some sheep eat it in preference to other herbage. Pigs will uproot the plant and eat the fleshy roots. Many insect species also feed on cat's-ear.

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