The biology and non-chemical control of Common Sorrel (*Rumex acetosa* L.)

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Common sorrel

(Sorrel dock, Sour dock)
***Rumex acetosa* L.**

Occurrence

Common sorrel is an erect perennial, native in a wide range of grassy places (Stace, 1997). It is found in open woodland (Clapham *et al.*, 1987). It is native in basic and other grassland, woodland rides, woodland edges, maritime and river shingle, and on mountain ledges (Lousley & Kent, 1981). It is most frequent on mildly acidic soils of pH 5.0 to 7.0 (Grime *et al.*, 1988). Common sorrel is said to grow well on phosphate deficient soil (Horne, 1953). It is only a casual on arable land. Common sorrel is generally found in grass leys (Putwain, 1970). It is tolerant of shade and can survive under bracken (Gillham, 1955). It occurs on damp soils and is recorded up to 4,050 ft in Britain (Salisbury, 1961).

Common sorrel has a fibrous root system and in well drained soil has a relatively superficial rooting pattern (Voesenek & Blom, 1987). Studies in The Netherlands have indicated that unlike curled dock (*R. crispus*), common sorrel does not develop flooding-resistant roots in response to waterlogging (Voesenek *et al.*, 1989). Common sorrel plants and seedlings did not exhibit the same flooding resistance as some other *Rumex* spp. (Voesenek *et al.*, 1993). The primary laterals died within 1-2 weeks of flooding, a few new laterals were formed but these were relatively short (Laan *et al.*, 1989).

Common sorrel exhibits much morphological variation but does not hybridise with related species (Grime *et al.*, 1988).

Common sorrel has been used as a salad leaf and in sauce making (Morse & Palmer, 1925). However, the high level of oxalates in combination with anthracene derivatives can make the leaves potentially toxic to man and animals if eaten in excess (Barker, 2001). If consumed in large quantities by cattle and sheep, the oxalate content of common sorrel can cause calcium deficiency and give symptoms similar to milk fever (Forsyth, 1968).

Biology

Common sorrel flowers from May to June (Clapham *et al.*, 1987; Grime *et al.*, 1988) or May to August (Barker, 2001). Male and female flowers occur on separate plants (Morse & Palmer, 1925). Male flowers are produced earlier than female flowers, however, the ultimately taller female inflorescences continue to elongate and develop after the male inflorescences have matured (Putwain & Harper, 1972). Natural populations often contain twice as many female plants. The flowers are wind pollinated (Grime *et al.*, 1988). Seed is set from June to September. There are around 2,000 seeds per plant (Guyot *et al.*, 1962). The average seed number per plant is 2,490 according to Pawlowski *et al.* (1970).

In Petri dish tests with seed maintained under high or low light intensity or in darkness, seed germinated virtually completely in the light and to 91% in the dark (Grime & Jarvis, 1976). Germination was uniformly high at alternating and constant temperatures in darkness and under a 'safe' green light (Grime *et al.*, 1981). Seeds appear relatively indifferent to light and when seeds were put to germinate under a leaf canopy or in diffuse white light there was 78% germination under the canopy and 93% in the light (Górski *et al.*, 1977). Putwain (1970) found common sorrel seed germinated mainly in the autumn. Seedling emergence and survival was influenced by climate, particularly rainfall. Seed sown in a 75 mm layer of soil in cylinders sunk in the field and stirred periodically, emerged mainly from March to April with a small flush of seedlings in September (Roberts & Boddrell, 1985). Odd seedlings emerged throughout the year. There appeared to be no dormancy and seeds began to emerge soon after sowing. Annual seedling numbers reduced rapidly from year 1 to year 5 of the study.

Populations raised from seed have a sex ratio of 1:1 (Putwain & Harper, 1972). Following a period of vegetative reproduction there is a shift towards a 2:1 ratio of females to males. The sex ratio is unaffected by plant density.

Persistence and Spread

Common sorrel does not seem to form a persistent seedbank. However, seeds have been recorded in large numbers in the soil beneath pasture even though the plant itself may be poorly represented in the vegetation (Chippindale & Milton, 1934).

Common sorrel regenerates readily from fragments of rootstock. In grazed and trampled habitats splitting of the crown may result in the formation of a limited number of daughter ramets (Grime *et al.*, 1988).

Common sorrel seed has occurred as a contaminant of grass seed mixtures, crop seeds and hay (Grime *et al.*, 1988). Seeds can survive ingestion by cattle and are found in their droppings (Salisbury, 1961).

Management

Control on arable land is through removal of the roots during cultivation combined with hoeing and hand pulling to prevent seeding (Morse & Palmer, 1925). A dressing of lime has a good effect. The use of pure crop seed is most important.

In grassland, seedling establishment requires sward damage from vehicular traffic, hooves or mole activity. In grazing studies common sorrel was unaffected by different strategies of tight and lenient grazing in pasture (NERC, 2006). Common sorrel is eaten by rabbits (Gillham, 1955). When grazed it forms a low rosette of leaves and sets few seeds (Grime *et al.*, 1988). Common sorrel exploits hay meadows because of its tall flower heads that set seed before the hay is cut.

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