

## **The biology and non-chemical control of Flixweed** **(*Descurainia sophia* (L.) Webb ex Prantl.)**

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### **Flixweed**

(tansy mustard)

***Descurainia sophia* (L.) Webb ex Prantl.**

(*Sisymbrium sophia*)

### **Occurrence**

Flixweed is an annual, overwintering or rarely biennial herb, possibly native or a long-term introduction (Rich, 1991). It was a common plant of waste ground in the 17<sup>th</sup> century but is now uncommon and scattered through England and Wales (Salisbury, 1961; Rich, 1991). Flixweed is not recorded above 1,000 ft in Britain. It is found on sandy and peaty soil in East Anglia (Clapham *et al.*, 1987; Stace, 1997). The distribution of flixweed is said to be centred in the Breckland region of East Anglia (ADAS, 1997; Wilson, 1994). Flixweed is considered an indicator of sand (Best, 1977; Hanf, 1970). In a survey of arable weeds 1971-73, it was found in less than 2% of the areas surveyed (Chancellor, 1977).

### **Biology**

Flixweed flowers from May to October (Rich, 1991). Under optimal conditions it grows to 110 to 150 cm tall and produces 4,000 to 7,500 seeds per plant (Mahn, 1988). In a competitive wheat crop a plant may grow to just 40-70 cm and have 150-250 seeds. Average seed number per plant is given as 75,650 by Rich (1991) and 6,000 by Stevens (1957). A large plant can produce 700,000 seeds according to Salisbury (1961). The average seed number per plant in ruderal situations is given as 52,636 (Pawlowski *et al.*, 1967). It has been calculated that if all the seeds grew and multiplied the plant could colonise the whole world 6,000 times over within three years (Sagar, 1970). The 1,000 seed weight is 0.12 g.

Flixweed seed germinates in spring and autumn (Best, 1977). There are emergence peaks in April-May and in September-October (Chepil, 1946). In a Swedish study, there was a very distinct germination maximum during autumn (Andersson & Milberg, 1996; Milberg & Andersson, 1991). Seeds buried in the autumn and exhumed at monthly intervals for germination tests gave little germination from March to August but gave high germination in September and October in the light or following a light flash. There was little germination in the dark. Dry stored seed buried in pots then exhumed at monthly intervals for germination tests did not begin to germinate till late July (Blackshaw & Rode, 1991). Germination then continued through to spring. Germination only occurred in the light or following a light flash. Seed stratified outdoors in soil overwinter was exhumed and tested for germination in the light, in the dark and in the dark with a 5 second flash of light (Andersson *et al.*, 1997). Seed gave less than 10% germination in any of the conditions. The addition of nitrate broke the dormancy of flixweed seeds where there had been negligible germination previously (Milberg, 1997). There was an interaction with light exposure in promoting seed germination.

Seed from plants that emerge later in the year will not germinate in that first autumn but may do so in the following spring or in some subsequent spring or autumn (Baskin *et al.*, 2004). Low winter temperatures maintain seed dormancy but mild spells in the autumn or spring cause some dormancy loss in a proportion of the seeds.

### **Persistence and Spread**

Flixweed is a prolific seeder. The seeds mature early, shatter readily and exhibit a long period of dormancy, (Chepil, 1946). The seeds can probably retain viability for long periods (Salisbury, 1961). Seed buried in soil in sub-arctic conditions had 28, 7 and 3% viability after 2.7, 6.7 and 9.7 years respectively (Conn & Deck, 1995). Seeds recovered from house demolitions and dated at 20 and 30 years has been reported to germinate (Ødum, 1974). Dry-stored seed gave 48% germination after 2 years and 3% after 5 years (Comes *et al.*, 1978).

Flixweed seed is found as an impurity in cereal and forage seed (Best, 1991). The seeds are spread by wind, animals and man. Flixweed seeds develop a film of mucilage when moistened that can aid dispersal (Young & Evans, 1973). Seed has been recovered from irrigation water in the USA (Kelley & Bruns, 1975). Flixweed seed submerged in water gave 8% germination after 6 months, 1% after 4 years and zero after 5 years (Comes *et al.*, 1978). Ensilage for 8 weeks, rumen digestion for 24 hrs or a combination of both, killed most seeds but up to 3% were still viable (Blackshaw & Rode, 1991).

### **Management**

Seedlings that emerge in autumn can be controlled by autumn or early spring cultivations (Best, 1977).

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