The biology and non-chemical control of Hairy Tare (*Vicia hirsuta* (L.) Gray)

W Bond, G Davies, R Turner
HDRA, Ryton Organic Gardens, Coventry, CV8, 3LG, UK

Hairy Tare
(hairy vetch)
***Vicia hirsuta* (L.) Gray**
(*Ervum hirsutum*)

Occurrence
Hairy tare is a scrambling annual, native in grassy places and rough ground throughout lowland Britain and is a weed of cultivated land (Stace, 1997; Clapham *et al.*, 1987). It is found in the hedgerows as well as in the open field (Salisbury, 1961).

There is evidence that hairy tare was a weed of crops in the Iron Age (Greig, 1988). In a survey of arable weeds in 1971-73, hairy tare was it was absent to rare in some areas but common to abundant in others (Chancellor, 1977). It was found in 15% of the tetrads surveyed. In a comparison of the ranking of arable weed species in unsprayed crop edges in the Netherlands in 1956 and 1993, hairy tare moved from 16th to 11th place (Joenje & Kleijn, 1994). In Germany, hairy tare is a problem in winter cereals (Lukashyk *et al.*, 2002). It is also a problem weed of organic agriculture in Central Europe being adapted to low nitrogen availability and having strongly dormant seed (Köpke, 1999).

Hairy tare occurs sporadically as a birdseed alien (Hanson & Mason, 1985).

Biology
Hairy tare flowers from May to August (Clapham *et al.*, 1987). The pods are usually 2-seeded. Seed numbers per plant range from 200 to 250 (Guyot *et al.*, 1962). The average seed number per plant is 168 according to Pawlowski *et al.* (1970). In winter cereals the average seed number per plant ranged from 234 to 342 and in spring cereals from 191 to 193 (Pawlowski, 1966).

Seed collected 15, 20, 25 and 30 days after flowering gave germination levels of 10, 64, 85 and 90% respectively when tested after 7 months storage (Chakravati & Pershad, 1953). Ripe seeds are relatively indifferent to light. When seeds were put to germinate under a leaf canopy or in diffuse white light there was 28% germination under the canopy and 33% in the light (Górski *et al.*, 1977). Scarification increased the level of seed germination from 20 to 100% (Grime *et al.*, 1981).

Seed sown in a 75 mm layer of soil in cylinders sunk in the field and stirred periodically, emerged mainly from October to May with just odd seedlings emerging through the summer (Roberts & Boddrell, 1985). In this 5-year study, seedling emergence was high in years 1-3 then reduced to year 5 but some viable seeds still remained at this time. Hairy tare seed mixed with soil at different depths and cultivated periodically emerged mainly in the second and third year of a further 5-year experiment (Roberts & Feast, 1972). Seedlings emerged from depths of up to 150 mm in both cultivated and undisturbed soil. In a sandy-loam soil, field seedlings

emerged from the upper 0-90 mm with most seedlings emerging from the 0-50 mm layer (Unpublished information). In a clay-loam soil, the seedlings emerged from the top 100 mm but again the majority were from the surface 0-50 mm.

Persistence and Spread

Seeds mixed with soil and left undisturbed had declined by 84% after 6 years but in cultivated soil the decline was 91% (Roberts & Feast, 1973). After 5 years burial in soil, hairy tare seeds still retained 50% viability (Kjaer, 1940). Seed that had been dry stored for the same period had over 90% viability.

In cereal seed samples tested in 1961-68, hairy tare was a contaminant in up to 3.6% of rye, 0.8% of oats, 0.5% of barley and 0.3% of wheat samples tested (Tonkin, 1968). In a survey of weed seed contamination in cereal seed in drills ready for sowing on farm in spring 1970, hairy tare was found in 1% of samples (Tonkin & Phillipson, 1973). All of this was home saved seed. In samples of rye seed tested in 1950-51 and 1960-61, hairy tare seed was found in 11% and 3% of samples respectively (Gooch, 1963). Hairy tare seed has been an impurity in crimson clover seed (Salisbury, 1961). Viable seeds have been found in cattle droppings.

Management

Harrowing hairy tare at the cotyledon stage reduces the weed in wheat (Aarssen *et al.*, 1986). After the 3-leaf growth stage, hoeing gives better results. A cultivator will control it at the young plant stage.

In an evaluation of direct weeding treatments, thermal control reduced hairy tare at early weed and crop stages but not after winter cereals had reached tillering (Lukashyk *et al.*, 2004). Application of kainite, a natural mineral (17% KCl, 59% NaCl, 16% $MgSO_4$) found in salt mines in Saxony, was effective at early weed stages but the efficacy was very weather dependant. Tine harrowing gave adequate control when it was carried out repeatedly between stem elongation and ear emergence of the crop. Early harrowing combined with late or repeated harrowing improved the level of control (Lukashyk *et al.*, 2005). The removal of hairy tare reduced yield loss and increased the thousand grain weight. The same treatments can be used in winter rye but the time period over which kainite and thermal treatments can be applied is shorter due to the rapid development of the crop (Lukashyk, 2005). With both kainite and flame weeding treatments hairy tare is most susceptible at the 1-leaf stage (Lukashyk & Köpke, 2005). Plants with 4 or more leaves are able to recover. A high infestation of the weed is unlikely to be controlled by these treatments alone and some plants will recover and set seed. Also a further flush of hairy tare seedlings is likely to emerge after an early treatment. A combination of kainite or flame weeding with repeated harrowing gives more consistent control of the weed. Both kainite and flame weeding cause some crop injury and there is a significant reduction in leaf area. As the kainite breaks down it has a fertilising effect.

Hairy tare scrambles up the cereal shoots and the choice of winter wheat cultivar is unlikely to reduce the weed (Drews *et al.*, 2002). However, increased crop competition can help to reduce seed production by the weed (Köpke, 1999).

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