Medicago minima (L.) Bartal.

Bur Medick

Medicago minima is a small, Nationally Scarce annual with yellow flowers, lanceolate or ovate stipules and spiny fruits arranged in coils. It occurs in short, open turf over well-drained calcareous coarse sands and gravels, and is found in heaths, disturbed ground around rabbit warrens, banks and road verges, sandy coastal grassland, and the margins of arable fields. The majority of sites occur in the Brecklands of Norfolk and Suffolk. There are also scattered populations within open sandy grassland on the Suffolk, Essex and Kent coastlines, and in the Channel Islands Elsewhere it is a casual, non-native species. It is assessed as 'Vulnerable' in Great Britain.

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IDENTIFICATION

Medicago minima is a densely hairy plant with stalked yellow flowers and stipules that are lanceolate to ovate and either entire or minutely toothed (denticulate).

The leaves are composed of three leaflets, each less than 6 mm long (Rich & Jermy, 1998) and with a notch at the tip that has a small, straight point. They leaves are arranged alternately along procumbent stems.

The fruits (burrs) are downy with slender hooked spines, usually grooved near the base, and arranged in 3-5 coils (Stace, 2010; see illustration, p.169).

The distinctive seeds of *Medicago minima*. ©Lliam Rooney

SIMILAR SPECIES

Medicago lupulina can be sparsely or densely hairy and has stipules that are entire or minutely toothed. However, its leaflets are usually much larger and the fruits lack spines. *Medicago arabica* has burrs with spines arranged in coils, but each spine has a deep groove for more than half of its length. It is also a ±glabrous plant with a dark blotch on each leaflet. *Medicago polymorpha* has similarly shaped burrs to *M. minima* but they are hairless and usually larger (4 mm to 6 mm as opposed to 3 mm to 5 mm) than the burrs of *M. minima*.

HABITATS

This is a winter-annual of short, open turf over well-drained calcareous coarse sands and gravels (Trist, 1979). It is found in heaths, disturbed ground around rabbit warrens, banks and road verges, sandy coastal grassland, and the margins of arable fields (Trist, 1979; Sanford & Fisk, 2010).

It has a wide range of associates, including *Agrostis capillaris*, *Arenaria serpyllifolia, Cerastium semidecandrum, Erodium cicutarium, Koeleria cristata, Trifolium arvense* and *Vicia lathyroides* (Trist, 1979). It is frequently found with other threatened or near threatened species; for example, at a well-known site for the species west of Thetford it occurs with *Filago minima*, *Hypochaeris glabra* and *Turritis glabra*, along with other Breckland specialities. In terms of the NVC, *Medicago minima* is listed as a rare species of NVC CG7 *Festuca ovina - Hieracium pilosella - Thymus polytrichus/pulegioides* grassland (Rodwell, 1992).

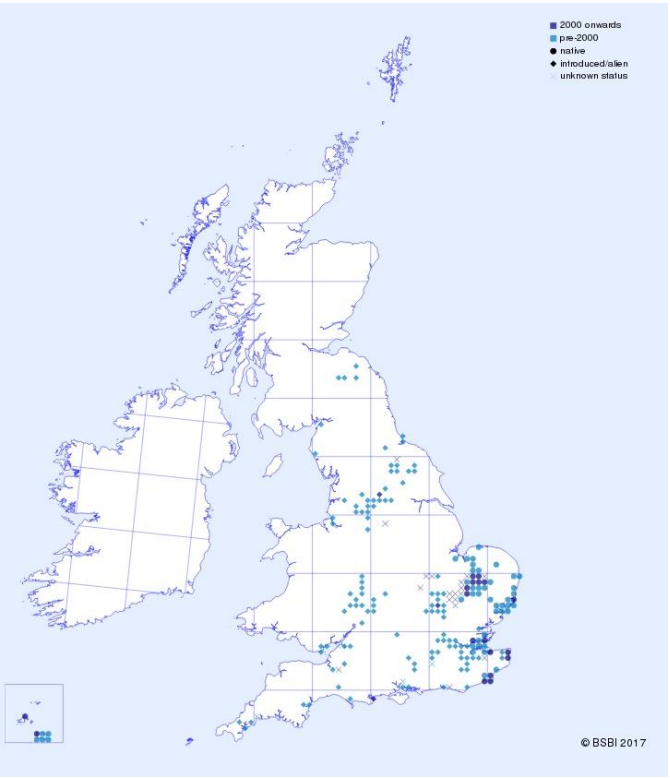
Throughout its core Mediterranean range, *M. minima* typically occurs in pseudo-steppe or steppe grassland with

species such as *Anisantha diandra, A. madritensis, E. cicutarium*, *Stipa capillata* and *S. lessingiana*.

BIOGEOGRAPHY

Medicago minima has a Eurosiberian Southern-temperate distribution (Preston & Hill, 1997). It is particularly widespread in the Mediterranean basin and other semi-arid regions, but its range extends throughout temperate Europe, with northern limits in Britain and Denmark (Preston, 2007). *Medicago minima* has also become naturalised in many places, including Australia, New Zealand, Argentina and North America.

In Britain, the Brecklands of Norfolk and Suffolk support the majority of populations. Outside this core area there are scattered localities for *M. minima* within open sandy grassland on the Suffolk, Essex and Kent coastlines, and the Channel Islands. Elsewhere it is a casual species, previously introduced with wool shoddy (Pearman, 1994), with past records from inland and coastal areas of England and Scotland and the southern Welsh coastline, although there are few recent (post-1999) records. It is absent as a native or casual in Ireland.



Distribution of *Medicago minima* in Great Britain and Ireland.

ECOLOGY

Medicago minima is a therophyte, reproducing entirely by seed. Each plant can produce upwards of 100 fruits (average of four seeds per fruit; Mayor *et al.*, 1999), which can be dispersed in the fleece of sheep (Wessels *et al.*, 2008), and it is likely that fruits are also caught in the fur of rabbits. Seedling emergence occurs during autumn after the first significant rainfall event, and vegetative development continues during winter and early spring (Fresnillo-Fedorenko, 2001). Flowering takes place from May, into the summer months.

The initial stages of germination often take place within the fruit casing (Mayor *et al.*, 1999). Germination appears to be triggered by fluctuations in temperature and humidity that lead to a softening of the hard seed coat (Fedorenko *et al.*, 1996). However, the majority of seeds produced do not germinate due to the presence of two simultaneous dormancy states (exogenous and endogenous) which restrict rates of germination under favourable conditions (Mayor *et al.*, 1999). In this way synchronised germination is avoided and the species may build up a sizeable and persistent soil seed bank.

Medicago minima displays a high degree of phenotypic plasticity and can tolerate prolonged periods of drought (Fresnillo-Fedorenko *et al.*, 1995; Busso *et al.*, 1998), allowing plants to persist in areas with high levels of water stress.

In central Argentina, where *M. minima* is an exotic species, it makes a substantial contribution to the diet of cattle (Fresnillo Fedorenko *et al.*, 1991), and is also a high protein nectar source for honey bees (Andrada & Telleria, 2005).

THREATS

Medicago minima has been lost from coastal sites due to either neglect or undergrazing (by livestock and/or rabbits), leading to shaded, closed and rank conditions (Pearman, 2002). Habitat destruction also remains a threat to extant populations.

MANAGEMENT

Many Breckland sites are grazed solely by rabbits and so require little in the way of active management. At heathland and grassland locations, livestock grazing will provide suitably open, light conditions for the species to complete its life cycle.

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