

## *Mentha pulegium* L.

### Pennyroyal

*Mentha pulegium* has weakly arching or prostrate stems with fine downy hairs, channeled leaves that smell strongly of mint when crushed, and lilac-mauve flowers with hairy corollas. It is typically found in damp, seasonally inundated grassland overlying silt or clay, often on the edges of runnels, ruts and poached areas and with other uncommon plants such as *Cicendia filiformis*. In Britain core populations are found in south Hampshire, east Sussex, Devon, Cornwall and southern Ireland. Elsewhere its distribution is often obscured by introductions. Declines to native populations have led to an assessment of Critically Endangered in England and Wales.



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#### IDENTIFICATION

The whorls of axillary lilac-mauve flowers of *Mentha pulegium* resemble small pin-cushions. Corollas are hairy on the outside, four-lobed and have four protruding stamens. Calyx tubes have 2 lower teeth that are longer and narrower than the 3 upper teeth.

The elliptic-ovate yellow-green opposite leaves are strongly channeled, have very small (1-4) teeth (-subentire) per side (Poland & Clement 2009), and are dotted with glands containing a strongly mint-scented essential oil (Kay & John 1995). The stems (8-20 cm) root at the nodes, are weakly arching or prostrate and have fine, downy hairs.



*Mentha pulegium* at Cadnam Common in the New Forest, arising between the seed heads of *Pulicaria vulgaris*. ©Clive Chatters.

#### SIMILAR SPECIES

*Mentha pulegium* can resemble small *M. arvensis*, but the leaf and flower characters given above will easily separate the two species. Leach (1996) and others have noted the accidental introduction of *M. pulegium* as a contaminant of seed mixtures, and it has long been suggested (e.g. Hooker 1878) that there are two varieties present in Britain: a robust, upright introduction (var. *erecta*) and a prostrate, weakly rooting native (var. *decumbens*). Recent DNA sequencing has confirmed the presence of these two varieties as well as an apparent hybrid population (Cowan et al. 2004). However, these are not described in Stace (2010), and further morphological and taxonomic research is urgently required. In the meantime, the habits described above may be used as a general guide alongside its typical habitats and associates described below and reference to the native range described in Preston et al. (2002).

#### HABITATS

*Mentha pulegium* is typically found in damp, seasonally inundated grassland overlying silt or clay (Walker 2002), often within or on the margins of shallow ephemeral pools, runnels, ruts and poached areas that are caused by grazing practices or vehicle disturbance (Kay & John 1995). It has been recorded from very short turf of traditionally managed lowland pastures, lawns adjacent to open heaths, village greens, and more rarely on woodland rides, coastal grassland, or the edges of trackways, lakes and reservoirs (Chatters 1994).

Although it is not explicitly associated with any NVC type, Chatters (1994) describes several scarce or threatened species that occur with *M. pulegium* in micro-habitats that are

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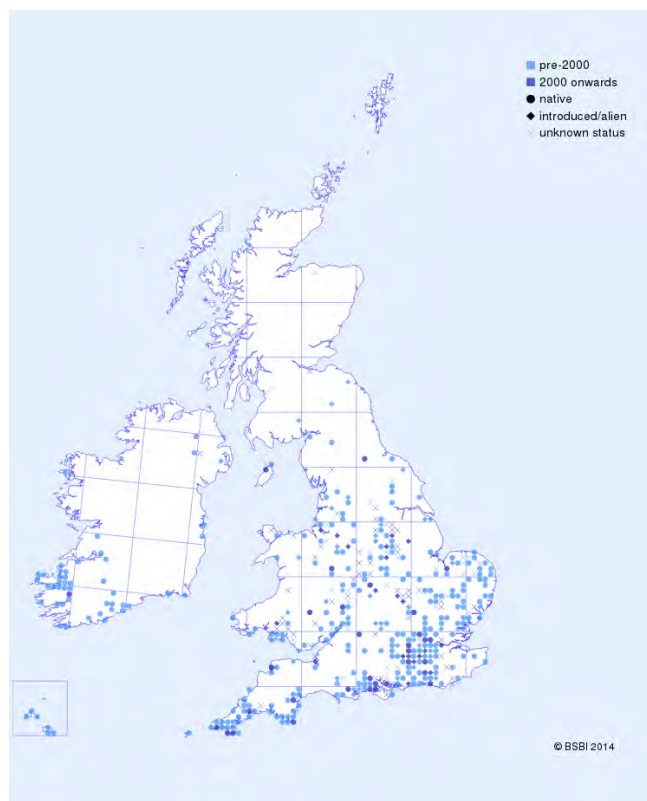
typically wet in winter and spring but dry out in summer, including *Chamaemelum nobile*, *Cicendia filiformis* and *Pulicaria vulgaris*.

In a typical habitat on the margin of Lake Suhodanj in north-eastern Bosnia, it is a characteristic species of the vegetation community *Polygono-Bidentetum tripartitae* (Barudanović & Kamberović 2011), which is broadly comparable to NVC OV30 *Bidens tripartita*-*Polygonum amphibium* community (Rodwell 2000).

### BIOGEOGRAPHY

*Mentha pulegium* has a European-southern Temperate distribution (Preston & Hill 1997), with its absolute northern limit in the British Isles (Preston 2007). It is widespread in Europe, with the range extending throughout the Mediterranean, Macaronesia, Asia and North Africa (Chatters 1994), with the southern range limit reached in Madeira. *M. pulegium* is naturalised in North and South America and is considered an invasive alien species in Australia.

In Britain, the distribution of the native plant is obscured by introductions. The bulk of extant native sites mapped in Preston et al. (2002) are located in south Hampshire, east Sussex, Devon and Cornwall. It now occurs at perhaps only one native location in Wales (Brechfa Common), having historically also been present on the Gower peninsula, and is absent as a native species from Scotland. In Ireland, it is widely scattered across Kerry and Cork in the south and Lough Neagh in the north.



Distribution of *Mentha pulegium* in Great Britain and Ireland.

### ECOLOGY

Described as a short-lived perennial herb by Chatters (1994), other field observations (e.g. Kay & John 1995) suggest that it is capable of persisting indefinitely if there is a sufficient quantity and quality of suitable habitat for rhizomatous spread, although habitat fragmentation and landscape change mean that this persistence is unlikely to occur at most extant British locations. Plants are winter-green, flowering from August into early October. Flowers at a single node open almost simultaneously, allowing contact between stamens from adjacent flowers in a whorl.

Under suitable conditions, vegetative spread can be vigorous, with annual radial increments of c. 5-9 cm recorded for plants at the sole Welsh locality (Kay & John 1995). *M. pulegium* is capable of very high seed production, particularly in areas that are associated with higher levels of soil disturbance caused by grazing stock (Panetta 1985a). Seeds are very small, have a high viability, and are capable of rapid germination if exposed to light (Panetta 1985b).

Ellenberg values (see Hill et al. 2004) indicate that the species requires wet, open and fertile sites on moderately acidic soils for germination and establishment. Seedlings are capable of surviving prolonged periods of inundation to a depth of 10 cm (Panetta 1985b).

The long-distance dispersal of seeds on the feet of wildfowl may complement short-range dispersal of propagules by livestock, although no studies have been undertaken to establish the efficacy of such potential dispersal mechanisms for this species.

### THREATS

In common with many threatened plants of seasonally inundated ground, *M. pulegium* has been extremely vulnerable to landscape trends such as changes to farming practices, the decline of traditional grazing and livestock droving, and the increasingly efficient drainage of pastures, commons or other seasonally-inundated locations. This has been reflected in a decline in sites of >50% between the two Atlas periods.

### MANAGEMENT

Locations that have maintained traditional pastoral grazing systems (e.g. the New Forest) have largely retained Pennyroyal populations (Rand & Mundell 2011). Management should aim to maintain or restore traditional grazing regimes with livestock that promote a short sward, create disturbance through poaching and also act as agents of dispersal. Other activities such as the creation of ruts by tractors or other farm vehicles is highly desirable, but should not lead to excessive disturbance over a large area. Broader management aims may attempt to enlarge extant sites or link up isolated populations in order to re-establish metapopulations. If suitable conditions still exist, management at historical sites where the taxon has apparently been lost could attempt experimental

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disturbance of the soil in an attempt to promote germination from a potentially long-lived seed bank.

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