

## *Helianthemum apenninum* (L.) Mill.

### White Rock-rose

*Helianthemum apenninum* has white petals and narrow leaves that are grey-tomentose on the upper side and whitish-tomentose on the lower side, with deeply-grooved mid-ribs and strongly downward curving margins. It is a calcicolous paramaritime dwarf shrub of rocky, thin, infertile soils and in Britain and Ireland is restricted to a small number of species-rich localities in north Somerset and south Devon, where it can be locally abundant, growing with rare species such as *Koeleria vallesiana* and *Trinia glauca*. It is assessed as Vulnerable in Great Britain, with cessation of management the main threat to extant populations.



©John Crellin

#### IDENTIFICATION

*Helianthemum apenninum* has white petals with a yellow spot at the base. When viewed up close, petals also tend to have a rather 'crinkled' appearance. Flowers open in full sun, close at night or in cold and damp conditions, and usually fall within a day of flowering (Proctor, 1956; Tébar *et al.*, 1997). The stigma is ± straight, and the elliptic pubescent sepals (7–10 mm) have ridges that are often a reddish colour.

The opposite leaves (2–3 mm wide) have an upper surface covered in a grey tomentum of appressed stellate hairs (Proctor, 2012), giving a 'matt' appearance, and an underside covered with a dense whitish tomentum. The leaves have a deeply-grooved central mid-rib and are strongly revolute (rolled back) at the margins (Poland & Clement, 2009; Stace,



*Helianthemum apenninum* growing with *Trinia glauca* at Berry Head, south Devon. ©Pete Stroh

2010), particularly in very dry conditions (Proctor, 2012).

#### SIMILAR SPECIES

When not in flower, the width of the leaves (narrower in *H. apenninum*) and grey-tomentose appearance of the upper surface easily separate this species from the green pubescent leaves of *H. nummularium*, which tends to grow in deeper soils.

*Helianthemum apenninum* hybridises with *H. nummularium* ( $\times$  *sulphureum*), although only two locations are known from sites with native *H. apenninum* populations in south-west England – Purn Hill and Brean Down, both in north Somerset. The hybrid has beautiful pale-lemon yellow (or sulphur) petals, and leaves which are also intermediate in character. See Stace *et al.* (2015), p.180, for more information.

#### HABITATS

*Helianthemum apenninum* is a calcicolous plant of steep south or west-facing stable rocky slopes over Carboniferous or Devonian limestones with very infertile thin soils that often dry out for long periods of time, similar to paramaritime conditions characteristic of the Mediterranean region (Ratcliffe, 1977; Porley, 1999; Hill *et al.*, 2004).

Colonising short, open xeric coastal turf interspersed with rocky outcrops and areas of bare ground (Rodwell, 1992), in the south-west of England *H. apenninum* occurs in two geographically distinct species-rich variants of NVC CG1 *Festuca ovina*–*Carlina vulgaris* grassland. In north Somerset, it is found in the *Carex humilis* sub-community with *Koeleria vallesiana*, and in south Devon in the *Scilla autumnalis*–*Euphorbia portlandica* sub-community with *Trinia glauca*. Within these community types it is found as a constituent of

## *Helianthemum apenninum* (L.) Mill.

the thin open turf and also as plants rooted into limestone crevices (Proctor, 1958; see photo above).

*Helianthemum apenninum* inhabits a similar ecological niche across its European range although the Poitou-Charentes region between La Rochelle and Bordeaux supports a population at Sèchebec on rocky red limestone soils with little free carbonate and a mildly acid reaction (Proctor, 1958).

### BIOGEOGRAPHY

*Helianthemum apenninum* has a Mediterranean-montane element, with its main area of distribution in the limestone garrigue communities of southern France (Proctor, 1958). It occurs in the Mediterranean region from Morocco and the Iberian Peninsula to Italy and the southern slopes of the Alps, eastwards to the Dolomites and the mountainous regions of Albania, Greece, and Crete, and northwards to central and northern France, where it becomes more thinly scattered in its distribution, on to England, Belgium and western Germany (Proctor, 1956). It reaches its absolute northern European range limit at Brean Down, North Somerset (Preston, 2007).

In Britain *H. apenninum* has a very restricted range, being present (sometimes in local abundance) at just two main localities; the Torbay area of south Devon at Berry Head (Brixham), Walls Hill/Anstey's Cove, and Daddyhole Plain (both Torquay), and along the north Somerset coast at Brean Down and Purn Hill.

Although plants were discovered in the mid-1980s at a new location at Pennard Cliffs, Gower, it was soon discovered to be

the result of an unofficial introduction in the early 1960s from material taken from Brean Down (Ellis, 1987). *H. apenninum* has also been introduced to Goblin Combe, north Somerset as part of a University of Bristol experiment, where it persisted until very recently (Helena Crouch, pers. comm.), and at Sand Point on the site of a former cottage garden (Roe, 1981). It was also present at Fishcombe Point in South Devon, presumably using seeds acquired from native populations at nearby Berry Head.

In Britain, *H. apenninum* reaches its maximum altitude (90 m) at Brean Down, but can be found as a montane species in southern Spain at altitudes exceeding 1000 m (Tébar *et al.*, 1997).

### ECOLOGY

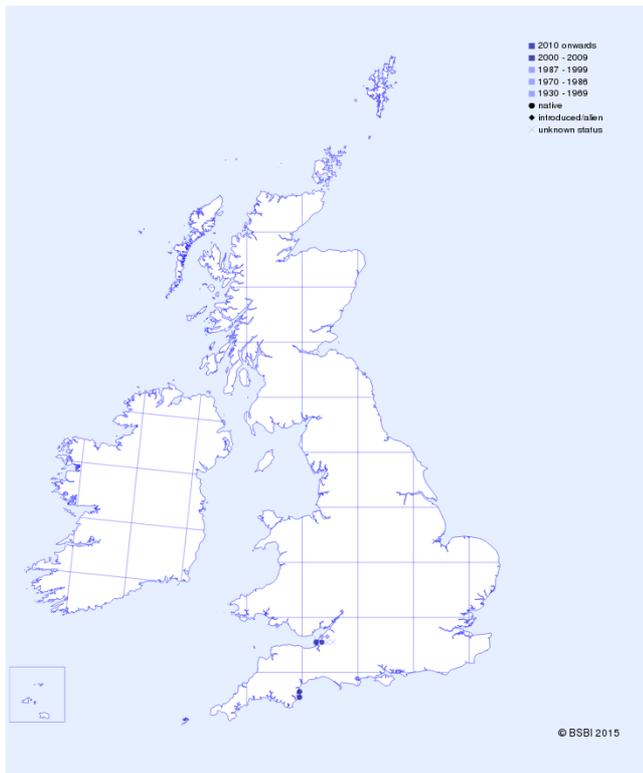
*Helianthemum apenninum* is an evergreen perennial calcicolous dwarf shrub of open, sunny, rocky slopes, forming a dense mat from a central rootstock and flowering, often in some profusion, from April to July (Proctor, 1956).

Flowers are pollinated by hymenoptera, although self-pollination often also occurs within a population. Proctor (1956) noted that stamens are very sensitive, almost immediately spreading outwards when touched before returning to an upright position after a minute or so, an adaptation that perhaps allows for easier transfer of pollen to the pollinator. Following pollination, fruit development begins immediately, with the ovary permanently protected by the sepals (Tepal *et al.*, 1997). The fruit is a thin, woody capsule with three valves (4–8 mm in size) containing *ca.* 10 seeds. The seeds are small, *ca.* 2 mm diameter, subspherical and hard-coated.

Experimental work by Robles & Castro (2002) and Ramos *et al.* (2006) found that seed germination significantly increased following ingestion by herbivores (specifically sheep and goats) due to a softening and/or scarification of the hard seed coat, and further that the emergence and survival of seedlings was not affected by dung, leading to the conclusion that there is a convincing mutualism between herbivorous ungulates and *H. apenninum*. However, the establishment (or at least recorded observation) of new individuals from seed in field conditions is rare, despite plants freely setting seed and this being the main means of reproduction (Proctor, 1956). This apparent lack of regeneration from seed may in part be due to an inhospitable environment for the survival of seedlings, particularly in very dry and hot years (Porley, 1999).

Although Robles & Castro (2002) did not find a significant correlation between improved seed germination and heat shock, Luna *et al.* (2007) found that exposure to a brief heat pulse of 80°C followed by a six week incubation period significantly stimulated germination, and consequently that recruitment had the potential to be high after low intensity fires, although there was a sharp decrease in germination under this experimental treatment at higher temperatures.

Slow, incremental vegetative expansion is unlikely to play a role in the spread of an individual plant as the oldest branches



Distribution of *Helianthemum apenninum* in Great Britain and Ireland.

## *Helianthemum apenninum* (L.) Mill.

die back after a few seasons to be replaced by fresh growth from the base (Proctor, 1956).

### THREATS

An absence or substantial reduction in grazing pressure remains the main threat to extant populations in the south-west of England, leading to increased cover of rank grasses, scrub growth, and the eventual shading out of plants.

### MANAGEMENT

Management should aim to produce a short, open turf by the end of the growing season. Sheep grazing is often the most effective and practical means of achieving this outcome, supplemented by the local rabbit population, although at Berry Head goats are also used for grazing in areas inaccessible to sheep.

### REFERENCES

- Ellis, R.G. 1987. A cautionary tale. *BSBI News* 46: 13-15.
- Hill, M. O., Preston, C. D. & Roy, D. B. 2004. *PLANTATT: attributes of British and Irish plants: status, size, life-history, geography and habitats*. Biological Records Centre, Huntingdon.
- Luna, B., Moreno, J.M., Cruz, A., Fernández-González, F. 2007. Heat-shock and seed germination of a group of Mediterranean plant species growing in a burned area: An approach based on plant functional types. *Environmental and Experimental Botany* 60: 324-333.
- Poland, J. & Clement, E. 2009. *The Vegetative Key to the British Flora*. Botanical Society of the British Isles (BSBI), London.
- Porley, R.D. 1999. *Helianthemum apenninum* (L.) Miller (Cistaceae). In Wigginton, M.J. (ed.), *British Red Data Books 1 Vascular Plants. 3<sup>rd</sup> Edition*. p.184. Joint Nature Conservation Committee (JNCC), Peterborough.
- Preston, C.D. 2007. Which vascular plants are found at their southern and northern edges of their European ranges in the British Isles? *Watsonia* 26, 25-269.
- Proctor, M.C.F. 1956. Biological flora of the British Isles. *Helianthemum apenninum* (L.) Mill. *Journal of Ecology* 44: 688-691.
- Proctor, M.C.F. 1958. Ecological and historical factors in the distribution of the British *Helianthemum* species. *Journal of Ecology* 46: 349-371.
- Proctor, M.C.F. 2012. Adaptive differences related to water availability and shading in *Helianthemum* and *Koeleria*. *New Journal of Botany* 2: 26-36.
- Ramos, M.E., Robles, A.B. & Castro, J. 2006. Efficiency of endozoochorous seed dispersal in six dry-fruited species (Cistaceae): from seed ingestion to early seedling establishment. *Plant Ecology* 185: 97-106.
- Ratcliffe, D.A. 1977. *A Nature Conservation Review. Volume 1*. Cambridge University Press, Cambridge.
- Robles A.B. and Castro J. 2002. Effect of thermal shock and ruminal incubation on seed germination in *Helianthemum apenninum* (L.) Mill. (Cistaceae). *Acta Botanica Malacitana* 27: 41-47.
- Rodwell, J. S., ed. 1992. *British plant communities. 3. Grasslands and montane communities*. Cambridge University Press, Cambridge.
- Roe, R.G.B. 1981. *The Flora of Somerset*. Somerset Archaeological and Natural History Society, Taunton.
- Stace, C. A. 2010. *New Flora of the British Isles, third edition*. Cambridge University Press, Cambridge.
- Stace, C.E., Preston, C.D. & Pearman, D.A. 2015. *Hybrid flora of the British Isles*. Botanical Society of Britain and Ireland (BSBI), Bristol.
- Tébar, F.J., Gil, L. & Llorens, L. 1997. Reproductive biology of *Helianthemum apenninum* (L.) Mill. And *H. caput-felis* Boiss. (Cistaceae) from Mallorca (Balearic Island, Spain). *Acta Botanica Malacitana* 22: 53-63.

### AUTHOR VERSION

Peter Stroh. Version 1: 20 October 2015.

### SUGGESTED CITATION

Stroh, P.A. 2015. *Helianthemum apenninum* (L.) Mill. White Rock-rose. Species Account. Botanical Society of Britain and Ireland.