Teesdalia nudicaulis L.

Shepherd's Cress

Teesdalia nudicaulis has small asymmetrical flowers with the outer white petals larger than the inner, and compressed spoon-shaped fruits that have a small notch at the tip and a miniscule style. It is a plant of free-draining, periodically disturbed shallow gravelly or acid soils, and is typically associated with rabbit-scraped heath grassland, dune systems and sandy shorelines, arable margins and mountain screes. In Britain its distribution broadly follows suitable substrates, although declines have been recorded across its range, leading to an assessment of Near Threatened in GB and England. It is assessed as of Least Concern in Wales.

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IDENTIFICATION

Teesdalia nudicaulis has erect or ascending stems (-25 cm) and small white asymmetrical flowers, with the outer petals approximately twice as long and inner petals only slightly longer than the ± triangular sepals (Tutin et al. 1964; Rich 1991).

Fruits (2.5-5 x 2-4 mm) are compressed, spoon-shaped, have very narrow marginal wings and are held on patent pedicels 2-6 mm long. They have a small notch at the apex and a miniscule style (Rich 1991; Stace 2010). The basal rosette of spathulate, fleshy, glabrous or sparsely hairy leaves have a few acute-obtuse lateral lobes and a broad terminal lobe that is often 3-lobed (Rich 1991; Poland & Clement 2009).

SIMILAR SPECIES

The size and asymmetry of the flowers, the presence of a tiny scale at the base of the filament and closer inspection of leaf and fruit shape will quickly separate *T. nudicaulis* from superficially similar species.

Typical habitat for *Teesdalia nudicaulis* at Icklingham Triangle, west Suffolk. ©Tim Pankhurst.

HABITATS

T. nudicaulis is a plant of free-draining, bare or disturbed ground on shallow acidic sandy and gravelly soils (Pearman 2002). It is found in a range of open habitats, including grazed and rabbit-scraped heath grassland characterised by large amounts of *Cladonia sylvatica*, sandy shorelines, disturbed dune systems, arable margins, waste ground, road verges, shingle and gravel banks, mountain screes and gravels, sand and gravel workings, coal bings and cinder tips (Trist 1979, Rich 1991; Wood & Woods 2013).

It is an associate of both NVC CG7 *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland and the richest variant of U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland, the *Erodium cicutarium-Teesdalia nudicaulis* sub-community that includes other ephemeral species such as *Aira praecox, Filago minima, Hypochaeris glabra, Myosotis ramosissima, Ornithopus perpusillus* and *Veronica arvensis* (Rodwell 1992).

BIOGEOGRAPHY

T. nudicaulis has a European Temperate distribution (Preston & Hill 1997), being widespread across much of western, central and south-east Europe and Russia, with its northern range limits extending to Sweden. It is rare in the Mediterranean (Rich 1991), where it is largely replaced by *T. coronopifolia*. It is an introduced non-native in North America, South America, north-west Africa and Australia.

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In Britain, *Teesdalia nudicaulis* is widespread throughout much of central and northern Wales, England and Scotland from sea-level to 450m on Ben More (vc103), with the location of populations mirroring suitable substrates and particularly concentrated across areas of south Devon and Cornwall, eastern England, north Hampshire, Surrey, Lincolnshire, the Welsh Borders, Cumbria, Moray and Easterness.

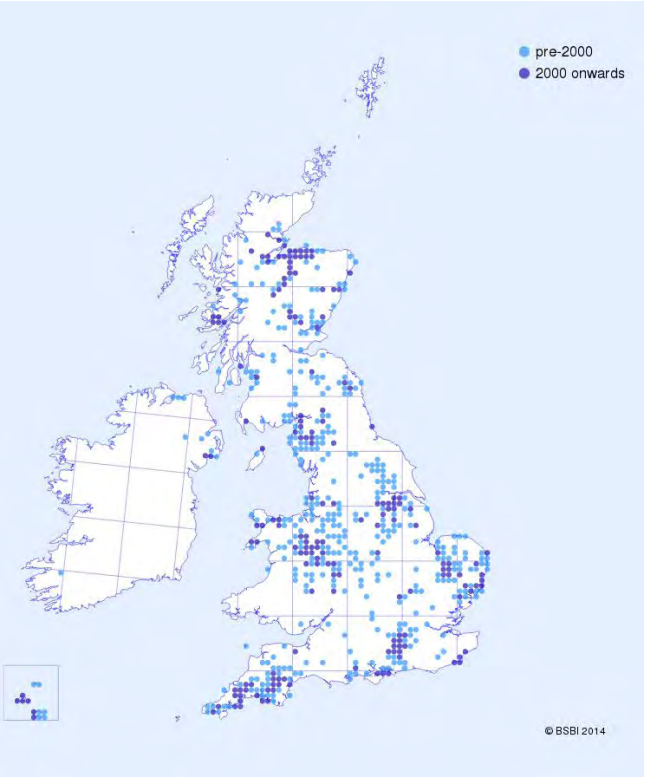
It has a very restricted distribution in Ireland, where it is recorded from sand dunes in Dundrum Bay, County Down and the County Londonderry coast at the Bann Estuary and Benone (Hackney 2011).

ECOLOGY

A winter-annual therophyte, associated with low soil pH, high Phosphorous availability, and low levels of ammonium and total inorganic Nitrogen (Martensson & Olsson 2010).

Plants flower from March to June and produce an inflorescence of up to 40 flowers, with each flower producing one fruit containing 4 seeds (Newman 1964). Seed are ovoid, yellow-brown and very small (0.9-1.7 mm). Although Newman (1964) states that seeds have no specific adaptations for dispersal, more recent studies have shown that very small, round seeds can survive endozoochorous dispersal.

The primary means of reproduction is probably self-pollination. Germination occurs in the autumn, with plants developing a basal rosette of leaves and a tap root (c.1-4 cm long) before over-wintering in a vegetative state.



Distribution of *Teesdalia nudicaulis* in Great Britain and Ireland.

Studies by Newman (1963, 1964, and 1965) showed that the vast majority (c. 90%) of *T. nudicaulis* seeds germinate in the season in which they are produced. Larger over-wintering rosettes and plants that produced greater numbers of flowers and seeds were correlated with early autumnal germination when soils were both moist and warm (relative to November) and had higher than average soil moisture in early spring. Newman (1964) also found that a delay in germination of 3 weeks between mid-September and mid-October would lead to smaller plants and a decrease in seed production of c.40%. Hoffmann (2000) speculates that the rarity of *T. nudicaulis* in the Mediterranean within apparently suitable habitat may be due to more lengthy periods of drought and high summer temperatures that result in harmful effects on seeds.

Rich (1991), Farrell (1994) and Pearman (2002) all mention that *T. nudicaulis* has a very short-lived seed bank. However, seed bank studies undertaken in Breckland heaths by Pakeman & Marshall (1997) found that *T. nudicaulis* was present as a viable resource in the soil seed bank when not present in above-ground rank vegetation. This finding strongly suggests that *T. nudicaulis* has a more persistent seed bank than previously assumed, and consequently has the potential to re-establish following disturbance and/or an increase in grazing intensity.

Small-scale disturbance plays a key role in *T. nudicaulis* ecology, with a study by Martensson & Olsson (2010) in south-eastern Sweden showing that patches disturbed by rabbit and ant activity increased seedling establishment by two to four times.

THREATS

As a plant of open habitats, the main threats to extant populations are linked to a lack of disturbance, vegetation succession and scrub encroachment. In addition, populations have been lost because of habitat loss and the subsequent fragmentation of the local landscape, the intensification of agricultural practices, sand extraction, commercial afforestation and urban development (Farrell 1994).

MANAGEMENT

Management should, where appropriate, instigate or maintain a traditional grazing regime resulting in a tightly grazed sward and small-scale disturbance. Scrub clearance is likely to be necessary on rank or degraded sites. Although sand extraction is listed as a threat, sand and gravel workings can also present new opportunities for habitat creation, but without an appropriate after-care management plan post-extraction these habitats are likely to be short-lived.

REFERENCES

Farrell, L. 1994. *Teesdalia nudicaulis* L.. In: *Scarce Plants in Britain*. Stewart, Pearman, & Preston (eds). pp. 403.Joint Nature Conservation Committee (JNCC), Peterborough.

Hackney, P. 2011. *Teesdalia nudicaulis* – Shepherd's Cress. Northern Ireland Priority Species accounts. National Museums, Northern Ireland.

Hoffmann, M.H. 2000. Biogeography and Climatic Differentiation of Two Annual Species of Teesdalia R. Br.(Brassicaceae). *Journal of Biogeography* 27: 989-999.

Martensson, L.M. & Olsson, P.A. 2010. Soil chemistry of local vegetation gradients in sandy calcareous grasslands. *Plant Ecology* 206: 127-138.

Newman, E. I. 1963. Factors controlling the germination date of winter annuals. *Journal of Ecology* 51: 625-38.

Newman, E. I. 1964. Factors affecting the seed production of Teesdalia nudicaulis. I. Germination date. *Journal of Ecology* 52: 391-404.

Newman, E. I. 1965. Factors affecting the seed production of Teesdalia nudicaulis. II. Moisture in Spring. *Journal of Ecology* 53: 211-232.

Pakeman, R. J. & Marshall, A.G. 1997. The seed banks of the Breckland heaths and heath grasslands, eastern England, and their relationship to the vegetation and effects of management. *Journal of Biogeography* 24: 375-390.

Pearman, D.A. 2002. *Teesdalia nudicaulis*. In: Preston, C.D., Pearman, D.A. & Dines, T.D. (eds & comps). *New Atlas of the British and Irish Flora*. pp. 272. Oxford University Press, Oxford.

Preston, C.D. & Hill, M.O. 1997. The geographical relationships of British and Irish vascular plants. *Botanical Journal of the Linnean Society* 124: I-120.

Rich, T.C.G. 1991. *Crucifers of Great Britain and Ireland*. BSBI Handbook No.6. Botanical Society of the British Isles (BSBI), London.

Rodwell, J.S. 1992. *British Plant Communities. Volume 3. Grassland and montane communities*. Cambridge University Press, Cambridge.

Stace, C.A. 2010. *New Flora of the British Isles*, third edition. Cambridge University Press, Cambridge.

Trist, P.J.O. 1979. *An Ecological Flora of Breckland*. E.P. Publishing, West Yorkshire.

Tutin et al. 1964. *Flora Europaea Volume 1*. Lycopodiaceae to Plantanaceae. Cambridge University Press, Cambridge.

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