

Gentiana verna L.

Spring Gentian

The stunning blue flowers of *Gentiana verna* are unmistakable, but when not in flower plants can still be identified by the pale, apple-green opposite leaves which have a leathery texture and a pronounced fold around the central vein. Where vegetation is hard-grazed, leaves appear as compact 'rosettes'. It is a rare species in Britain and Ireland, confined to limestone grassland and calcareous drift in the North Pennines and around Galway Bay in western Ireland. *G. verna* is assessed as of Least Concern in Great Britain, but as Vulnerable in England due to recent declines.



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IDENTIFICATION

Flowering plants of *Gentiana verna* are unmistakable, but scarce. Surveyors thus need to know the plant's vegetative characters. The distinctly pale, apple-green leaves are borne in opposite pairs alternating at right angles to one another. They lack a petiole and have a rather thick, leathery texture with no apparent venation apart from a pronounced fold around the central vein, and no trace of lobing or toothing.

Young leaves are oval, but as they mature they develop bluntly-pointed or even lozenge shapes. In grazed turf the compressed internodes result in compact 'rosettes', although these elongate in taller grassland. Shoots usually occur in loose groups or clusters.



The pale, apple-green young leaves of *Gentiana verna*. ©Stuart Hedley

SIMILAR SPECIES

Small rosettes of *G. verna* can be mistaken for a variety of common species, including *Prunella vulgaris* and *Bellis perennis*, which may have a similar pale colour in turf. Close inspection will rapidly reveal the complete absence of toothing and thick texture. Both *Gentianella amarella* and *G. campestris* have darker, more pointed leaves.

HABITATS

In Britain *G. verna* is a very rare plant of limestone grassland and calcareous drift throughout its range, and fixed calcareous dunes in the west of Ireland (Elkington 1963).

At the core of its Pennine range it is associated with NVC CG9d *Sesleria albicans-Galium sternerii* grassland, *Carex capillaris-Kobresia simpliciuscula* sub-community, over 'sugar limestone' rendzinas, CG10b *Festuca ovina-Agrostis capillaris-Thymus praecox* grassland, *Carex pulicaris-Carex panicea* sub-community, on deeper, lime-rich boulder clay, or M10b *Carex dioica-Pinguicula vulgaris* mire, *Briza media-Primula farinosa* sub-community mire or sedge-rich CG10b on streambanks and flushes, where it avoids the wettest areas.

On more isolated hills in the North Pennines it is either found in CG9e *Saxifraga hypnoides-Cochlearia alpina* sub-community or on drier forms of CG10b where bands of limestone outcrop within blanket-peat. In these areas it is (or once was) predictable in its occurrence. Rarely, it colonises secondary surfaces such as quarries, and on Widdybank Fell it may even be found growing under heather as it does in the Burren in Western Ireland, where it is also found on limestone exposures in CG9 grassland.

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BIOGEOGRAPHY

In England *G. verna* is confined to a very limited area (13 × 18 km) centred on the upper valley of the River Tees in the North Pennines. In Ireland it is particularly abundant on the limestones of the Burren area in County Clare. Its altitudinal range is from 400 m to 750 m (Mickle Fell) in England and from sea-level to 300 m in Ireland. It ascends to over 3500 m in the Swiss Alps.

G. verna is an Arctic-montane species distributed widely throughout the uplands of central and southern Europe from North-west Spain and Morocco eastwards to the Caucasus and the mountains of central Asia (Altai and Northern Mongolia east to Lake Baikal). It also occurs at between 43–62°N in Arctic Russia (now Nenets Autonomous Okrug or Nenetsia), including the Kanin Peninsula and Kolguev Island.

This extreme disjunction suggests that *G. verna* may have been present in Scandinavia before the height of the last glaciation c.25K years ago (Elkington 1963). Morphologically, Irish populations are distinct from Teesdale populations which are much closer to those on the continent (Elkington 1972).

ECOLOGY

Gentiana verna is a small perennial, evergreen herb with terminal rosettes at the end of long, branched underground stems variously described as rhizomes (Poland & Clement 2009) or stolons (Taylor 2002). The grouped rosettes are often especially numerous (and small) in heavily-grazed

situations, illustrating how the 'pruning' effects of grazing stimulates branching of the underground stem; the lateral buds are sometimes visible buried in thatch in tall grassland. Taylor (2002) points out that this makes it very difficult to estimate the number of genetically distinct plants, although in many continuous populations shoot-clustering strongly suggests that plural genets occur. There is considerable variation in leaf size with populations from higher altitudes in Europe tending to have shorter, wider rosette leaves than those from lower altitudes (Elkington 1972).

Although the longevity of the plants is unknown, Bradshaw (1985) has shown that on Widdybank Fell roughly a third of rosettes are replaced each year. Transplants from Widdybank Fell only survived for eight years in cultivation, possibly because the higher flower and seed production in cultivation exhausted the plants' reserves much faster than would occur under grazing in the wild (Cranston & Valentine 1983).

The solitary flowers are self-compatible but spontaneous selfing does not seem to occur. Flowering generally takes place from late April to May and flowers are mainly pollinated by bees which collect nectar at the base of the corolla tube, often by biting through the base of the calyx and corolla (Elkington 1963). After flowering, the pedicels elongate up to 15 cm and the capsules mature in June and July when the seeds are shaken from them and dispersed over short distances.

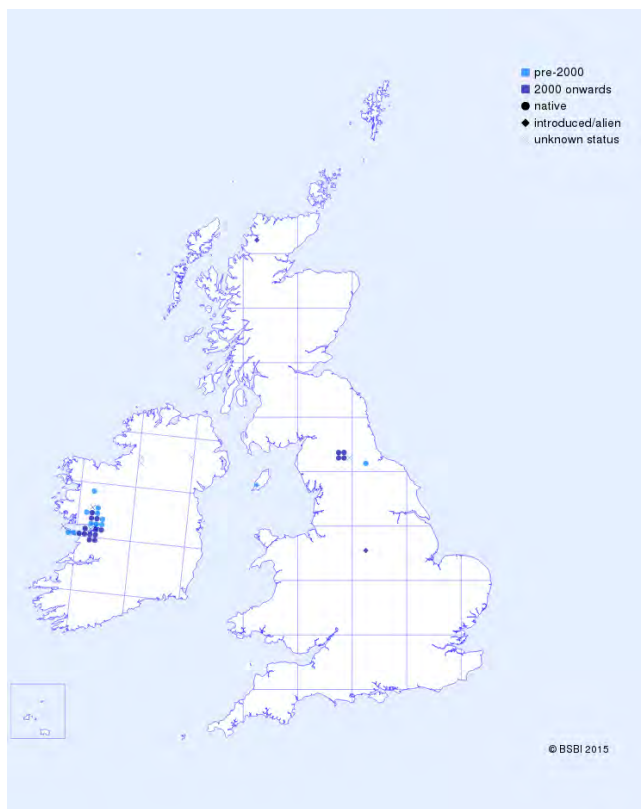
Viable seed is set each year, but seems to be highly variable with average numbers ranging from c.110 to c.400 per capsule (Elkington 1963; Cranston & Valentine 1983). However, reproduction in Teesdale would seem to be mainly vegetative due to the grazing of flowers and capsules; the distinctive seedlings with their large cotyledons are only very rarely seen.

THREATS

Undergrazing in the spring may pose a new threat to *G. verna* by reducing light levels to established plants and seedling niches. Heavy grazing remains a more serious threat, however, in particular damage to rhizomes caused by burrowing and scraping by rabbits. In addition increased rush biomass in flushed habitats caused by changes in the types and timing of livestock grazing seems to be threatening *G. verna* in at least some instances (Jerram 2011).

MANAGEMENT

In recent decades heavy grazing has suppressed flowering and fruiting in most populations in the North Pennines, but presence of this high-profile plant has usually catalysed a management response, with reduced spring grazing where possible, or fencing in remote situations. This response has accentuated the naturally wide habitat choice of the plant, to produce a huge range of contemporary contexts for *G. verna*, from closed swards, both short and tall and thatchy, to dry/wet open vegetation with bare substrate, both natural and man-made. There is much more that could be learned from a systematic study and review of these varied situations about



Distribution of *Gentiana verna* in Great Britain and Ireland.

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the Spring Gentian's response to conservation management.

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AUTHOR VERSION

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