

## *Viola lutea* Huds.

### Mountain Pansy

*Viola lutea* has yellow, sometimes purple, violet or parti-coloured flowers, a slender spur at least twice as long as the calyx and toothed leaves on long petioles. It is associated with unimproved, weakly basic to weakly acid soils and most commonly encountered in unimproved upland pastures, rocky ledges, and more rarely in calaminarian grassland and dune slacks. It is widespread across much of upland Britain, a rare species in Ireland and virtually absent from southern England. Assessed as of Least Concern in GB, it is Near Threatened in England following evidence of a decline in distribution of c. 26% since 1930.



©John Crellin

#### IDENTIFICATION

*Viola lutea* has slender creeping rhizomes that send up solitary stems (-20 cm) bearing flowers that are 2-3.5 cm wide and 1.8-2 cm long (Stace 2010). Petals are usually yellow, but can frequently be purple, violet, blue or parti-coloured. The slender spur (3-6 mm) is at least twice as long as the calyx appendages and not more than half as long as the petals (Tutin et al. 1968). Sepals are linear-lanceolate with backward-pointing auricles (Balme 1954). Palmate stipules are pubescent on the margins, divided into 3-5 segments and have an entire terminal lobe not distinctly wider than the other segments (Stace 2010).

Toothed leaves are variable in shape and borne on long petioles. Lower leaves are usually ovate-obtuse and upper leaves oblong or linear-lanceolate. The upper surfaces of leaves often have very short, stiff white hairs (Poland &



The purple form of *Viola lutea*, recorded near to High Force waterfall, Upper Teesdale. ©Paul Wood, 2011.

Clement 2009). The leaves of plants found on rock ledges and scree slopes tend to be smaller than those found in more stable habitats (Balme 1954).

#### SIMILAR SPECIES

*V. lutea* is similar to *V. tricolor* and the two are known to hybridise (see below). *V. tricolor* differs from *V. lutea* in having smaller flowers (<2 cm across) and stipules that are often slightly crenate (as opposed to entire) and with the terminal segment noticeably wider than the other segments (Stace 2010).

#### HABITATS

It is found in extensively grazed unimproved pastures and rock ledges in upland areas on soils over Carboniferous limestones, whin sill, basic schists and more siliceous rock. *V. lutea* also occurs in calaminarian grassland covering old mine workings or on river gravels. It is less abundant in areas where calcifugous species such as *Vaccinium myrtillus* and *Calluna vulgaris* are encroaching or becoming co-dominant, and is absent from highly calcareous soils and very acidic sites (Balme 1954; Porter & Foley 2002).

In Britain the species is commonly associated with a *Festuca-Agrostis* transition zone intermediate between true calcareous grassland and limestone heath, and more rarely on leached rendzina soils and thin podsols <6 cm deep (Balme 1954). Rodwell (1992, 2000) describes *V. lutea* as an associate of NVC MG3 *Anthoxanthum odoratum-Geranium sylvaticum* grassland, CG12 *Festuca ovina-Alchemilla alpina* grassland, U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland and OV37 *Festuca ovina-Minuartia verna* communities. It is also found in SD7 *Ammophila arenaria-*

## *Viola lutea* Huds.

*Festuca rubra* coastal dune communities.

### BIOGEOGRAPHY

*V. lutea* has a European Boreal-Montane element, occurring in western and central Europe, southwards to the Pyrenees. It is absent as a native species from Scandinavia, but is found as a rare casual in Sweden (Jonsell & Karlsson 2010).

It is widespread across upland Britain, and also occurs rarely as a species of coastal dune systems in western Ireland. An outlier population on Exmoor represents a significant extension of its southerly GB range limit. Strathy in west Sutherland represents the most northerly extant British location, although historical records are known from Caithness.

In Britain and Ireland *V. lutea* is found from sea level up to 1050 m in the Breadalbanes, Perthshire, with the vast majority of records from upland habitats above 300 m. In Europe it is found at altitudes of up to c. 2000 m.

### ECOLOGY

A perennial hemicryptophyte, reproducing vegetatively via slender shoots and branched rhizomes and also by seed, *V. lutea* flowers from April to August and, in common with other violets, also produces small green self-fertilised cleistogamous flowers. Fruits are three-seeded capsules that dry and contract, eventually forcibly expelling seeds up to three feet via self-propulsion.

A mature plant has two or more flowering shoots connected

by a shallow rhizome (- 15 cm long). The basal node of each flowering shoot has a main tap root in which food reserves are stored. *V. lutea* spreads via the main rhizome system that gives rise to long, creeping runners that send out adventitious roots at intervals from nodes (Holden 1952). New plants are produced from the lateral runners, with the rhizomatous connection between the daughter plant and the new plant eventually dying off.

*V. lutea* flowers are adapted to attract bees, with the much larger lower petal acting as a landing platform, and the network of veins on the lower petal guiding the insect into the narrow entrance of the flower. Stamens have short filaments and anthers that are situated below the stigma. The bee enters the flower, and pollen that has previously fallen on its head is deposited on the stigma. As the bee withdraws, freshly disturbed pollen is prevented from also being left on the stigma by a small flap at the base which is forced upwards (Holden 1952).

Although *V. lutea* is classified as a light-loving plant of unimproved soils (Hill et al. 2004), healthy populations are often found amongst a relatively thick sward where the soil surface is protected from extreme fluctuations in atmospheric conditions. Plants in upland areas are exposed to high levels of humidity throughout the year and relatively low summer temperatures and are known to be susceptible to prolonged drought conditions (Balme 1954).

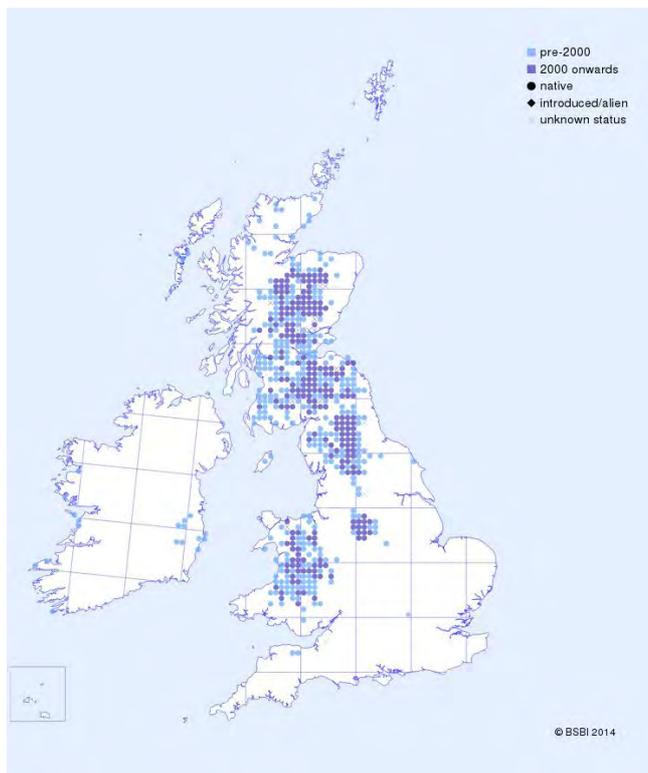
Hybrids between *V. lutea* and *V. tricolor* are known from Northumberland and Derbyshire, and may be overlooked elsewhere. Such plants feature characters either intermediate between the two parents or resembling *V. lutea* to a much greater extent than *V. tricolor* (see Fothergill 1938 for a full description). Northumberland populations of this hybrid are found on the banks of the River Tyne near Bywell Castle, and Swan (1993) hypothesised that seeds of *V. lutea* released upstream travelled down-river to mix with the lowland *V. tricolor* population.

There are longstanding records of *V. lutea* x *V. arvensis* hybrids from North Yorkshire and the Scottish Borders, although some doubt remains about their status and the possibility remains that plants may instead be the diminutive *V. lutea* var. *hamulata* (Foley & Porter 2007).

### THREATS

*V. lutea* is intolerant of high levels of grazing that result in a closely cropped sward and excessive trampling, with overgrazing likely to have negative effects on vegetative growth, establishment and the production of seed. The species is a plant of unimproved soils and has declined as a result of intensive agricultural regimes. Other threats include prolonged cessation of grazing leading to the encroachment of low-growing shrubs. Investigations by Hayes et al. (2006) demonstrated that *V. lutea* is potentially sensitive to predicted future levels of ambient ozone pollution.

### MANAGEMENT



Distribution of *Viola lutea* in Great Britain and Ireland.

## *Viola lutea* Huds.

Management should follow extensive livestock grazing practices that allow for a proportion of plants to flower and set seed each year. Such a regime controls competitive coarse grasses, prevents the encroachment and dominance of low growing shrubs and avoids a uniform short sward across large areas.

### REFERENCES

- Balme, O.E. 1954. *Viola lutea* Huds. *Journal of Ecology* 42: 234-240.
- Foley, M. & Porter, M. 2007. Mountain Pansy (*Viola lutea* var. *hamulata*) in N. Yorkshire. BSBI News 105: 47-48.
- Fothergill, P.G. 1938. Studies in *Viola*. I. The cytology of a naturally occurring population of hybrids between *Viola tricolor* L. and *Viola lutea* Huds. *Genetica* 20: 1-57.
- Hayes, F., Mills, G., Williams, P., Harmens, H., & B ker, P. 2006. Impacts of summer ozone exposure on the growth and overwintering of UK upland vegetation. *Atmospheric Environment* 40: 4088–4097.
- Hill, M.O., Preston C.D. & Roy D.B. 2004. *PLANTATT. Attributes of British and Irish Plants: Status, Size, Life history, Geography and Habitats*. NERC Centre for Ecology and Hydrology, Huntingdon.
- Holden, A.E. 1952. *Plant life in the Scottish Highlands: Ecology and Adaptation to Their Insect Visitors*. Oliver & Boyd Ltd., Edinburgh.
- Jonsell, B. & Karlsson, T. 2010. *Flora Nordica volume 6: Thymelaeaceae – Apiaceae*. Sweden Museum of Natural History, Stockholm.
- Poland, J. & Clement, E. 2009. *The Vegetative Key to the British Flora*. Botanical Society of the British Isles (BSBI), London
- Porter, M.S. & Foley, M.J.Y. 2002. *Viola lutea*. In: Preston, C.D., Pearman, D.A. & Dines, T.D. (eds & comps). *New Atlas of the British and Irish Flora*. pp. Oxford University Press, Oxford
- Rodwell, J.S. (ed.) 1992. *British Plant Communities Volume 3. Grasslands and Montane Communities*. Cambridge University Press, Cambridge.
- Rodwell, J.S. (ed.) 2000. *British plant communities. Volume 5. Maritime communities and vegetation of open habitats*. Cambridge University Press, Cambridge.
- Stace, C. A. 2010. *New Flora of the British Isles*, third edition. Cambridge University Press, Cambridge
- Swan, G.A. 1993. *Flora of Northumberland*. Natural History Society of Northumbria.
- Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. 1968. *Flora Europaea, Volume 2. Rosaceae to Umbelliferae*. Cambridge University Press, Cambridge.

### AUTHOR VERSION

Peter Stroh. Version 1: 25 February 2015.

### SUGGESTED CITATION

Stroh, P.A. 2015. *Viola lutea* Huds. Mountain Pansy. Species Account. Botanical Society of Britain and Ireland.