

Potentilla tabernaemontani Asch.

Spring Cinquefoil

Potentilla tabernaemontani has bright yellow flowers with sepals clearly visible between the five separated petals. It is associated with open, base-rich and highly infertile skeletal soils, and is found in dry calcareous grassland, on steep rocky slopes, dune slacks and limestone pavement. In Britain it is thinly scattered from Wiltshire and the Mendip Hills to the limestones of Banffshire. It is absent from Ireland, and has been lost from its former stronghold in the Breckland region of East Anglia. It was assessed as of Least Concern in Great Britain, with the bulk of declines taking place before 1930.



©Pete Stroh

IDENTIFICATION

The flowering stems of *Potentilla tabernaemontani* (syn. *P. neumanniana*) arise laterally from the side of the terminal leaf rosette (Stace 2010), bearing bright yellow flowers (10–15 mm across) on adpressed-hairy petioles. The flowers have five petals and five sepals, the ovate sepals clearly visible between the separated petals (Poland & Clement 2009).

The basal leaves are palmate with 5–7 obovate leaflets, the terminal tooth on each leaflet often noticeably shorter than the lateral teeth. Leaves have simple hairs on the underside, and are sparsely-hairy or glabrous on the upper side.

The short flowering stems of *P. tabernaemontani* are only a little longer than the leaves, and often have a downy appearance due to the presence of numerous simple hairs.



Potentilla tabernaemontani at Black Rock in the Mendip Hills, Somerset. ©John Crellin.

SIMILAR SPECIES

When not in flower *P. tabernaemontani* bears a close resemblance to *P. crantzii*, but the shape of the stipules of the basal leaves differ, with the former having entire, linear-lanceolate and acute stipules and the latter obtuse, ovate-lanceolate stipules with thickly membranous margins (Poland & Clement 2009; Stace 2010). When flowering, the two species are usually readily separated, as *P. crantzii* has larger, yellow-orange flowers 15–20 mm across. However, puzzling plants that are intermediate in habit, flower-size and stipule shape have been reported from Northern England and Scotland and possibly arose through sexual crossing (*P.* × *beckii* Murr) although further work is required to address this problem (Stace et al. in press).

Potentilla erecta has sessile stem leaves, and stems do not root at the nodes. When in flower, the two are easily separated as flowers of *P. erecta* have four petals. A close examination of the leaflets will separate dwarfed, sterile forms of *P. reptans* from *P. tabernaemontani*, as the former species has hydathode-tipped teeth (Poland & Clement 2009) and a terminal tooth that is ± the same size as the lateral teeth.

HABITATS

Potentilla tabernaemontani is found in seasonally parched, open, base-rich and highly infertile skeletal soils in habitat that includes dry calcareous grassland, limestone pavement, chalk pits and quarries, steep basic rocky slopes, dune slacks, coastal cliff faces and outcrops that have a southerly aspect.

In south-west England it is a characteristic species of the CG1 *Festuca ovina*-*Carlina vulgaris* grassland, especially the *Trinia glauca* sub-community on coastal limestones and the

Potentilla tabernaemontani Asch.

Koeleria macrantha sub-community of CG1 in the Avon Gorge (Rodwell 1992). In eastern England it grows with *Veronica spicata* on the calcareous soils 'stripes' amongst chalk heath on periglacial patterned ground (e.g. Newmarket Heath; Coombe 1987).

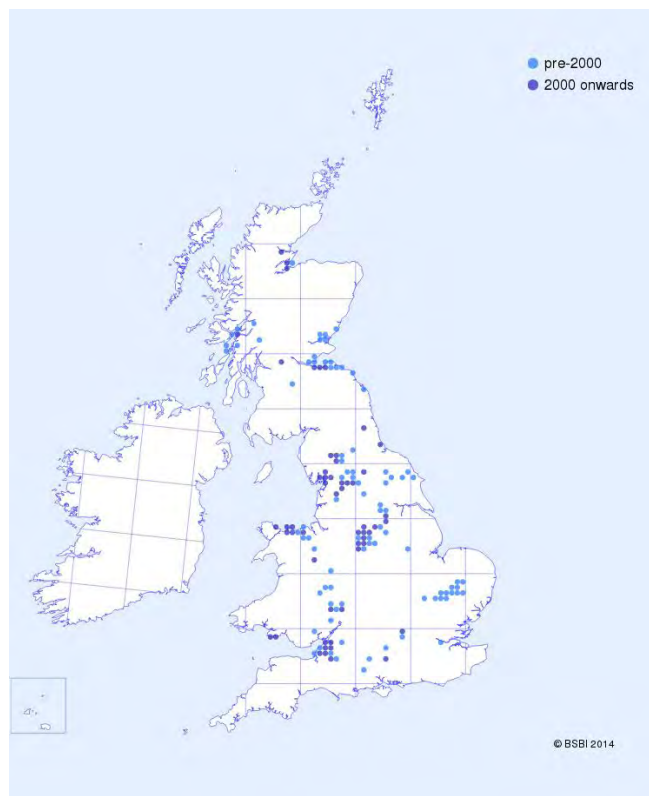
On limestone outcrops in northern England and Scotland *P. tabernaemontani* is associated with CG9 *Sesleria albicans-Galium sternerii* grassland and with the *Sedum acre-Arenaria serpyllifolia* sub-community of OV39 *Asplenium trichomanes-A. ruta-muraria* (Rodwell 2000). *Potentilla tabernaemontani* has been recorded from CG1, CG2 *Festuca ovina-Avenula pratensis* and CG6 *Avenula pubescens* grasslands in Wales (Stevens et al. 2010).

Across its European range *P. tabernaemontani* is also found in sub-Atlantic mesophilous calcareous grasslands, with *Brachypodium pinnatum* often the dominant grass (roughly equating to CG4 grassland), and species-rich Nordic alvar and pre-Cambrian calcareous rockflats with *Helianthemum oelandicum* and *Pulsatilla patens*.

BIOGEOGRAPHY

Potentilla tabernaemontani is a plant of the European Temperate zone, native to northern, western and central Europe, extending to the eastern Baltic, and becoming rarer in eastern Europe and the Carpathians.

In Britain it is thinly scattered from the chalk of Wiltshire and the Carboniferous limestone of the Mendip Hills, north to the Dalradian limestone of Banffshire (Garrard & Streeter 1983).



Distribution of *Potentilla tabernaemontani* in Great Britain and Ireland.

It has disappeared from a few former strongholds such as the Breckland region of East Anglia where it was last recorded in 1952 (Trist 1979), and is absent from Ireland. It is generally a lowland plant, but occurs at 335m in Westmoreland, and there are historical records from Loch Loch in East Perthshire at an altitude of 610 m (McCosh 2002).

ECOLOGY

Potentilla tabernaemontani is a prostrate, mat-forming apomictic perennial, reproducing by seed and vegetative regeneration, with stolons rooting at the nodes (Chatters 1994). Plants usually flower from April to June but can flower as early as January (Garner 2003).

Seed production is in part dependent on weather conditions, with Rusch & van der Maarel (1992) finding that a wet, cold spring followed by an early summer resulted in low flowering and fruit setting and low seedling recruitment in the following year. Blom (1976) found that under optimal soil-moisture conditions in coastal dune systems, emergence and establishment of *P. tabernaemontani* occurred in higher percentages on loose non-compacted soils than on compacted substrates.

The availability of open, bare areas is necessary for germination, seedling recruitment and the vegetative expansion of *P. tabernaemontani*. Such conditions are regularly found in dry, infertile stony or sandy habitats. Annual livestock grazing is often necessary to create suitable open conditions within dune slack or limestone grassland habitats.

Potentilla tabernaemontani can build up a sizable seed bank (Bossuyt et al. 2006) and may persist in the soil for a considerable period of time, with Bakker et al. (1996) demonstrating viability in dry limestone grassland soils in south-east Sweden after a period of c.80 years. Dai (2000) recorded viable seeds of *P. tabernaemontani* in cattle dung and also in soil under cattle dung, and many authors have shown that seeds capable of persisting in the soil for long periods of time are often also capable of surviving endozoochorous dispersal.

In central Europe, *P. tabernaemontani* is one of the main host plants for the Grizzled Skipper (*Pyrgus malvae*) (Krämer et al. 2012).

THREATS

Threats include a cessation or reduction in grazing pressure leading to rank vegetation and eventually scrub encroachment, the stabilisation of soils, and the shading out of *P. tabernaemontani*. Chatters (1994) cites the loss of an extensive pastoral grazing system and the closure of commercial warrens as the main causes of the eventual extinction of the species in the Suffolk and Lincolnshire Brecks. Threats also include an increase in the built environment, agricultural intensification and afforestation.

Potentilla tabernaemontani Asch.

MANAGEMENT

Sites on unstable, stony soils and open scree are likely to require minimal management, but where grazing is necessary, management should aim to produce a short turf of less than 20 cm and in places less than 10 cm by the end of the growing season (Robertson & Jefferson 2000). Bare ground is required for germination and establishment, and this is likely to be achieved through a combination of weather and disturbance. Based on the findings of Blom (1976, see above), it is suggested that grazing pressure should be kept at a level that precludes excessive poaching resulting in soil compaction by heavy grazing animals.

REFERENCES

- Bakker, J.P., Rosén, E. & Steg, K. 2007. Re-establishment of alvar plant species in abandoned arable fields on Öland. *Acta Phytographica Suecica* 88: 73-79.
- Blom, C. 1976. Effects of trampling and soil compaction on the occurrence of some *Plantago* species in coastal sand dunes. I. Soil compaction, soil moisture and seedling emergence. *Oecologia Plantarum* 11: 225-241.
- Bossuyt, B., Butaye, J. & Honnay, O. 2006. Seed bank composition of open and overgrown calcareous grassland soils—a case study from Southern Belgium. *Journal of Environmental Management* 79: 364-371.
- Chatters, C. 1994. *Potentilla neumanniana* Richb. In: A. Stewart, D.A. Pearman & C.D. Preston (eds) *Scarce Plants in Britain*, pp.334-335. JNCC, Peterborough.
- Coombe, D.E. 1987. Spiked speedwell, soils stripes and polygons, and the vanishing chalk heaths of Cambridgeshire. *Nature in Cambridgeshire* 29: 26-37.
- Dai, X. 2000. Impact of cattle dung deposition on the distribution pattern of plant species in an alvar limestone grassland. *Journal of Vegetation Science* 1: 15-724.
- Garner, P.G. 2003. *Potentilla neumanniana* flowering in January. *BSBI News* 93: 26-27.
- Garrard, I. & Streeter, D. 1983. *The Wild Flowers of the British Isles*. Midsummer Books, London.
- Krämer, B., Kämpf, I., Enderle, J., Poniatowski, D. & Fartmann, T. 2012. Microhabitat selection in a grassland butterfly: a trade-off between microclimate and food availability. *Journal of Insect Conservation* 16: 857-865.
- Mc Cosh, D.J. 2002. *Potentilla neumanniana*. In: C.D. Preston, D.A. Pearman & T.D. Dines (comps & eds) *New Atlas of the British and Irish flora*, p.330. Oxford University Press, Oxford.
- Poland, J. & Clement, E. 2009. *The Vegetative Key to the British Flora*. Botanical Society of the British Isles (BSBI), London.
- Robertson H.J. & Jefferson R.G. 2000. *Monitoring the condition of lowland grassland SSSIs. Volume I: English Nature's rapid assessment system*. English Nature Research Reports, No 315, Volume I. English Nature, Peterborough.
- 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.
- Rusch, G. & van der Maarel, E. 1992. Species turnover and seedling recruitment in limestone grasslands. *Oikos* 63: 139-146.
- Soják, J. 2009. Proposal to conserve the name *Potentilla verna* (Rosaceae) with a conserved type. *Taxon* 58: 652-653.
- Soják, J. 2010. Origin of *Potentilla crantzii*, *P. verna* and *P. puberula* (Rosaceae) with a note on the nomenclature of *P. pusilla*. *Feddes Repertorium*: 121: 112–116.
- Stace, C. A. 2010. *New Flora of the British Isles*, third edition. Cambridge University Press, Cambridge.
- Stace, C.A., Preston, C.D. & Pearman, D.A. (in press). *Hybrid flora of the British Isles*. Botanical Society of the British Isles (BSBI), London.
- Stevens, D.P., Smith, S.L.N., Blackstock, T.H., Bosanquet, S.D.S. & Jones, P.S. 2010. *Grasslands of Wales: A survey of lowland species-rich grasslands, 1987–2004*. University of Wales Press, Cardiff.
- Trist, P.J.O. 1979. *An Ecological Flora of Breckland*. E.P. Publishing, West Yorkshire.
- von Blanckenhagen, B. & Poschod, P. 2005. Restoration of calcareous grasslands: the role of the soil seed bank and seed dispersal for recolonisation processes. *Biotechnology, Agronomy, Society and Environment* 9: 143–149.

AUTHOR VERSION

Peter Stroh. Version 1: 23 December 2014.

SUGGESTED CITATION

Stroh, P.A. 2014. *Potentilla tabernaemontani* Asch.. Spring Cinquefoil. Species Account. Botanical Society of Britain and Ireland.