

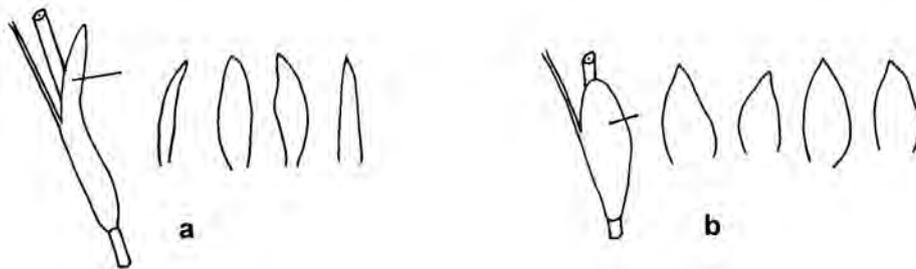
POTENTILLA

1. *Potentilla crantzii* / *P. neumanniana*

When grazed (e.g. on shingle), *P. crantzii* may be procumbent and be mistaken for *P. neumanniana* (*P. tabernaemontani* Asch.) if other characters are not examined (Edelsten 1996). A few populations are intermediate between the two species and may have arisen by hybridisation (Smith 1971). The stipule character can be used for herbarium material as the other characters are difficult to assess on pressed material. The terminal teeth on the leaflets seem to vary more than as described in the Table below.

P. neumanniana is generally a plant of lowland chalk and limestone, sometimes much more abundant after drought years. *P. crantzii* occurs on basic rocks and crags mainly in the uplands, but does occur washed down on shingle. Maps of both species are given in the *Scarce Plants*.

	<i>P. neumanniana</i> Rchb.	<i>P. crantzii</i> (Crantz) Beck ex Fritsch
Shoots	Prostrate, usually rooting and forming mats	Ascending, forming clumps, not forming mats except when grazed
Free part of stipule on stem leaf	Linear-lanceolate, <i>c.</i> 4.2-7.6 times as long as wide; apex acute (Fig. a)	Ovate, <i>c.</i> 1.9-3.5 times as long as wide; apex obtuse (Fig. b)
Terminal tooth of basal leaflet	Usually markedly smaller than its neighbours, relative width 0.6-0.8(-0.95)	Scarcely smaller than its neighbours, relative width 0.75-0.9
Flowers	10-15 mm diameter, usually without orange spot	15-25 mm diameter, often with orange spot at base of petal



Stipules of stem leaflet (a) *Potentilla neumanniana*, (b) *P. crantzii*.

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References Edelsten, J. (1996). *BSBI Scottish Newsletter* **18**: 15-16.
Smith, G. L. (1971). *New Phytologist* **70**: 607-618.

2. *Potentilla erecta*

Richards (1973) described the occurrence of *P. erecta* (L.) Raeusch. subsp. *strictissima* (Zimmer) A. J. Richards, a robust upland race with sparse flowers, in Britain and Ireland. It occurs in dwarf-shrub heath, on rocks and ledges, and less commonly in grassland, on peat or mineral soils at a range of altitudes (not just upland). It has been recorded from V.c. 3-5, 42, 46, 48, 64, 66, 70, 81, 90, 95, 96, 98, 99, 106, H3, H12, H14, H20, H21, H23, H25-29, H36-40 (Richards 1973, Rich & Scannell 1990). It is not uncommon and should be looked for elsewhere.

Intermediates with the widespread subsp. *erecta* have been found in one locality where the two subspecies occur together, but the taxa are usually readily separated elsewhere.

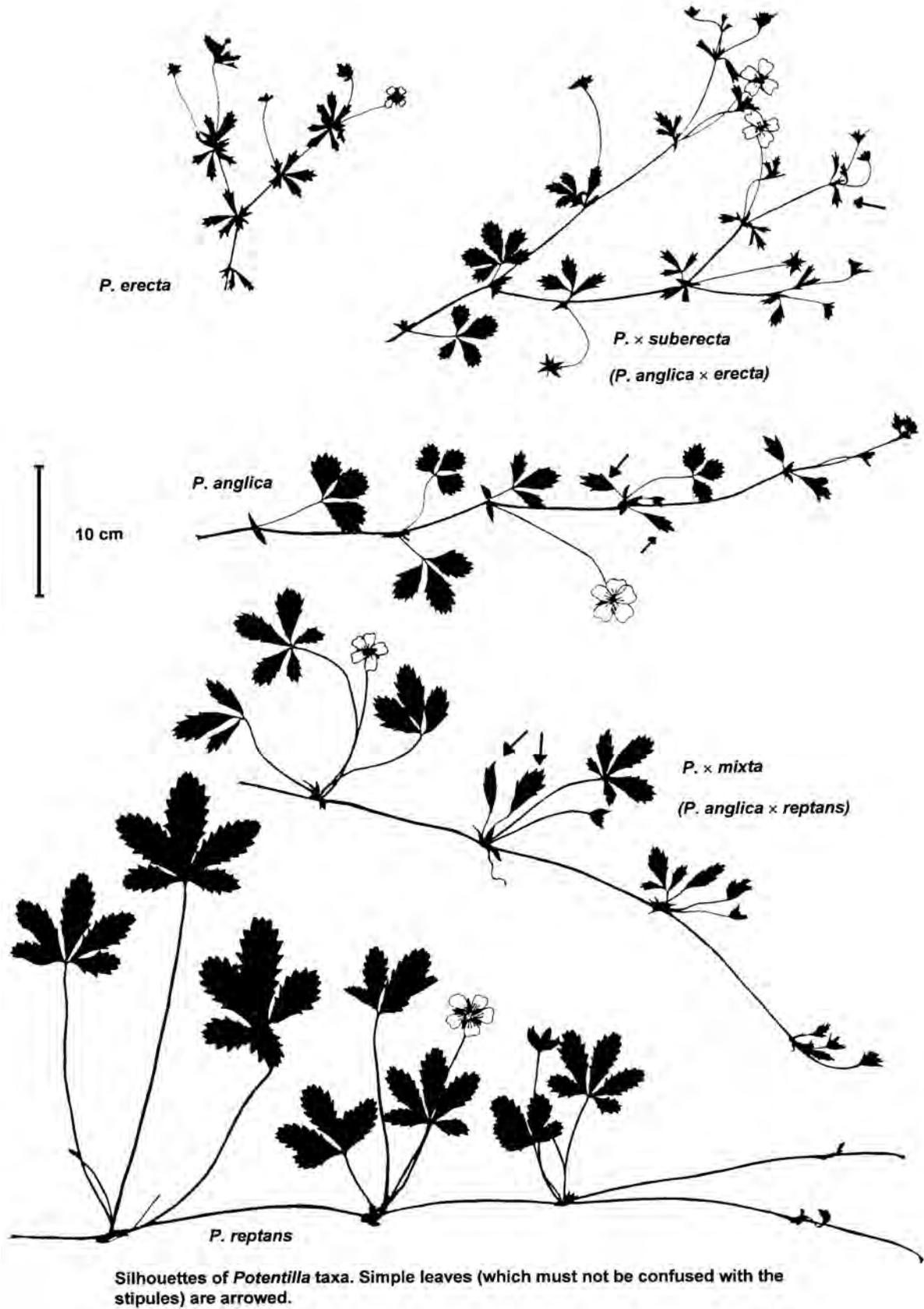
	Subsp. <i>erecta</i>	Subsp. <i>strictissima</i>
Habit	Weak, often decumbent, usually 5-16(-20) cm in length	Erect, usually 10-40 cm in length
Stem leaves	Uppermost usually 5-14(-20) mm long; weakly toothed (teeth usually less than 1.5 mm long) to only ½ way to base	Uppermost usually (12-)16-28 mm long; coarsely and acutely serrate (teeth usually exceeding 1.5 mm long) to base
Stipules	Less than 10 mm long, divided to ½ way	Longer than 10 mm, divided ± to base
Petals	Usually 2.5-4.5(-5.0) mm long	Usually (3.8-)4.5-6.5 mm long

References Richards, A. J. (1973). *Watsonia* **9**: 301-317.
Rich, T. C. G. & Scannell, M. J. P. (1990). *Irish Naturalists' Journal* **23**: 224-225.

3. *Potentilla erecta* / *P. reptans* / *P. anglica* and hybrids

P. erecta (L.) Raeusch. and *P. reptans* L. are well known and easily recognised but *P. anglica* and its hybrids, *P. × mixta* Nolte ex Rchb. (*P. anglica* × *P. reptans*) and *P. × suberecta* Zimmer (*P. anglica* × *P. erecta*), are extremely difficult to distinguish from one another. The hybrids are common and *P. × mixta*, which is seed-sterile but spreads very effectively by runners, is more common in most localities than *P. anglica* Laich itself. It is often found in isolation from the parents whilst *P. × suberecta* only occurs within the vicinity of *P. erecta* and *P. anglica*.

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The following Table summarises the main distinguishing features between *P. anglica* and the hybrids. All characters should be considered together when making a diagnosis.

	<i>Potentilla</i> × <i>mixta</i>	<i>P. anglica</i>	<i>P.</i> × <i>suberecta</i>
Habit	Prostrate, rarely branching	Procumbent, branching occasionally	Procumbent to erect, dichotomously branching
Rooting at the nodes	Readily	In later summer	Hardly ever
Petiole length (note 1)	Variable but rarely shorter than the shortest leaflet, often much longer	Varying from less than the length of the shortest leaflet to much longer	Variable; leaves near apex of stem may be sub-sessile whilst those nearer the base have much longer petioles
Stipules (note 1)	Simple	Entire or deeply cut	Entire or deeply cut
Leaflet number (note 1)	3, 4 or 5	3, 4 or 5; predominately ternate but some plants have a much higher proportion of 5-nate leaves than others	3 (4 or 5)
Number of petals	4 or 5	4 or 5	4(5)
Fertility	Sterile	Fertile	Partially sterile; a few achenes may be formed

Note

1. Cauline leaves (basal leaves do not always persist).

The reason for the difficulty is that *P. anglica* arose by hybridisation between *P. erecta* and *P. reptans* associated with chromosome doubling, and is therefore intermediate between them in morphology. *P.* × *mixta* and *P.* × *suberecta* take intermediate positions between their parents so that there is an almost continuous range of morphology from *P. erecta* at one extreme to *P. reptans* at the other. The species and hybrids can easily be separated by chromosome counts since *P. erecta* and *P. reptans* have 28 chromosomes, *P. anglica* has 56 and both hybrids have 42, but this is no help to the field botanist.

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The difficulties are exacerbated by environmental variation. For example, plants growing on bare or trampled ground or in short turf develop very small leaves and short petioles. Seasonal variation is also very pronounced, especially in *P. anglica* and the hybrids, resulting in a progressive decrease in leaf and flower size and a shortening of the petiole throughout the summer. For these reasons quantitative characters are hopelessly unreliable and it may be impossible even for the most experienced observer, to distinguish between *P. anglica*, *P. × mixta* and *P. × suberecta* on morphological characters alone.

Fertility is the only certain diagnostic feature. *P. anglica* is seed- and pollen-fertile but the hybrids are sterile. A plant with intermediate morphology which is setting seed can therefore be confidently identified as *P. anglica*. Unfortunately seed set cannot be assessed early in the flowering season; as a rough indication of maturity, it should be possible to count at least three withered flowers on the same stem distal to an open flower or bud. The oldest of these flowers heads should contain conspicuously swollen carpels if the plant is fertile. *P. × mixta* rarely produces even a single achene per flower and *P. × suberecta* may set a few seeds but undeveloped carpels always outnumber the swollen ones. One word of caution: *P. reptans* is highly fertile but self-incompatible and therefore needs to be cross-pollinated in order to set seed. Since large areas may be colonised by a single clone which has spread vegetatively, cross-pollination sometimes does not occur resulting in the absence of seed. A plant should not be identified as a hybrid unless it also shows the mixture of 3-, 4- and 5-nate leaves and 4- and 5-nate flowers typical of the hybrids.

Leaflet shape is too variable to be diagnostic although leaflets of *P. anglica* tend to be more broadly obovate than those of the hybrids and in *P. × mixta* the teeth tend to occur nearer the leaf base. The flower diameter is also too variable to be diagnostic and it diminishes throughout the flowering season. *P. anglica* and the hybrids have small simple leaves like a single leaflet (arrowed on the drawings) as well as palmate leaves; if confused with the stipules, these will give rise to errors since the large stipules of *P. erecta* and *P. × suberecta* are an important diagnostic feature.

The third possible hybrid combination, *P. erecta* × *P. reptans*, has 28 chromosomes but only one natural hybrid with this chromosome number has so far been found. It must therefore be very rare. Plants which are sterile, similar to *P. anglica* in morphology but more delicate or smaller and with narrower leaflets should, if possible, be collected live and grown for further examination. This does not mean uprooting the plant; runners will usually root readily in water.

When collecting specimens for determination, please collect a complete stem or stems with at least three withered flowers behind the open flower or bud so that seed set can be assessed, and describe the range of petal number on a plant.

References Matfield, B., Jones, J. K. & Ellis, J. R. (1970). *New Phytologist* **69**: 171-186.
Matfield, B. & Ellis, J. R. (1972). *Heredity* **29**: 315-327.
Harold, B. (1994). *BSBI News* **66**: 13-15.

Author B. Harold (née Matfield), February 1988.