# Short Notes

## *POTENTILLA RIVALIS* NUTT. EX TORREY & GRAY NEW TO BRITAIN

*Potentilla rivalis* Nutt. ex Torrey & Gray is thoroughly established on the broad, beach-like, sandy edge of the north-eastern corner of Barnsley Pool, Roughton, near Bridgnorth, Salop, v.c. 40, GR 32/753.927. The colony, which covers an area of approximately 50 by 2–5 yards, was observed by Mrs S. R. Price between 1976 and 1978, and a specimen of hers, sent by Miss M. Chorley to me for determination, collected in July 1978, is in **BM**. The number of plants visible on three visits varied from none (when deeply submerged) to thousands, depending upon the height of the water level. It is a very prolific seeder, but its precise ecological requirements appear to be the factor controlling its success here.

The pool, which seems to depend upon its existence from land drainage and a tiny stream at the southern end, is unpolluted, and supports fresh-water shrimps (*Gammarus* sp.). Red sandstone rocks form an outcrop behind the *Potentilla*. Associated species are *Ranunculus sceleratus, Cardamine hirsuta, Lotus corniculatus, Epilobium montanum, Polygonum aviculare, P. persicaria, P. lapathifolium, Rumex maritimus, Anagallis arvensis, Veronica beccabunga* and *Sonchus asper*.

This polymorphic, apomictic annual occurs in its native N. America on river banks and damp soil from Minnesota to Illinois, west to Alberta, British Columbia, California, Arizona and New Mexico, and is occasionally adventive further east (Gleason 1968). I have, surprisingly, not been able to find any adventive records for Britain, or, indeed, the rest of Europe. Some authors split this complex into three species and I originally named the above specimen as the segregate, *P. pentandra* Engelm. ex Torrey & Gray; but later, on seeing several seedling plants, I lost faith in the reliability of the diagnostic lower-leaf characters.

The origin of the Roughton plants is unknown. The area was used as a pheasant-rearing station some years ago, so introduction with pheasant food is one possibility. No other alien plants could be found nearby, except for the surprising but presumably unconnected occurrence of three bushes of the European *Euonymus latifolius* (L.) Miller by the public footpath.

*P. rivalis* much resembles both *P. intermedia* L. and *P. norvegica* L., but it differs from both in having the sepals about twice as long as the petals (not nearly equal), 5–10 stamens (not *c.* 20) and smooth 0·6–0·7 mm long achenes (not 0·9–1·3 mm long and sulcate-rugose). This species should be searched for in similar sites elsewhere in Britain.

ACKNOWLEDGMENT

I am greatly indebted to Mrs S. R. Price for kindly supplying all the information about the locality.

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E. J. CLEMENT

## THE KARYOTYPE OF *ARMERIA MARITIMA* (MILL.) WILLD.

*Armeria maritima* (Mill.) Willd. has a disjunct distribution in Britain. Its populations grow in a range of habitats and several ecotypes have been described, some of which are recognized as subspecies (Baker 1953). In this study chromosomes from plants from different populations were counted and the karyotype of *A. maritima* subsp. *maritima* described.

TABLE 1. LOCALITIES OF *ARMERIA MARITIMA* IN THE BRITISH ISLES FROM WHICH CHROMOSOME COUNTS OF $2n = 18$ WERE OBTAINED

| Locality | Grid Reference | No. of plants counted |
|---|---|---|
| *Armeria maritima* subsp. *maritima* | | |
| Braunton, N. Devon, v.c. 4 | 21/483.335 | 2 |
| Bossington, S. Somerset, v.c. 5 | 21/892.484 | 4 |
| Hurlstone Point, nr Porlock, S. Somerset, v.c. 5 | 21/899.493 | 2 |
| Treath Crugan, Caerns. v.c. 49 | 23/342.327 | 1 |
| Jenny Brown's Point, W. Lancs., v.c. 60 | 34/461.735 | 1 |
| Rye Loaf, nr Malham, Mid-W. Yorks., v.c. 64 | 34/862.637 | 2 |
| Woodhall, Wensleydale, N. W. Yorks., v.c. 65 | 34/986.898 | 2 |
| Widdybank Fell, Teesdale, Durham, v.c. 66 | 35/813.304 | 1 |
| Howhill, Teesdale, Cumberland, v.c. 70 | 35/729.433 | 1 |
| Whitesike Mine, Teesdale, Cumberland, v.c. 70 | 35/751.425 | 2 |
| Ben Lui, Mid Perth, v.c. 88 | 27/267.273 | 2 |
| Black Head, Clare, v.c. H9 | H12/145.112 | 2 |
| Oranmore, S. E. Galway, v.c. H15 | H12/376.246 | 1 |
| Carraholly, W. Mayo, v.c. H27 | H02/958.853 | 2 |
| Croagh Patrick, W. Mayo, v.c. H27 | H02/905.801 | 2 |
| *Armeria maritima* subsp. *elongata* | | |
| Pasture, nr Ancaster, S. Lincs. v.c. 53 | 43/983.436 | 1 |
| Burial Ground, Ancaster, S. Lincs. v.c. 53 | 43/983.436 | 2 |

TABLE 2. KARYOTYPE OF *ARMERIA MARITIMA* SUBSP. *MARITIMA* ($2n = 18$)

| No. of chromosomes | Centromeric[1] position | Mean length of chromosome ($\mu$m) | Mean ratio of arm lengths |
|---|---|---|---|
| 6 | Submedian | 4·8 | 1·89 |
| 6 | Submedian | 4·0 | 1·78 |
| 6 | Median | 3·2 | 1·21 |

[1] After Levan *et al.* (1965)

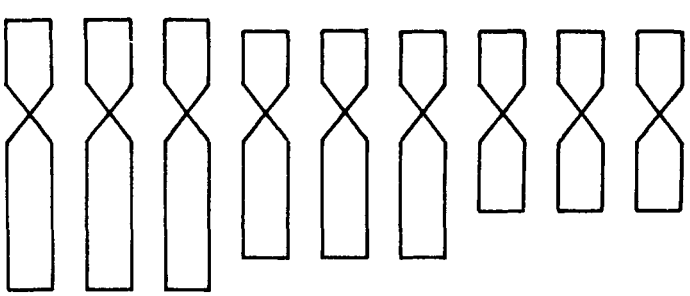

FIGURE 1. Ideogram of the haploid karyotype of *Armeria maritima* subsp. *maritima*

All chromosome counts were made on mitotic preparations from root-tips fixed from plants grown in pots. Excised root-tips were pre-treated in 0.002 M 8-hydroxyquinoline for 3 h and fixed in 3:1 absolute ethanol:glacial acetic acid. They were hydrolysed in 1 N hydrochloric acid at 60°C for 10 min and stained with Feulgen reagent.

Chromosome counts of *Armeria maritima* subsp. *maritima* from 17 localities in the British Isles (Table 1) and the Quiberon Peninsula, Morbihan, France, and of *A. maritima* subsp. *elongata* (Hoffm.) Bonnier from two localities in S. Lincs., v.c. 53 (Table 1), all showed $2n = 18$. These counts agree with all previous ones from Britain (Baker 1954, 1959; Hedberg 1958) and continental Europe (Löve & Löve 1961).

The karyotypes of plants of *Armeria maritima* subsp. *maritima* were compared; one plant from each of Widdybank Fell, Hurlstone Point and the Quiberon Peninsula, Morbihan, France. They were all similar, with three groups of six chromosomes. The mean karyotype is detailed in Table 2 and Fig. 1.

The karyotype described here differs from those of other species and subspecies of *Armeria*, including those of *A. maritima* subsp. *alpina* and subsp. *interior*, described by Suda (1969). Suda concluded that all karotypes of *Armeria* species have (1) at least one pair of 'heteromorphous' chromosomes which differ from each other in size and arm length, (2) at least one pair of chromosomes with satellites and (3) nine distinguishable pairs of chromosomes. The karyotypes determined here for *A. maritima* subsp. *maritima* differ from Suda's karyotypes in all these features.

However, Donadille (1967) gave idiograms of three *Armeria* species, including *A. maritima* subsp. *alpina*. In these none of the chromosomes had satellites or 'heteromorphous' chromosomes. Also, not all of the nine pairs of chromosomes could be distinguished from each other. These agree with my own observations, although Donadille was able to distinguish more pairs of chromosomes in *A. maritima* subsp. *alpina* than I have in subsp. *maritima*.

ACKNOWLEDGMENT

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A. DALE

## THE KARYOTYPE OF *SESLERIA ALBICANS* SCHULTES

*Sesleria albicans* Schultes is part of a European polyploid complex and in continental Europe chromosome counts have shown it to be tetraploid (Bielecki 1955). In the British Isles it has a disjunct distribution, so in this study chromosome counts were made on plants from several different areas; there appear to be no previous counts of this species in the British Isles.

All chromosome counts were made on mitotic preparations from root-tips fixed from plants grown in pots. Excised root-tips were pre-treated in 0·002 M 8-hydroxyquinoline for 3 h and fixed in 3:1 absolute ethanol: glacial acetic acid. They were then hydrolysed at 30°C for 8 h in a solution of 3 parts 8% pectinase solution (Koch-Light Laboratories Ltd, ex *Aspergillus niger*) in pH 5·0 citrate buffer and 1 part 0·07 M EDTA in pH 5·0 citrate buffer and stained in alcoholic-HCl-carmine (Snow 1963) overnight. The mixture of pectinase and EDTA solution was used since the cells separated more completely than when a pectinase solution was used alone (Humphries & Wheeler 1960).

Chromosome counts of *Sesleria albicans* from six British and Irish localities (Table 1) all gave $2n = 28$, in agreement with those published for continental Europe (Bielecki 1955, Ujhelyi 1960).

The karyotype of one plant of *S. albicans* from Widdybank Fell, Teesdale is given (Fig. 1, Table 2). In this karyotype only one chromosome of the largest pair of chromosomes had a satellite. This is the first detailed description of a karyotype for the genus *Sesleria*.

TABLE 1. LOCALITIES OF *SESLERIA ALBICANS* FROM WHICH CHROMOSOME COUNTS OF $2n = 28$ WERE OBTAINED

| Locality | Grid Reference | No. of plants counted |
|---|---|---|
| Cronkley Fell, Teesdale, N. W. Yorks., v.c. 65 | 35/840.283 | 2 |
| Widdybank Fell, Teesdale, Durham, v.c. 66 | 35/814.302 | 2 |
| Highfolds, Malham, Mid-W. Yorks., v.c. 64 | 34/894.674 | 2 |
| Jenny Brown's Point, W. Lancs., v.c. 60 | 34/461.735 | 1 |
| Creag an Lochain, Mid Perth., v.c. 88 | 27/590.411 | 1 |
| Lough Carra. E. Mayo, v.c. H26 | H12/163.726 | 1 |

TABLE 2. KARYOTYPE OF *SESLERIA ALBICANS* ($2n = 28$)

| No. of chromosomes | Centromeric[1] position | Mean length of chromosome ($\mu$m) | Mean ratio of arm lengths | Satellite length ($\mu$m) and position |
|---|---|---|---|---|
| 4 | median | 6·1 | 1·07 | [2]1·6 L. A. |
| 4 | median | 5·4 | 1·25 | |
| 2 | median | 5·4 | 1·27 | 1·6 S. A. |
| 2 | median | 4·9 | 1·30 | 1·4 S. A. |
| 2 | median | 4·8 | 1·56 | |
| 6 | median | 4·6 | 1·07 | |
| 2 | median | 4·1 | 1·08 | 1·3 L. A. |
| 4 | submedian | 4·0 | 1·82 | |
| 2 | submedian | 3·5 | 1·75 | |

[1] After Levan *et al.* (1965).
[2] Only one chromosome in this group had a secondary constriction.
L. A. = long arm; S. A. = short arm.

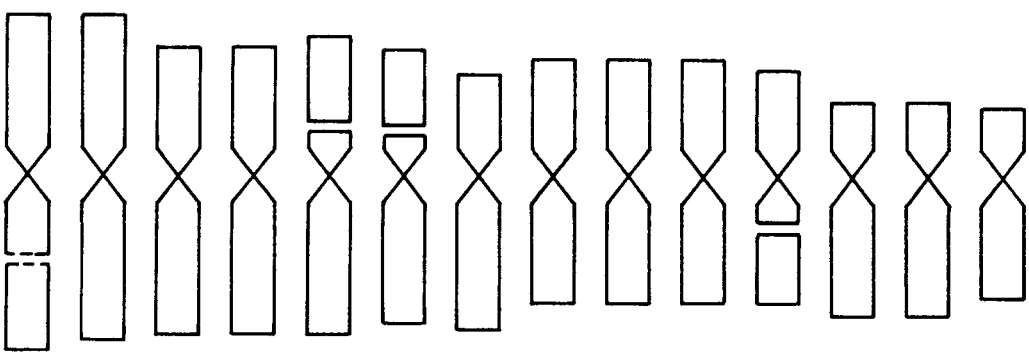

FIGURE 1. Ideogram of the haploid karyotype of *Sesleria albicans*.

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A. DALE

## THE DISTRIBUTION OF *CAREX ORNITHOPODA* WILLD. IN BRITAIN

*Carex ornithopoda* has a European and West Asian distribution similar to that of its close ally *C. digitata* (David 1978), but in general prefers more open and more upland conditions and is absent from much of the northern European plains. In Britain, at its north-western limit, it is concentrated in two main areas in Derbyshire and Westmorland. Where it occurs, it is usually in abundance, on rocky outcrops and grassy ledges of the limestone. It is somewhat surprising that over one third of its British stations have a northerly aspect; while on Whitbarrow, Westmorland, *C. digitata* and *C. ornithopoda*, whose distributions overlap in both the areas mentioned above, exchange their normal roles, *C. digitata* being found here and there on the open screes of the west-facing escarpment and *C. ornithopoda* being widespread in woodland rides on the dip-slope.

Such interchanges, and the close similarity of the two taxa, have caused some confusion in the records. In particular, there is as yet no certainty as to whether *C. ornithopoda* does or does not occur on the eastern side of the northern Pennines. The evidence that it does is derived from two records. A single specimen purporting to come from Hawnby (see list below) is undoubtedly *C. ornithopoda*, but Hawnby is a well-known locality for *C. digitata* and there may have been a muddle over the specimen's provenance. The identity of Borrer's plant from Mackershaw (see list below) rests on W. W. Newbould's word, for the specimen has not been traced, and Borrer himself did not know *C. ornithopoda*, which was not recognized in Britain until twelve years after his death (Babington 1874). Mackershaw, moreover, is another noted locality for *C. digitata*, which there grows very small, and I have deposited in **CGE** a specimen that demonstrates how easily a misidentification could arise.

In view of this history it may be as well to set out the main differences between the two taxa. When flowering or fruiting they should be easily distinguishable, for the lowest spike of the inflorescence of *C. digitata* is clearly separated from the one above it, whereas in *C. ornithopoda* all the spikes originate from almost the same point; the inflorescence of *C. digitata* will somewhere carry at least a tinge of crimson while that of *C. ornithopoda* is straw-coloured; and in *C. digitata* the female glumes are as long as the utricles whereas in *C. ornithopoda* they are markedly shorter. When the plants are in the vegetative state separation is not so easy, for the intensity of the red colouration of the basal sheaths and the breadth and degree of hairiness of the leaves (the distinctions usually quoted) are relative. Yet it is true that in *C. digitata* the sheaths are, in general, more deeply and genuinely crimson (as opposed to rust-coloured) and the leaves broader as well as being of a more yellowish or bronzy green (as opposed to mid- or dark-green). Furthermore, the new shoots of *C. digitata* are very distinctive. They begin to appear in October and are then tinged with deep red and tipped with green. In March they elongate and arch over at the tips, presenting a highly characteristic fountain-shape. None of these marks can be found in its ally.

The recorded stations of *C. ornithopoda* in Britain have all been resurveyed since 1970, and the present status of the sedge in each is indicated in the following list by the letters A = 1 to 20 plants, B = 21 to 100, C = 101 to 1000, D = over 1000. Where the plant has not been refound, the date of the last known sighting is given, together with the authority. The authenticity of the herbarium specimens quoted has been confirmed by me.

Derbys., v.c. 57: 43/1.7, Miller's Dale (C); near Monsal Dale, 1915, **K** ('Monsal Dale, high', 1896, **BM**) may be the same as the preceding; Cressbrook Dale (C). An erroneous record for 43/2.4 (Perring & Walters 1962) arose from a confusion between the 'Ravensdale' north-east of Brailsford and the same name used for the northern part of Cressbrook Dale.

N. E. Yorks., v.c. 62: 44/5.8, Hawnby, 1881, **NMW.** The unique specimen, collected by J. A. Wheldon and determined by E. Nelmes, is authentic, but some error may be suspected. Wheldon was 19 when the plant is said to have been gathered.

Mid-W. Yorks, v.c. 64: 44/2.6, Mackershaw (Lees 1888). Another doubtful record (see second paragraph of this paper).

N. W. Yorks., v.c. 65: 34/7.9, Fell End Clouds (B). An erroneous record for 34/8.8 (Perring & Walters 1962) was due to a misreading.

Westmorland, v.c. 69: 34/4.7, reports of *C. ornithopoda* from 'limestone pavements on the eastern side of Morecombe Bay' are errors for *C. digitata* (David 1978); 34/4.8, Halecat (C); Aslew Green (C); Mill Side, Low Fell (C); Whitbarrow, locally abundant between Howe and Raven's Lodge (D); Brigsteer, 4 places (A,B,B,C); 34/4.9, Helsington Barrows (C); Scout and Underbarrow Scars at frequent intervals (C); Cunswick (A); 34/5.7, Curwen Woods (B); Hutton Roof (B); 35/5.1, Shap (B); 35/6.0, Orton, Broadfell (B); Sunbiggin, scattered over the limestone pavements (B); 35/6.1, Crosby Gill, a main colony (C) and many scattered plants; on most of the terraces between Orton Scar and Great Asby Scar (C); Flass House, no date, **OXF**; 35/7.0, Smardale (B); Potts Beck (B); Fell End Clouds, continuation of colony in v.c. 65 (B); 35/7.1, Helbeck (C).

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R. W. DAVID

## BIOGRAPHICAL NOTES ON THOMAS GREENLEES (1865–1949)

The current interest in biographical details and the incomplete and incorrect entry in R. Desmond's *British and Irish botanists and horticulturalists* (1977) has prompted the following notes on Thomas Greenlees.

Thomas Greenlees was born in 1865 in Astley Street, Bolton, S. Lancs. His father was a shoe-maker by trade and Greenlees also took up this trade when he became of working age. This was not to be his life-long career, however, and he had several other jobs. According to his daughter, Mrs Alice W. Crook, this was due to his being very public-spirited; when work became short at the tannery he would leave and take up another job for a while so that his fellow-workers could have more work and therefore more pay. He did eventually return *c.* 1916 to the tannery where he was a leather-dresser, and he became a trade union secretary (*c.* 1927–32), a job which involved visiting many other tanneries.

Amongst his other occupations, he was a herbalist and had a shop in Morris Green Lane, Bolton. His interest in botany began in his youth, although he came from a very humble background and had a poor education. All his knowledge of plants was self-taught. The Bolton Botanical Society began in December 1895 with Greenlees and a few of his friends, also interested in botany, who used to go for rambles at weekends. They had a plot of land in Queen's Park, adjacent to the Chadwick Museum, which was made into a small botanical garden. Mr T. K. Holden was one of these pioneers and also a great friend of Greenlees, both being interested in chess as well as botany. Holden was not a Bolton man but came from Appleby in Westmorland, and it is thought he had a university education.

On the rambles the Society collected botanical specimens which were identified with the aid of 'Hayward's Classification', pressed between books and mounted. The Society gained many more members over the years and Greenlees became the president. Eventually, in 1907, the Society became the Bolton Field Naturalists' Society and as such is still in existence today, the 50th anniversary having

been celebrated by a dinner in the Town Hall in 1957. The Botanical Garden in Queen's Park was a special privilege granted by the Parks Committee to the Society.

Holden was the first Honorary Secretary of the Society, from 1907 until 1934, when he died. He was also the referee for biology and geology, while Greenlees was referee for botany. Greenlees and Holden were the authors of *The flora of Bolton*, which appeared as a series of articles in Parts 6–11 of Volume 12 of the Lancashire and Cheshire Naturalist (December 1919–May 1920) and was reprinted in booklet form by the Bolton Field Naturalists' Society in 1920. From 8th May, 1908, to late in the year 1914 Greenlees wrote articles for the *Bolton Chronicle* under the name of 'Flora'. The articles were mainly botanical but he also wrote several on astronomy. Mrs Crook has in her possession two large albums containing these articles.

During the summer months the Society organized rambles and Greenlees led several, mainly to Gale plantation, which was his favourite area. In winter, films were shown in the usual meeting-place of the Society, which was Mawdsley Street Congregational School. In April, 1938, Greenlees became one of the Vice-presidents.

He died of a stroke in 1949 and a seat was placed at Walker Fold in memory of him. His specimens were donated to the Chadwick Museum and they remain the only past record of the local flora at the present museum. His sheets number about 1,500, of which about one third (from Germany) were donated earlier.

ACKNOWLEDGMENTS

I am indebted to Mrs A. W. Crook of 72 Bennetts Lane, Bolton, daughter of Greenlees, and Dianne Beckwith, who compiled most of the information.

E. G. HANCOCK

## *CORRIGIOLA TELEPHIIFOLIA* POURRET NEW TO BRITAIN

In June, 1974, two minute plants of a *Corrigiola*, tentatively named *C. litoralis* L., were found at Gloucester Docks, E. Glouc., v.c. 33, by C. W. Bannister. They were among a remarkable collection of some 46 adventives, all typical of sandy soils and obviously originating from the Iberian Peninsula, growing on two small heaps of granite chippings on the dockside (Bannister 1975). Unfortunately the whole area was sprayed later in the summer and the plants disappeared.

However, a visit by S. C. H. *et al.* on 11th September, 1977, revealed that not only had the *Corrigiola* survived but it was well established in two separate places. In both, the plants were growing on a gravelly mixture of fine granite chippings and sand, Site A being adjacent to the original site and Site B on the quayside in another part of the Docks. 20 plants were counted in Site A and 30 in Site B, the majority of them flowering freely on decumbent, branching, leafy, often reddish stems (up to 23 cm long) radiating from a central rosette (Fig. 1), inconspicuous against the off-white background. They were still flowering on 5th February, 1978.

It then seemed that the plants might well be referable to the perennial Mediterranean species *C. telephiifolia* Pourret and not to the annual *C. litoralis*, and mature specimens with well developed fruits were sent to E.J.C., who had no hesitation in naming them *C. telephiifolia*, a species he had frequently seen in south-western Spain growing on waysides.

After contacting the importers of the granite, S.C.H. learned that the shipments to Gloucester came from N. Portugal, from two different quarries to the north of the Doura, and are exported from the port of Leixoes. The granite is used in this country for road making and architectural work.

Early in 1978 the quaysides and railways sidings were again sprayed. Site A was covered with steel girders throughout the summer and in early October was being used for storing boats. It will be surprising if the *Corrigiola* appears there again. Site B was piled high with granite blocks and only 8 small plants of the *Corrigiola* could be seen on 7th October. On a visit on 23rd June, 1979, the quay was still being used for stacking granite and no plants were visible. However, if the quayside should be left clear for a long enough period, there might well be a resurgence of the plant.

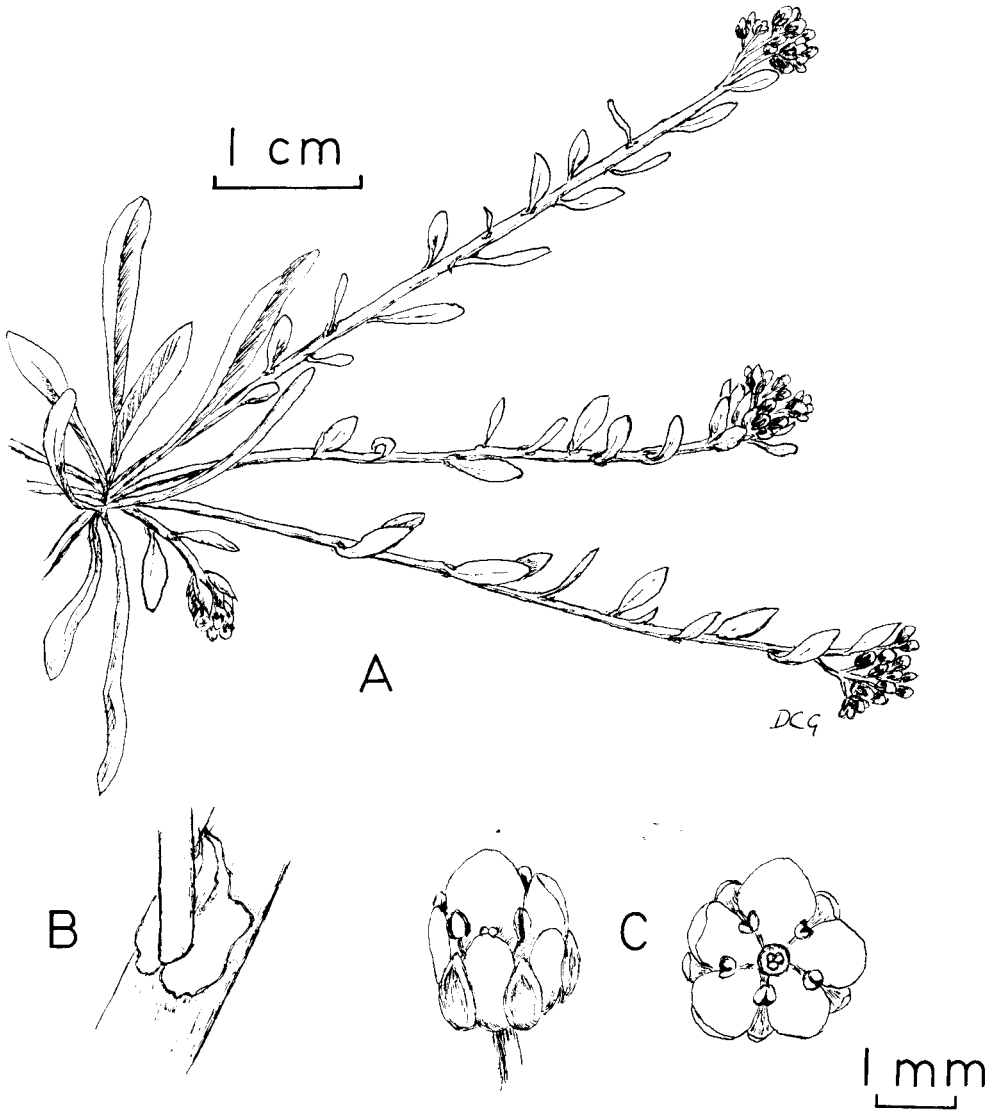


FIGURE 1. *Corrigiola telephiifolia* Pourret from Gloucester Docks. A, Habit; B, Stipules; C, Flowers.

Walters (1964) separated these two species in the traditional way, describing *C. litoralis* as an annual with inflorescence-branches bracteate and *C. telephiifolia* as a perennial with inflorescence-branches usually ebracteate; supplementary characters are the stouter stems of *C. telephiifolia* and its larger fruits (1.5–2.5 mm contrasting with 1.0–1.5 mm in *C. litoralis*).

Inspection of pressed specimens in **BM** reveals that typical specimens are readily nameable but, due to virtual overlap of all the diagnostic characters, some individuals are not so easily assigned. Maire (1963) very reasonably regarded the two taxa as subspecies of *C. litoralis*; Brummitt (1967) and others have certainly suggested that biennial/perennial variants of *C. litoralis* exist. Such stout plants of *C. litoralis*, suggesting a short-lived perennial habit, may be seen in **BM**:

a) Torcross, S. Devon, H. W. Pugsley, 5 September, 1934;

b) Lizard, Cornwall, waste ground, Colonel R. Meinertzhagen, August, 1931.

However, no British specimens, even those from railway sidings, are clearly *C. telephiifolia*, and so this species at Gloucester Docks appears to be new to Britain. It is an established alien in Belgium and Germany (Walters 1964), so its occurrence here, in the mild south-west, is not altogether surprising. It may be overlooked elsewhere.

ACKNOWLEDGMENT

We are most grateful to Mrs D. C. Grenfell for drawing Figure 1 for us.

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S. C. HOLLAND & E. J. CLEMENT

## *RANUNCULUS PENICILLATUS* (DUMORT.) BAB. IN THE BRITISH ISLES

There has been understandable confusion concerning the taxonomy of *Ranunculus penicillatus* (Dumort.) Bab., since it was not until 1966 that Cook demonstrated that the taxon is 'a collection of segmental amphidiploids' which has resulted from hybridization. Determination of parentage is difficult since the original hybridizations are believed to have occurred before the parents evolved to their present forms. Cook (1966) recognized three varieties of *R. penicillatus*: var. *penicillatus*, var. *calcareus* (R. W. Butcher) Cook, and var. *vertumnus* Cook. The first is synonymous with *R. peltatus* Schrank subsp. *pseudofluitans* (Syme) Cook in Clapham (1962), and *R. pseudofluitans* (Syme) Newbould ex Baker & Foggitt in Cook (1964). Var. *calcareus*, first described by Butcher (1960), was included within *R. penicillatus* by Cook (1966), but the clear distinguishing feature separating the two, namely that var. *calcareus* never forms laminate leaves, was not stressed. Var. *vertumnus* was newly described by Cook (1966) and has highly branched, rigid and divergent capillary leaves which are much shorter than the internodes. Professor C. D. K. Cook (pers. comm., October 1978) reported the presence of distinctive material of this taxon on the Continent which has leaves that are more or less in one plane. Since in this country I have not seen convincing material which is sufficiently different from very short, rigid var. *calcareus*, details of the morphology and distribution in the British Isles of only the vars. *penicillatus* and *calcareus* will be given here. For further detailed comparisons, tabular key, and silhouettes and descriptions of all British species, see Holmes (1979).

*R. penicillatus* (Dumort.) Bab. var. *penicillatus*
Key features: both laminate and capillary leaves produced; laminate leaves large, orbicular, entire; capillary leaves flaccid and longer than the internodes of mature, vegetative shoots; receptacle and achenes pubescent.

Vegetative plants can be confused with either small plants of *R. fluitans* Lam. or var. *calcareus*. Floral shoots, however, develop large laminate leaves which distinguish it from these other taxa. In my experience var. *penicillatus* rarely forms more than three flowers without developing laminate leaves. In the flowering state, therefore, var. *penicillatus* could be confused only with *R. peltatus* Schrank. The only differences between these two taxa are the form of the capillary leaves and a slight difference in peduncle length. The capillary leaves of *R. peltatus* are usually shorter than the internodes and rigid when taken from the water and shaken to remove surplus water. In var. *penicillatus* they are generally longer than the internodes (especially on vegetative shoots), and are flaccid and limp when lifted from the water. Typical var. *penicillatus* from large rivers is easily identified whereas material from smaller areas of water is more likely to be confused with *R. peltatus*.

Var. *penicillatus* occurs only in fast-flowing rivers, where it is capable of growing in torrent conditions, as well as in more slow-flowing sections which have a high current velocity during flood periods only. It occurs in a substantial number of rivers in Wales, Ireland and western England but it has not been found in central or eastern England or Scotland. Material from Wales and Ireland is robust, very fertile and closely resembles the type material. Material in the rivers of the Lake District and south-west England is usually far less fertile. Var. *penicillatus* thus occupies geographical regions where *R. fluitans* is either absent or very rare.

*R. penicillatus* (Dumort.) Bab. var. *calcareus* (R. W. Butcher) Cook

Key features: only capillary leaves produced, mature capillary leaves approximately equalling the length of the internodes; prostrate summer growth with nodal roots; receptacle and achenes pubescent.

This variety is clearly different from var. *penicillatus* when in flower since the latter forms very large laminate leaves. When the two varieties are not flowering it is viritually impossible to tell them apart, although var. *calcareus* shows much greater variability in size. In some large rivers plants are up to 5 m long with sparsely branched capillary leaves that exceed the internodes, whereas in small streams there are plants which rarely exceed 1 m long and which have densely branched leaves that are shorter than the internodes. The former plants often resemble *R. fluitans* whereas the latter could be referred to *R. penicillatus* var. *vertumnus*. These variations are frequent in single river catchments, where the larger plants occur in the larger, more stable sections of the main river and the smaller plants occur in the headwaters and smaller tributaries; the River Severn and River Avon (Wiltshire) are good examples. Most confusion arises when separating var. *calcareus* from *R. fluitans*. The latter, however, usually has four or fewer divisions of the capillary leaves compared with seven or eight in the former. Care should be taken when looking at flowering shoots since these usually have more segmented leaves. Flowering plants are identified more easily because *R. fluitans* has receptacles that are either totally glabrous or with only a few hairs, whilst those of var. *calcareus* are densely pubescent. During the summer growth period *R. fluitans* does not form roots at the nodes whereas var. *calcareus* usually does. Some large rivers in southern England are dominated by plants that are intermediate in character between *R. fluitans* and *R. penicillatus* var. *calcareus*. Vegetative shoots and flowering shoots produced early in the year have leaves characteristic of *R. fluitans*, yet floral characteristics indicate *R. penicillatus*.

Like var. *penicillatus*, var. *calcareus* occurs most frequently in fast-flowing rivers, although it is less dependent on torrent conditions. It thus occurs in rivers which do not necessarily rise at high altitude. It is common throughout England, occasional in Wales, known only from the south of Scotland, and not recorded from Ireland. The two varieties, therefore, occur in different geographical regions of the British Isles and are rarely found in the same river system. However, one site where both do occur together is the River Eden, Cumberland, v.c. 70. Var. *calcareus* is, on the other hand, frequently found in the same river systems as *R. fluitans*. Although the name *calcareus* is not always apt, in many areas this variety occupies more base-rich rivers and is replaced by var. *penicillatus* in the more base-poor rivers.

Since Cook (1966) has suggested how *R. penicillatus* arose by hybridization, it would be not unreasonable to further his evolutionary hypothesis by suggesting the parentage of the present day varieties. Cook (1966) suggested that var. *pencillatus* probably arose from a *R. fluitans* × *R. peltatus* hybrid, the latter species giving rise to the large laminate leaves. The morphology of var. *calcareus* would suggest that it arose from a *R. fluitans* × *R. trichophyllus* hybrid, since neither parents nor hybrid have laminate leaves. Var. *vertumnus* could have arisen from hybridization involving *R. circinatus* with *R. fluitans*, *R. trichophyllus* or *R. penicillatus* var. *calcareus*. The great variation in the morphology of these varieties is also not totally surprising when it is considered, for example, that *R. fluitans* exists as $2n = 16$, 24, 32 and 40 and *R. peltatus* exists as $2n = 16$ and 32 cytotypes (Cook 1966).

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N. T. H. HOLMES

## *ERICA* × *STUARTII* E. F. LINTON—A CORRECTION

In the text of my article on *Erica* × *stuartii* (McClintock 1979), the author citation of the hybrid binomial should have read simply 'E. F. Linton', and not '(Macf.) E. F. Linton'. The latter would have been correct if Linton had referred to Macfarlane's name of *E. tetralix* subsp *stuartii*. In fact, Linton made no allusion to it in either of his papers in which he published his binomial. He was under no obligation to take over Macfarlane's name: when he was describing the plant at a different rank, he could have chosen another. That he did use *stuartii* again is not in itself reason to cite it as originally of Macfarlane, even though courtesy and clarity would have suggested at least some acknowledgment of the detailed work which had preceded his hasty publication.

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D. MCCLINTOCK

## DESCRIPTIVE KEY TO BAMBOOS NATURALIZED IN THE BRITISH ISLES

At the Manchester B.S.B.I. Conference in April, 1979, I spoke for half an hour on some aspects, notably flowering, of the bamboos naturalized in our islands—see Report, p. 74. I also referred to the quite particular difficulties of deciding whether a given plant is naturalized or not. With me I had a draft key to the nine species which probably have the best claim to inclusion in our Floras. This has now been elaborated and is reproduced below.

Nomenclature is that currently used in Britain and in *Flora Europaea*, **5**. But agreement with Japanese names is being actively sought, and the generic names usually employed in Japan are added in brackets.

Bamboos belong to the subfamily Bambusoideae of the Gramineae (Poaceae). They are woody perennials, usually of considerable size and rapid growth. Characters common to the nine included here are: culms generally terete, with a central internodal hollow and glabrous nodes; leaves petiolate, jointed to the sheath, green, paler beneath. The data are for our own islands, and statements on flowering are valid at the time of writing (July 1979). The details are so drawn up as, hopefully, to exclude other species grown but not considered to be naturalized.

1. Culms up to 8 m, terete at least below; leaf-blades glabrous; *Arundinaria* Michx *pro parte* . . . . . 2

1a. Culms up to 2 m, terete throughout; leaves concolorous beneath . . . 6

2. Culms up to 3 m, relatively thin (up to 15 mm diam.) so arching or drooping when mature; branches and branchlets finally numerous at a node; leaf-blades small, narrow, thin, up to 10 cm × 8 mm, with up to 6 pairs of veins, concolorous beneath, shrivelling in winter winds . . . . . 3

2a. Culms up to 8 m, stouter (up to 25 mm diam.) so not or much less arching; leaf-blades larger, thicker, up to 30 cm, with up to 10 pairs of veins, not or less shrivelling in harsh winters . . . . . 4

3. Plant in dense clumps; culms dull purple or greyish-green, often overlaid with a glaucous bloom; sheaths usually long-persistent; leaf-blades up to 8 cm, with 3–4 pairs of veins. No flowers (*Sinarundinaria* Makino ex Nakai) . *A. nitida* Mitf.

3a. Plant surrounded by far-running rhizomes; culms greenish-brown; sheaths soon deciduous; leaf-blades up to 10 cm, with 4–6 pairs of veins. May show flowers. . . . . *A. anceps* Mitf.

4. Branches 1 at a node; plant in clumps, occasionally with a wandering rhizome; culms up to 5(–8) m × 20 mm, thin-walled, somewhat arching when mature; sheaths long-persistent; branches from upper part of culm in second year; leaf-blades up to 20(–30) cm × 40 mm, glaucous for ¼ of the width of the lower surface, not usually shrivelled in winter. May show flowers (*Pseudosasa* Makino) . . . . . *A. japonica* Siebold & Zucc. ex Steudel

4a. Branches finally several at a node . . . . . 5

5. Plant in clumps; culms up to 6(–8) m × 25 mm, very thin-walled, sometimes somewhat grooved above, always stiffly erect; sheaths deciduous, or tattered after one year; branches short, erect, from upper part of culm; leaf-blades up to 20 cm × 20 mm, concolorous beneath, hardly shrivelling in winter. Flowering finishing (*Semiarundinaria* Makino ex Nakai) . . . . . *A. fastuosa* (Latour-Marliac ex Mitf.) Lehaie

5a. Plant with running rhizomes; culms up to 3(–5) m × 20 mm, terete, thin-walled, arching when mature; sheaths persistent; branches longer, ± horizontal, starting from lower on the culms; leaf-blades up to 30 cm × 30 mm, ½ of the width beneath typically glaucous, shrivelling in severe winters. Has flowered (*Pleioblastus* Nakai) . . . *A. simonii* (Carrière) A. & C. Rivière

6. Culms ascending, relatively stout, often purplish or purple-mottled; branches 1 at a node; sheaths persistent; leaf-blades relatively huge, up to 30 cm × 70 mm or more, glabrous; *Sasa* Makino & Shibata . . . . . 7

6a. Culms ± erect, slender, up to 1.2 m × 6 mm, greenish, branches usually 2–3 at a node; leaf-blades slenderer and narrower, up to 25 cm × 25 mm; *Arundinaria pro parte* . . . . . 8

7. Culms up to 2 m, usually purple-mottled (var. *nebulosa* Makino); rhizome far running; leaf-blades up to 30(–40) cm × 70(–95) mm, acuminate, bright shining green above, with up to 13 pairs of veins; petioles green. Flowering finishing . . . . . *S. palmata* (Burbidge) E. G. Camus

7a. Culms up to 1 m, often purplish and glaucous-bloomed; rhizome shortly running; leaf-blades up to 25 cm × 60 mm, blunter, greyish-green above, soon with broad white-withered margins, with 5–9 pairs of veins; petioles often purplish. Flowers unknown in British Isles . . . . *S. veitchii* (Carrière) Rehder

8. Rhizome far-running, the whole forming dense patches; branches 1 at a node, wide-spreading from rather under half way up the culm; sheaths persistent; leaf-blades up to 20 × 25 mm, pubescent (especially beneath, with margins sometimes narrowly withering white in winter. Flowers unknown . . . . . *A. vagans* Gamble

8a. Rhizome running, forming open patches; branches (1–)2–3 at a node, erect, starting from near the base of the culm; sheaths deciduous; leaf-blades up to 15(–25) cm × 15(–20) mm, ± glabrous, with margins not withering in winter. Has flowered in recent years . . . . . *A. humilis* Mitf.

Several species of *Phyllostachys* Siebold & Zucc., many difficult to discriminate, are grown. They are more or less clump-forming and can persist where they have been planted. The genus is distinctive in its 3–5 m hollow culms being markedly grooved on alternate sides (except sometimes below in giant species) with deciduous sheaths and two unequal, long, wide-spreading branches at a node, often with a depauperate one in between.

D. McCLINTOCK

## *CORYNEPHORUS CANESCENS* (L.) BEAUV. IN W. SUFFOLK, V.C. 26

*Corynephorus canescens* (L.) Beauv. has five post–1930 records from E. Suffolk, v.c. 25, five from E. Norfolk, v.c. 27, one from W. Norfolk, v.c. 28, two from S. Lancs., v.c. 59, and in addition is recorded from Jersey, Channel Islands (Perring & Walters 1962). All these sites are on coastal sand-dunes. Hind (1889) recorded two inland sites in the Breckland of W. Suffolk, v.c. 26, namely: 'between Lakenheath and Wangford, G. C. Druce and Bolton King: Lackford Heath, G. C. Druce 1883'. *Corynephorus canescens* had been considered extinct in Breckland for many years until it was re-discovered by the writer and M. G. Rutterford in January, 1970, on a reserve of the Suffolk Trust for Nature Conservation known as Wangford Glebe.

Specimens in Herb. Druce (**OXF**) collected by Bolton King give 'July 1883, Brandon, Suffolk', and it appears that Druce followed to collect *Corynephorus* in 'August 1883, Brandon, W. Suffolk' and then went his own way to find another inland site in the same month at 'Culford Heath, W. Suffolk", not, as reported by Hind (1889), at Lackford Heath. The Wangford Glebe site is only two miles south-west of Brandon and it is reasonable to consider that it may well be the site found by Bolton King in 1883.

The site is a low, wind-raised sand-bank facing south and the small colony of plants covers an area of 7 by 5 m. The vegetation is open and the only plant associates are *Agrostis canina* subsp. *montana* and *Carex arenaria*, together with small patches of *Cladonia gracilis*, *C. impexa*, *C. pyxidata* agg., *Cornicularia aculeata* and *Polytrichum piliferum*.

Marshall (1967) stated that *Corynephorus* is evergreen and grazed by rabbits. Although this ancient warren still has a fair rabbit population, it is kept in check and no damage to *Corynephorus* has been noted. Marshall made the point that 'populations are maintained on stable sand for several years on suitably dry, semi-open habitats in the presence of lichens and some annual species, by successfully resowing themselves'. The plant is described as self-eliminating and that 'competition for water takes place in the presence of *Carex arenaria* at Winterton, Norfolk, to the detriment of *Corynephorus*'. This also describes the habitat at Wangford. It is likely that the fortunes of the colony have changed over the years, for the population size between 1971 and 1978 has been noted and has shown considerable variation.

The perennial life-span of *Corynephorus* is relative to conditions. At Wangford, the colony is in a sheltered position and does not experience much sand movement. Marshall (1967) recorded no vegetative spread occurring beyond individual clumps and that it only forms a close sward under favourable moisture conditions, which also allow for favourable germination, in such places as dune-hollows, old wheel-tracks and blow-out bases. For the conservation of this species, note must be taken of Marshall's comment that 'it grows most vigorously where there is up to 10 cm of sand accretion per year . . . and that it is a potentially long lived perennial so long as sand accretion is taking place'.

On 12th October, 1971, a total of 231 plants was recorded at Wangford. Observations made between 1972 and 1974 showed that the population of *Corynephorus* had declined to *c.* 150 plants. A count in the autumn of 1975 revealed 112 plants. Few seedling plants were seen and there was a large number of dead plants from which there was no new vegetative growth. These observations were made in the early summer and late autumn when the grey-green of the leaves is marked and the bright pink-purple of the sheaths is noticeable. The site of the colony has a problem in its topography for most of the plants are on a bank slope. The sand is firm and held by rhizomes of *Carex arenaria*; if more of the plants were at the foot of the bank they would have greater opportunity of some blown sand accretion and less loss of moisture.

The sand-dune area of this Reserve is the only remaining significant area of sand erosion in the

Breckland. Whilst *Carex arenaria* and a few grass species have stabilized the dunes elsewhere on the Reserve, the Trust aims to maintain some degree of erosion in certain areas, which are annually rotovated, but there is little movement of the firm sand in the *Corynephorus* area.

In the autumn of 1975, a wide trench of sand was disturbed at the foot of the bank below the colony, to encourage sand accretion by wind movement, and, additionally, sand was thrown over the area of the plants. These operations have been repeated each year up to 1978 and, in spite of the droughts of 1975 and 1976, the sand accretion has made a marked improvement in the plant population, both of seedlings and new vegetative growth from old plants. On November 15th, 1978, 232 yearling plants were recorded, a few of which had flowered in 1978, as well as a further 190 flowering tufts, many of which were developing new vegetative shoots. A total of 422 plants, following simple conservation management, compares very well with 231 plants recorded in 1971.

Marshall's conclusion that 'many of the present European communities containing *Corynephorus* owe their existence to human interference' is amply supported by its response to the active conservation measures now being taken at Wangford.

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