

Polypodium australe Fée in Scotland and North-East Ireland

R. H. ROBERTS and D. M. SYNNOTT

51 Belmont Road, Bangor, Caerns., and National Botanic Gardens,
Glasnevin, Dublin 9

ABSTRACT

Polypodium australe Fée, the diploid cytodeme of the *P. vulgare* complex in the British Isles, is recorded from Scotland and North-East Ireland for the first time. The known distribution of this species in the British Isles is given, and shows a considerable extension of its northern limit.

In Europe *Polypodium australe* Fée is mainly found in the south and west, with its main distributional area around the Mediterranean basin (Shivas 1961). It shows a similar distribution pattern in the British Isles, where it reaches its northern limit and has been recorded as far north as Westmorland, the Isle of Man, and Sligo and Leitrim in Ireland (Perring & Sell 1968, D. E. Allen *in litt.* 1970, Roberts 1970).

Recently, however, attention has been drawn to herbarium specimens of Scottish *Polypodium* having branched paraphyses in their sori (Synnott 1969). No definite identifications were made as the sporangia on all of them were either undeveloped or contained only empty spores. These specimens have now been re-examined in the light of recent work (Roberts 1970) and three of them have been identified beyond any doubt as *P. australe*. The absence of fully-developed sporangia in two of them and of mature spores in the third is clearly due to the early date at which the fronds had been gathered: July, August and September. The spores of *P. australe* are usually not mature before the second half of October.

A further specimen of this diploid *Polypodium* from a Scottish locality though probably originally cultivated was found among the named varieties of *P. vulgare* agg. in the Neill Fraser collection, Royal Botanic Garden, Edinburgh (E).

Three of the specimens have been identified by a combination of characters in addition to the presence of branched paraphyses. In the fourth (from Portincross, Ayr) only two fragments of paraphyses were seen and no sporangium characters could be observed because of the immature state of the sori. Identification of this specimen was based mainly on frond and rhizome-scale characters, but was confirmed by measurements of the length of the stomatal guard cells. The latter is a useful accessory diagnostic character whose value was pointed out by Benoit (1966), but was inadvertently not mentioned in a former note by one of us (Roberts 1970).

These specimens attest three definite new vice-county records for a species not recorded previously from Scotland, and extend the northern limit of *P. australe* in the British Isles by over a hundred miles. They also suggest that the report of

'*P. vulgare* var. *cambricum*' 'from Braid Hill, near Edinburgh', mentioned by Moore (1859), may indicate yet another Scottish locality for this species.

1. Colvend Coast, Kirkcudbright. W. G. Johnstone. Sept. 1850. Growing scarcely out of the reach of the sea spray. (E)
2. Portincross, Ayr, v.c. 75. 7 Aug. '96. Woods. A.S. [A. Somerville]. (E)
3. Cult. D.N.F. [D. Neill Fraser] Oct. 1877, from plant from Braxfield, Lanark. (E). (Probably cultivated at Braxfield.)
4. Aberdour woods, Co. Fife. July 1859. Ex herb. W. R. McNab. (DBN)

The reference to Argyllshire (Synnott 1969) is an error. It was intended to refer to the Ayrshire specimen from Portincross.

There are four Antrim specimens of *P. australe* in the herbarium of the National Botanic Gardens, Glasnevin (DBN). These, from some of the localities cited under '*P. vulgare* var. *semilacerum*' by Praeger (1938, p. 280), are the first records for North-East Ireland:

1. Garron Point, 31st July 1884, R. Ll. Praeger.
2. Knockagh, 1889, R. Ll. Praeger.
3. Redhall, 1887, R. Ll. Praeger.
4. Glenoe [no date, but probably c. 1880], R. P. Vowell.

It is likely that his records from the south end of Gobbins, the right branch of Woodburn Glen, and Deerpark on Cave Hill are also based on diploid plants.

A considerable number of the specimens in the Neill Fraser collection proved to be *P. australe*. Unfortunately only a few of them are localized, but two of these attest further new vice-county records: these are for Worcester, v.c. 37 (Bewdley, 23 Oct. '67, J. E. Mapplebeck) and Cheshire, v.c. 58 (Macclesfield, July 1868, E. J. Lowe).

All of the above records are included in the up-dated distribution map, Fig. 1.

In the British Isles *P. australe* clearly has a much narrower ecological tolerance than either *P. vulgare* L. or *P. interjectum* Shivas. It is found almost exclusively on circum-neutral soils of pH mostly 6.4 to 6.9 (Hughes 1969), and prefers a well-drained substratum in sheltered situations. Such conditions occur most frequently on cliffs of Carboniferous limestone, on old mortared walls, and occasionally on cliffs of other rocks which are locally base-rich, or whose crevices receive an adequate supply of lime from wind-blown shell sand. In limestone districts *P. australe* is sometimes found as an epiphyte on trees—particularly on *Quercus* and *Sambucus nigra*.

It is possibly significant that all of the Scottish localities listed above are either on or near areas of Carboniferous limestone, and the Antrim localities on or close to the outcrops of Cretaceous strata.

In North Wales *P. australe* often grows in small, isolated patches, many of them occupying only a few square yards, and it is easily overlooked. Doubtless the same is also true of it in Scotland and North-East Ireland, and this probably accounts for the lack of previous records of the diploid species from both of these regions.

We wish to thank Dr F. H. Perring, of the Biological Records Centre, for producing the up-dated distribution map; the Regius Keeper of the Royal Botanic Garden, Edinburgh, and the Director of the National Botanic Gardens, Glasnevin, Dublin, for the generous loan of herbarium material; and Miss C. W. Muirhead for her ready assistance.

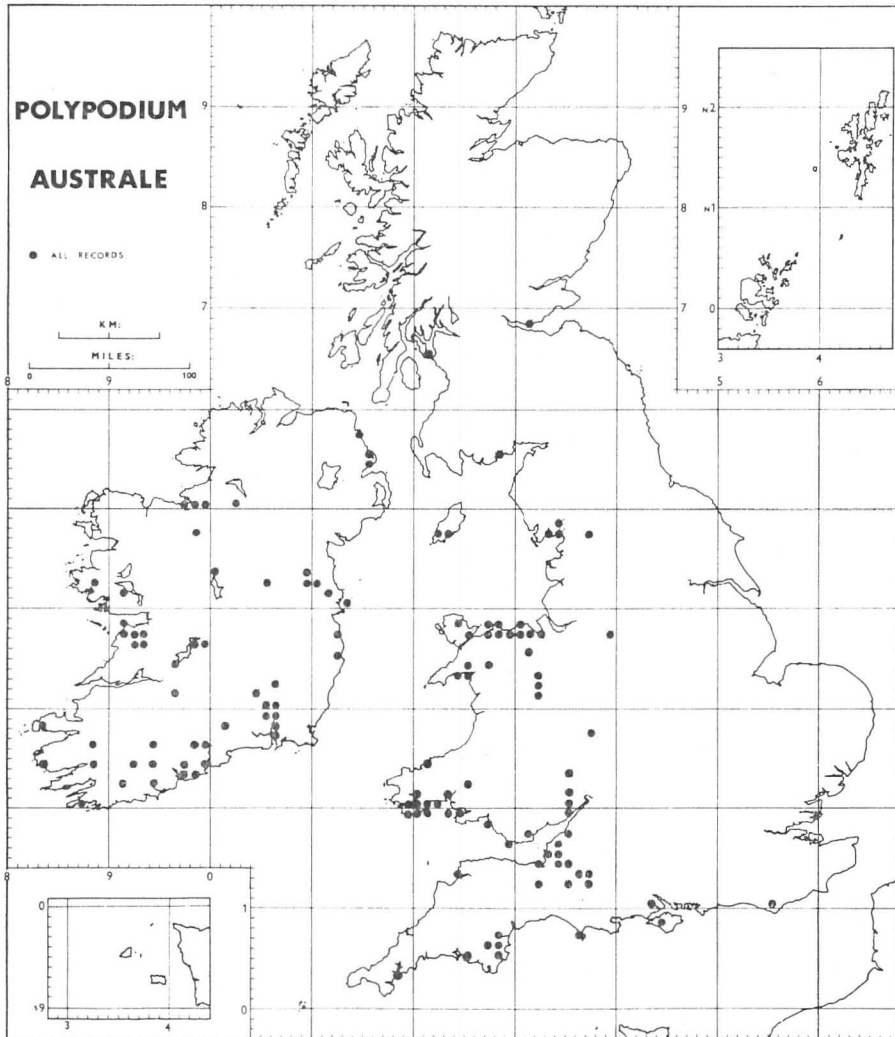


FIGURE 1. Up-dated distribution map of *Polypodium australe* in the British Isles, produced by the Biological Records Centre, Monks Wood, Abbots Ripton, Huntingdon.

REFERENCES

- BENOIT, P. M. (1966). Some recent work in Wales on the *Polypodium vulgare* aggregate. *Br. Fern Gaz.*, **9**: 277-282.
 HUGHES, W. ELFYN (1969). The distribution of *Polypodium vulgare* L. subspecies *serratulum* Arcangeli in North Wales. *Nature Wales*, **11**: 194-198.
 MOORE, T. (1859). *A Popular History of the British Ferns and the Allied Plants*, 3rd ed. London.
 PERRING, F. H. & SELL, P. D., ed. (1968). *Critical Supplement to the Atlas of the British Flora*. London.
 PRAEGER, R. LI. (1938). *A Flora of the North-East of Ireland*, 2nd ed. Belfast.
 ROBERTS, R. H. (1970). A revision of some of the taxonomic characters of *Polypodium australe* Fée. *Watsonia*, **8**: 121-134.
 SHIVAS, M. G. (1961). Contributions to the cytology and taxonomy of species of *Polypodium* in Europe and America, I: Cytology; II: Taxonomy. *J. Linn. Soc. (Bot.)*, **58**: 13-25, 27-38.
 SYNNOFT, D. M. (1969). Evidence of *Polypodium australe* Fée in Scotland. *Trans. Proc. bot. Soc. Edinb.*, **40**: 623-624.