

The rediscovery of *Senecio paludosus* L. in Britain

S. M. WALTERS

Botany School, University of Cambridge

ABSTRACT

Senecio paludosus, thought to be extinct in Britain, was rediscovered in July 1972. Some information is given on the locality, and the conservation measures taken to protect the plant. The problem of the origin of the 'new' population is discussed.

INTRODUCTION

The British flora is known to have lost several species during the course of the nineteenth century. These extinctions are somewhat heterogeneous, ranging from northern plants such as *Trichophorum alpinum* (L.) Pers., which had a single locality in Scotland, to lowland weeds such as *Roemeria hybrida* (L.) DC., formerly among East Anglian crops but now only seen as a casual. Within this range one small group of species, characteristic of the fenlands of eastern England, suffered particularly from the destruction of its habitat. The most famous of these supposedly extinct fenland species are *Senecio palustris* (L.) Hook. and *S. paludosus* L. This paper records the rediscovery, in a wild habitat in eastern England, of a stand of the latter species, an unexpected and fascinating event which raises a number of interesting questions and problems.

THE REDISCOVERY

Senecio paludosus was found on 18 July 1972 in a fenland ditch within its former native range in Cambridgeshire (v.c. 29) by Mr T. W. J. D. Duprée. There were 3 flowering stems, ranging from 90-140 cm in height and with 8-25 capitula, and 2 non-flowering ones; all were within 10 yards of each other. To make certain of the identification Mr Duprée collected a single capitulum and a single cauline leaf from one of the flowering specimens; this material is now deposited as a voucher specimen in the University Herbarium, Cambridge (CGE). The following list of the associated species was made by Mr P. D. Sell, Assistant Curator of the Herbarium, when he visited the site on 19 July:

<i>Cirsium arvense</i>	<i>Lemna minor</i>
<i>Convolvulus arvensis</i>	<i>Mentha aquatica</i>
<i>Dactylis glomerata</i>	<i>Polygonum amphibium</i>
<i>Epilobium hirsutum</i>	<i>Ranunculus sceleratus</i>
<i>Glyceria fluitans</i>	<i>Rumex palustris</i>
<i>Juncus articulatus</i>	<i>R. sanguineus</i>
<i>J. effusus</i>	<i>Sparganium erectum</i>
<i>J. inflexus</i>	<i>Typha latifolia</i>
<i>J. subnodulosus</i>	

HISTORY OF THE PLANT IN BRITAIN

Senecio paludosus was first recorded in Britain by John Ray (1660), who said: 'We have found it in many places in the Fens, as by a great ditch side near Stretham Ferry'. Bennett (1899) conveniently summarized all the records of this species (and also of *Senecio palustris*) in Britain in a short paper which begins as follows:

'For some time I have made a point of jotting down any notes I come across on the dying-out or nearly extinct species of the British Flora. In doing this I find I have come across stations, etc., hitherto unpublished; and while I can, it seems best to put on record what I have gathered together, and as these two species are of the greatest interest to East Anglian botanists, I am sending these notes to the Norfolk and Norwich Naturalists' Society. They may be viewed as a contribution to the history of the two species as British plants'.

Bennett says of *Senecio paludosus*: 'Cambridgeshire has always been its headquarters in England'. It seems that in West Suffolk (v.c. 26) the plant was discovered in 1798 at Lakenheath Fen, but was extinct (or unrecorded) after 1817. The records for Norfolk, Lincolnshire and Cheshire are less well documented, and it is clear that neither Bennett nor any other botanist known to him had seen the plant in any of these counties, though herbarium specimens exist to substantiate the Norfolk and Lincolnshire records.

The nineteenth-century records for Cambridgeshire seem to refer almost exclusively to the fenland areas around Ely and Littleport. Thus J. S. Henslow recorded the plant 'Three miles below Ely' in 1833, and this record is backed by a specimen collected by Henslow and labelled 'Ely, 31 July 1833' (CGE). At what is now the Nature Reserve of Wicken Fen, it seems that the plant was recorded many times from 1800 onwards ('perhaps to 1838' (Bennett 1899)); for example, it was collected in July 1828 by Revd J. Holme (CGE), and finally by C. C. Babington in 1857. This has generally been accepted as the last properly-documented evidence for the species wild in Britain. Babington published the following short note on his record (Babington 1857): 'On the 11th of last August [1857] I saw *Senecio paludosus* growing in a wild part of the fen between Cambridge and Ely. It was certainly native there, though small in quantity. The flowers were then over, but there could be no doubt concerning the species. As the plant has been supposed to be lost in that county, this fact may be worth recording'. This record is backed by the following specimens in CGE:

'Wicken Fen, Cambridgeshire, Aug. 1857' C. C. Babington.

'Wicken Fen, Cambridge Aug. 1857' W. Mudd, Curator of Bot. Garden'.
Specimen annotated by C. C. Babington: 'only one root seen, and not disturbed'.

'Wicken Fen, near the Engine House, Upware, August 1857' W. Mudd (from W. Mudd, Jnr.).

Babington later (1863) published the locality as Wicken Fen, saying: 'it is worthy of remark, that [Wicken] Fen is the only known station in the county of Cambridge where the *Senecio paludosus* Linn. is still remaining. We have

plants of it growing in the Cambridge Botanic Garden, which were brought from thence within the last three or four years'. This cultivated stock was kept in the Botanic Garden throughout the nineteenth century, as witnessed by a specimen made by S. H. Bickham on 9 September 1901 and labelled 'Bot. Garden Cambridge from Wicken Fen', and another distributed by Bickham from his garden in Ledbury in 1913 'probable origin, Wicken Fen' (both in CGE).

Babington's 1863 quotation implies that the plant was still growing at Wicken when he wrote; there is, however, no specimen to substantiate this, and no accurate published record of anyone seeing the plant wild in Britain after 1857. Yet Bennett's paper (1899) could be read as implying that he knew the plant still grew in the Wicken area, and E. F. Linton (1915) said of the cultivated material distributed by Bickham: 'Beautiful herbarium specimens of this rare and *nearly extinct* British plant . . .' [my italics]. This suggests that *Senecio paludosus* survived much later than is generally supposed, perhaps well into the present century.

THE CONTINENTAL DISTRIBUTION

Senecio paludosus is widespread in fen communities, especially *Caricetum elatae*, in central and eastern Europe (Oberdorfer 1970) and extending into northern Asia. Like many wetland species, it is probably becoming much rarer with the general drainage and destruction of habitats. It is, for example, apparently now extinct in Denmark, where two localities were known in the early part of the nineteenth century (Hansen 1954). From descriptions of the habitat in several different European countries (Hegi 1928, Micevski 1962, Szafer 1966, Westhoff & den Held 1969) it seems clear that the species has a rather narrow tolerance, occurring only in relatively rich fen and reed-swamp communities associated with several species familiar to British botanists at Wicken Fen, such as *Carex elata*, *Cladium mariscus*, *Peucedanum palustre*, *Phragmites australis* and *Thalictrum flavum*.

CONSERVATION MEASURES

The rediscovery presented an immediate and also a longer-term problem in devising methods to protect the plant from accidental or deliberate damage. The immediate problem seems to have been solved successfully. The discovery was reported to the Cambridgeshire and Isle of Ely Naturalists' Trust, whose Secretary, Mr S. R. Payne, promptly negotiated both with the Local Authority and with the owner of the land to protect the site from accidental damage, and an agreement was reached whereby the management of the length of ditch containing the plant was left to the Trust. This was very important, because the flowering plants were able to set seed naturally, and the ripe fruiting heads were collected between the 10th and the 14th of September when the stems were dying back, and the whole length of ditch vegetation was then cut. Further voucher specimens of these cut stems and fruiting heads were then deposited in CGE. At the same time, a very small portion of the root-stock of one of the non-flowering plants was collected, and both it and the ripe seed were planted in the University Botanic Garden, Cambridge.

The yield of 'seed' (achenes) from the collected capitula was disappointingly small, rather less than 1% of the florets producing well-formed achenes. The possible significance of this low fertility is discussed below. In all, only 28 well-formed achenes were sown. The germination was, however, prompt and good, and 21 seedlings were obtained. Eighteen of these are being grown on at the time of writing (June 1973), and we are therefore ensured of a good stock of plants in cultivation. It is hoped that plants can be grown both in the Botanic Garden and in the Demonstration Garden at the Wicken Fen Nature Reserve.

Longer-term protection of the site raises several problems. The first concerns publicity. It is hoped that the exact locality will not be published by any of the botanists who have already visited the site. There are two reasons for this secrecy. Firstly, the site is very accessible, and the plants and the habitat could therefore suffer from trampling and other disturbance, even if none of the visitors consciously misbehaved. The hazard to rare plants by visits of would-be photographers is now well known to most of the County Naturalists' Trusts who are involved in such protection measures. Secondly, the plant is on private land, and, although the owner is very cooperative, too many visits or enquiries by the general public could become a real nuisance to him and to the farm work in general.

The second problem concerns management. Like all fenland communities, the reed-swamp vegetation of the ditch in which the *Senecio* grows is impermanent and dependent upon regular cutting and clearing. Management of the site to preserve and perhaps to increase the small population of this rare species will require careful and controlled experiment, and is, as usual, handicapped by our ignorance of the ecology of the plant. This point is further considered below.

DISCUSSION

Given the history of *Senecio paludosus* in Britain, and the story of its re-discovery, what is it reasonable to conclude about the present population? There are obviously three possibilities to consider. Firstly, the plant may never have become extinct; secondly, the present population may represent a natural re-colonisation from one of its Continental European habitats, or, thirdly, someone may have deliberately introduced this famous extinct species from Continental sources.

One piece of evidence seems to dispose of the possibility that the plant has persisted for long undiscovered *exactly* where it is growing at present: we know that this stretch of ditch was newly constructed as recently as 1968. But this would not, of course, rule out the possibility that the plant spread from existing nearby colonies by natural means to a newly-made, favourable habitat. If so, there may be other colonies in the vicinity; and, though none was seen in 1972, a thorough search of the network of adjacent fen ditches has not yet been made. We should therefore preserve an open mind on this question until the suitable ground has been carefully searched. It may seem incredible that such a large and easily-recognisable plant could remain undetected, given the intensity of botanical study in England in recent years, but one ought to bear in mind that botanists, like other observers, are biased in what they see, perhaps subconsciously, by what they expect, and no-one

expected any longer to see either of the extinct *Senecio* species in the Fens. Although the plant is tall, and, once seen, quite unmistakable, it is nevertheless not easily spotted casually, because of the general resemblance it bears in colour and size of capitula to that abundant fenland weed, *Sonchus arvensis*.

The other possibilities relate to re-introduction of an extinct plant. Obviously we cannot rule out the conscious, planned re-introduction of a Continental stock by some misguided botanist; but I do not feel that this is a likely explanation, partly because anyone who has attempted to effect re-introductions (for example, in nature reserves) knows just how difficult the operation is! What seems more plausible is the chance arrival, perhaps, on the feet of migratory birds, of seeds of the *Senecio*, and their establishment in a new ditch where the conditions for seed-germination and seedling-establishment were just right.

We should, however, consider whether the difference between this possible explanation and the first one are quite as clear-cut as they seem. Many species are known to persist for long periods as dormant seed, and it is clear that, in general, the phenomenon has an adaptive significance. In reed-swamp and fen communities, the re-establishment after interference of early seral stages in the succession is in part dependent upon the germination of persistent seed in the upper layers of peat (or other soil) when certain conditions of exposure of those upper layers are brought about. This phenomenon is well known in the case of another fenland rarity, *Viola stagnina* Kit., which persists at Wood Walton Nature Reserve where its sudden appearance after scrub clearance is certainly due to the germination of dormant seed. It may be that the *Senecio* has a similar adaptation. If this is so, the seed which germinated when the new length of ditch was dug in 1968 may have been dormant for many years in the undisturbed upper peat, and our plant may represent the original local stock surviving, perhaps, from the previous century. The fact that the 1972 'good' seed germinated immediately would in any way disprove such an interpretation; what is known of seed dormancy indicates that it is a very complex phenomenon, in which conditions of maturation and storage of the seed play a large part, and seed of the same species often consists of a proportion capable of immediate germination while the rest has delayed germination. The apparent sterility of most flowers in 1972 suggests that the plant may be partially self-incompatible and that we may be dealing with a single clone. This hypothesis can be tested in future years.

It is difficult to see how we shall ever know the answer to the problem of the origin of the 'new' population, unless, of course, we can find other surviving colonies in ditches in the vicinity. We can, however, hope to investigate the seed germination of the population more thoroughly in the future, and determine whether seed can remain dormant and under what conditions. This and many other interesting investigations are open to us if we can preserve this fascinating 're-born' member of our Fenland flora.

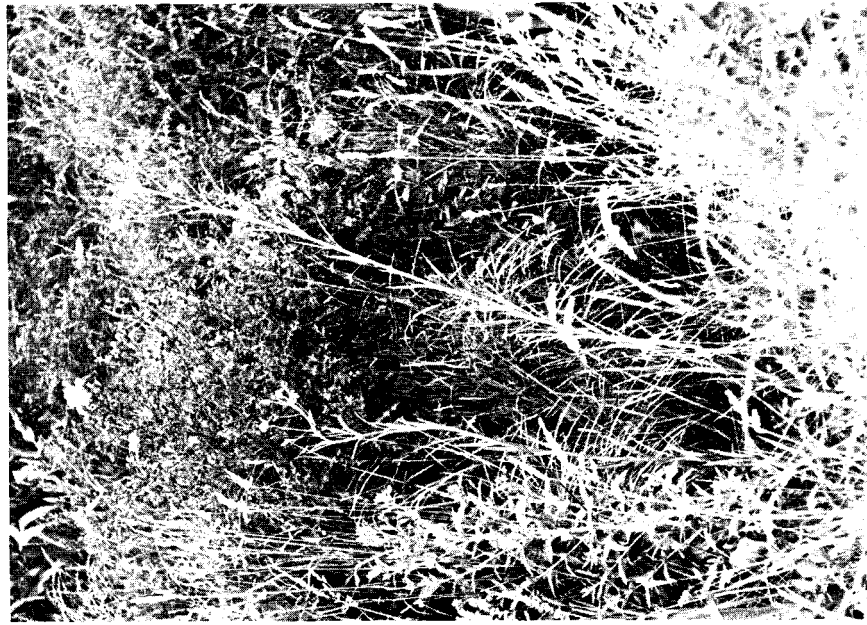
ACKNOWLEDGMENTS

I am indebted to Dr H. J. B. Birks for information about Continental habitats and the phytosociological literature, and to Mr W. H. Palmer for the black and white photographs here reproduced.

REFERENCES

- BABINGTON, C. C. (1857). *Senecio paludosus* between Cambridge and Ely. *Phytologist* (N. S.), **2**: 303.
- BABINGTON, C. C. (1863). *Sturmia loeselii* Reichenb. *J. Bot., Lond.*, **1**: 57.
- BENNETT, A. (1899). *Senecio paludosus* and *S. palustris* in East Anglia. *Trans. Norfolk Norwich Nat. Soc.*, **6**: 457-462.
- HANSEN, A. (1954). Er *Senecio paludosus* . . . uddøde i Danmark? *Bot. Tidsskr.*, **50**: 180-187.
- HEGI, G. (1928). *Illustrierte Flora von Mitteleuropa*, **6(2)**: 753. Munich.
- LINTON, E. F. (1915). Note on *Senecio paludosus*. *Rep. Watson botl Exch. Club* (1913-4), **2**: 447.
- MICEVSKI, K. (1962). Beitrag zur Kenntnis der Flora Mazedoniens, II. *Godišen Zb. filos. Fak. Univ. Skopje prirodno-mat. Oddel.*, **22**: 167-178.
- OBERDORFER, E. (1970). *Pflanzensoziologische Exkursions-Flora für Süddeutschland und die angrenzenden Gebiete*. Stuttgart.
- RAY, J. (1660). *Catalogus Plantarum circa Cantabrigiam nascentium*, p. 37. Cambridge.
- SZAFER, W. (1966). *The Vegetation of Poland*. Oxford.
- WESTHOFF, V. & DEN HELD, A. J. (1969). *Planten-gemeenschappen in Nederland*. Zutphen.

(Accepted July 1973)



A



B

PLATE 1. A. *Senecio pallulosus* in its fenland ditch habitat in Cambridgeshire. B. Close-up of *Senecio pallulosus*. Photos W. H. Palmer, 27 July 1972.