

**THE ECOLOGY and STATUS**

of

*Potamogeton acutifolius*, Link.  
(Sharp-leaved pondweed)

in

2003.

**With reference to the BSBI records  
for the period 1970 to 1999.**

**Report to English Nature  
Contract No. EIT34-01-07**

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## Summary.

*Potamogeton acutifolius* is largely confined to species-rich drainage ditches and has a restricted range occurring mainly in the grazing marshes of Sussex, Norfolk and Dorset (Preston, 1995). A survey was carried out during August, 2003, to establish the current status of *Potamogeton acutifolius* using the existing BSBI records which spanned the years 1970 to 1999. This involved a survey of the following areas: Strumpshaw Fen, Buckenham Marshes, the Cantley Levels, Limpenhoe Marshes, and the Norton Marshes all in Norfolk; sites at Stodmarsh, the Newnham Valley, Romney Marsh, the Rother Levels and The River Rother all in Kent; sites at the Pevensey Levels and Berwick Marshes, East Sussex; sites at Amberley Wild Brooks, the Pulborough Brooks and Lancing, West Sussex; the Stoborough Marshes, Dorset and Shortwood Common, Staines in Surrey.

The objectives of the survey were as follows:

- To establish the current status of sharp-leaved pondweed in England
- To report on the number, or abundance, of the species at each extant locality
- To describe the aquatic plant community of which the plant is a component
- To ascertain the present environmental conditions at each extant site
- To establish the likely ecological and environmental reasons for its disappearance from sites which it is not found
- To assess the feasibility of its re-introduction to these former locations

Whilst *Potamogeton acutifolius* was commonly found in many of the grazing marshes the most optimistic assessment suggested that there was an overall loss of 40% of the sites. Additionally the plant was only found in 7 of the 13, 10 km squares considered to be its status prior to this survey (Preston, *et. al.* 2002). In the present survey, the most typical plants associated with *Potamogeton acutifolius* were *Elodea canadensis*, *Myriophyllum verticillatum*, *Potamogeton natans*, *Potamogeton lucens* and *Sagittaria sagittifolia*. *Potamogeton acutifolius* was only associated with *Lemna trisulca*, *Hydrocharis morsus-ranae* and *Spirodela polyrhiza* when these species were at low abundances. In general, an increasing dominance of these species, either singly or in association with each other tended to reduce the abundance of *Potamogeton acutifolius* until it was no longer found.

*Potamogeton acutifolius* appears to be a species found in a water quality from middle mesotrophy to middle eutrophy with a pH range of 6.6-7.5. It has possibly adapted to two levels of conductivity. These were in two distinct bands, 239 to 355 and 611 to 804 microsiemens. The former band was found at Amberley Wild Brooks and the nearby Pulborough Brooks suggesting the intriguing possibility that these populations were genetically different from the more coastal populations at Norfolk; Pevensey, East Sussex; Stoborough, Dorset and Stodmarsh, Kent. *Potamogeton acutifolius* is most commonly found at water depths of 50 cms and 70 to 90 cms. The hybrid *Potamogeton x sudermanicus* between *P. acutifolius* and *P. berchtoldii* was found growing in abundance for 50m along one ditch at Stoborough, Dorset.

*Potamogeton acutifolius* appears to be a species, intolerant of competition and seems to be most abundant around the 3<sup>rd</sup> and 4<sup>th</sup> years after ditch management.

Where *Potamogeton acutifolius* was not found suggestions were given as to the reason or reasons for its decline and the feasibility of its re-introduction at that site. In general the most common cause for its decline in most grazing marsh ditches was the lack of management. At one grazing marsh, Limpenhoe in Norfolk, this was directly attributable to the absence of cattle following the Foot and Mouth epidemic in 2001.



## **Introduction.**

The New Atlas of the British and Irish Flora (Preston *et. al.*, 2002) considers that *Potamogeton acutifolius* is experiencing a long-term decline. *P. acutifolius* is nationally rare and is a Red Data Book species characteristically found in shallow species-rich drainage ditches. It is now confined to a few grazing marsh localities in Norfolk, Kent, Suffolk and Dorset. The purpose of the survey is to establish and verify the current status of *Potamogeton acutifolius* by visiting all the sites recorded by the Biological Records Centre since 1970. The survey provides a better insight into its ecology and gives possible reasons for its decline. The report also considers the desirability and feasibility of re-introductions at sites where it is no longer present considering such issues as management needs and water quality. An overall assessment of the status of the species in England is included with an assessment of the ecology of the species and its conservation needs. These it is hoped will inform any future conservation strategies for the species.

## **Objectives.**

The objectives of the project are as follows:

- To establish the current status of sharp-leaved pondweed in England
- To report on the number where possible or abundance of the species at each extant locality
- To describe the aquatic plant community of which the plant is a component
- To ascertain the present environmental conditions at each extant site
- To establish the likely ecological and environmental reasons for its disappearance from sites which it is not found
- To assess the feasibility of its re-introduction to these former locations

## **Methodology**

The fieldwork was undertaken between August 4<sup>th</sup>, and August 29<sup>th</sup>, 2003. The clear skies and sunny weather gave the best possible visibility into the water at any one site. Surveys were undertaken at each site using the following methodology and provided the following information:

1. The survey method was either a visual assessment or by the use of a grapnel where visual assessments were not possible. This methodology, it was hoped, would minimise any potential damage to an extant population.
2. The position of each site was established using a GPS, accurate to 1m.
3. Where present the status of sharp-leaved pondweed, *Potamogeton acutifolius* as areal extent or by using the DAFOR scale. Its immediate associate plant community was recorded and its relative abundance assessed using the DAFOR scale. A digital photograph of *P. acutifolius* was taken alongside that of its associated plant community within the site description. The associate plant community described those species assessed as growing alongside *P. acutifolius* and tended to include species found within a 5m. zone around the record. Bankside or marginal species were also recorded to the break of slope along the ditch edge.
4. If *P. acutifolius* was not found, the watercourse was searched for 50 metres either side of the grid reference. If found, the species was recorded as



- above in 3 and the new grid reference noted. If the species was not present along the projected 100m zone the plant community was assessed at its grid reference point as if it were and a digital photograph taken.
5. If the species was not found at the old grid reference or within the 100metre zone, the site, where possible, was searched more extensively in an attempt to re-establish the species within the 1km square.
  6. Where possible each site was presented on one page of writing which for most sites included a photograph of that site. A standard format, therefore, was used in the report giving the range of environmental conditions recorded at each site, whether or not the species had been found, and a description of the flora. An example of the standard format used and the environmental variables measured is given below in Box 1:

**Box 1. The Standard Format and the Environmental Variables measured.**

**WEST SUSSEX**  
**AMBERLEY WILD BROOKS**  
**SITE 1. Status of *Potamogeton acutifolius*: PRESENT**

<b>Present grid reference:</b>	<b>TQ 02946 13628</b>
<b>BSBI grid reference:</b>	<b>TQ 029 136, One 1994 BSBI record</b> <b>(Site 1 on the Amberley Wild Brooks Map)</b>
<b>Additional Records for same year:</b>	<b>None</b>
<b>Duplicate Records, different years:</b>	<b>None</b>
<b>1km. Square:</b>	<b>One 1988 BSBI record for the square TQ 02- 13-</b> <b>(Square A on the Amberley Wild Brooks Map).</b>
<b>10km. Square:</b>	<b>No record</b>

**Ditch width:** 3.0m    **Ditch depth:** 1.2m  
**Water depth:** 0.4m    **Freeboard:** 0.2m  
**Sediment Depth:** 0.6m    **Sediment type:** Black mud, Peat.  
**pH 7.1. Conductivity** 340 microsiemens  
**Open water:** 3    **Water Clarity.** 3 (Scale 1-5)  
**Flora.** A description is given of the flora found is given here.  
**Management.**  
**Shade.**  
**Agricultural use**  
**Reason(s) for presence or absence**

**N.B.** It should be stressed that a clear distinction has been made in the text and in the above Box between what is a site and what is a record. A BSBI 6 figure record has been termed a SITE, which covers a 100m. square. For some sites there may be an additional 6 figure record made in the same year. (Appendix 1). This could represent a different ditch system or a disjunct record found along the same ditch. For example, if there are several additional records for the same year, it is assumed that the recorder is the same person and only one site visit was made in that year. This implies that the species was found in several discrete areas along the same ditch or even in separate ditches but they are all found within the same 6 figure grid reference, i.e. a 100m square. Thus some SITES, in any one year, would have one record allocated to the Site and the others would be considered as ADDITIONAL RECORDS for that site. All records are considered in the overall analysis (Summary of Results, Table 2) and they allow a direct comparison with the results of the present day survey. Thus this definition of terms applies to the present day survey where the use of a GPS

accurate to 1m. has meant in some cases finding several disjunct records all within the same 100m square clearly having separate 10 figure grid references but all occurring within the same 6 figure grid reference. In such cases one record has been chosen to represent the SITE, any others records are recorded as ADDITIONAL RECORDS for the same site. In some cases the present survey has found NEW SITES, i.e. an entirely new 6 figure grid reference and this grid reference could contain NEW ADDITIONAL RECORDS for that site.

Some of the variables measured in the above Box also require explanation namely:

#### **Open water.**

This is the amount of open water seen in a ditch length, 12.5m. either side of the site and assessed on a 6 point scale:

- 0 No open water.
- 1 Up to 20% open water.
- 2 20 to 40% open water.
- 3 40 to 60 % open water.
- 4 60 to 80% open water
- 5 80 to 100% open water.

#### **Water clarity.**

This was assessed on a 5 point scale:

1. Highly turbid
2. Turbid often the result of iron ochre suspended in the water column.
3. Evident suspended particles and/or algae in suspension.
4. Clear water but with a slight lack of clarity.
5. Clear water.

#### **Management.**

Assessments were made from guidance given by the Wardens at the RSPB reserves of Pulborough Brooks, West Sussex and Strumpshaw Fen, Norfolk. They could state which ditches had been managed when and so the recovery phases could be assessed at other sites with some degree of confidence but it must be stressed these assessment are still subjective. The management terms used require definition; the terms “slubbing out” and “cleansing” are synonymous and relate to the use of, for example a Bradshaw weed cutting bucket or a tractor and bucket to remove the vegetation. The terms **dredging or re-profiling** are synonymous and mean the bucket has scraped the sides of the ditch down to the bare soil and the bottom has been scraped to purposely remove any accumulated sediment and with it any plant growth.

#### **Reason(s) for presence or absence”.**

This assessment indicates possible reasons for presence or absence of *P. acutifolius* as inferred from observations made at the time of the visit. It must be stressed that the assessments made were subjective and based on what were thought to be the reasons for the species’ presence or absence. It is hoped that further analyses of the variables measured will provide a more objective basis for its presence or absence and thus give a greater insight into the ecology of *Potamogeton acutifolius*.



### Site Records.

The methodology concentrated on surveying all those sites for which there is a six figure grid reference for *Potamogeton acutifolius*. Many records were duplicates of an earlier record (Appendix 1). Some of the early records are given as two, three or four figure grid references only. In most cases the 10 km square or the 1km squares so identified included later records where one or several six figure grid references had been given. Rather than searching the whole square it was assumed that the square would be covered by these six figure grid references. Areas for which there were no six figure grid references in any of the squares included the following records are given in Table 1.

**Table 1. BSBI records for which no Six Figure Grid references are given**

1. VC 13, South Stoke, near Amberley. The square TQ 02- 08-, has one small ditch and the River Arun flowing through it. The ditch was searched throughout its length.
2. VC 13, Amberley Wild Brooks. There is one, 1 figure grid reference covering the 10km square in which Amberley Wild Brooks is situated. Thus it is assumed this record was covered by the present Wild Brooks survey. There are 25, 2 figure grid references covering **seven** 1km squares. Five 6 figure grid references were found in **three** of these 1km squares. The remaining four of these squares, covering 17 records, were therefore searched. Each square was searched randomly and sites were not found for *Potamogeton acutifolius* in two of them. These squares were assessed as needing further survey.
3. VC 21, Staines, Shortwood Common. A survey of the Common was undertaken.
4. VC 14, Marshes near Berwick. There were two separate drains each about 1km long. The likely area(s) were searched.
5. VC 14, Pevensy Levels. There is one 1989 record covering a 10 km square which is on the extreme edge of the Pevensy Levels. There were also 16 records with four figure grid references covering **seven** 1km squares. **Three** of these squares were covered by nine 6 figure grid references so randomised searches were carried out in the remaining four squares.
6. VC 15, Romney Marsh, two 1982 records. The two 1982, 1 figure grid references embrace a 10km square which is outside the Romney Marsh area but they are given as being in VC 15. This excludes the 6 figure record in the area known as Ewhurst (VC 14). These two 1982 records are therefore likely to be part of the six, 6 figure records in the area known as Small Hythe (VC 14 and 15) on the Rother Levels. It is suggested the two 1 figure grid references are covered by the Small Hythe records.
7. VC 27, Norfolk, a 1998 record TG 2--,0--, no site name is given. This could be anywhere in the 10km square as no name is given for the site. It is suggested that this record is covered by the other records in this 10km square.