

**RECORDS OF *XESTOPHANES POTENTILLAE* (RETZIUS) AND  
*X. BREVITARSIS* (THOMSON) (HYMENOPTERA: CYNIPIDAE)  
DERIVED FROM HERBARIUM SPECIMENS OF *POTENTILLA*  
SPECIES AT THE BRITISH AND IRISH HERBARIUM, NATURAL  
HISTORY MUSEUM, LONDON**

M. T. JENNINGS & S. A. JENNINGS

206 Lower Higham Road, Gravesend, Kent, DA12 2NN

ABSTRACT

Herbarium sheets at the Natural History Museum, London were used to provide records of the gall-causing cynipid *Xestophanes potentillae* (Retzius) from Ireland (1882); Wales (1907); England, Devon (1875), Dorset (1889), London (1886), Northamptonshire (1892), Surrey (1892) and Somerset (1926). The host plants were *Potentilla reptans* L., *P. anglica* Laichard and *P. × mixta* Nolte ex Rchb. *Potentilla × mixta* is a new host plant for *X. potentillae*. Similarly, herbarium sheets of *P. erecta* (L.) Rausch. were used to provide records of *X. brevitarsis* (Thomson) from Scotland (1883); England, Surrey (1897) and Hampshire (1912).

INTRODUCTION

*Xestophanes potentillae* (Retzius) and *Xestophanes brevitarsis* (Thomson) are known as gall causers on species of *Potentilla* and both have a wide distribution in Europe (Melika, 2006). Both *Xestophanes* species induce rounded galls on aerial shoots or on the root at or below ground level. Galls for both species are formed by July and mature in September (Redfern, Shirley, & Bloxham, 2002, Melika, 2006). The larvae overwinter in the galls and the adults emerge in May–June.

In 1893 the biology and distribution of both species for Great Britain were summarised by Cameron (1893). *Xestophanes potentillae* was known from Devon and Kent and the host plant was given as *P. reptans*. The distribution of *X. brevitarsis* was given as widespread in Scotland with the host plant being *P. erecta*.

Connold (1901) records both *Xestophanes* species from Hastings, Sussex with the host plant of *X. potentillae* given as *P. reptans* and that of *X. brevitarsis* as *P. erecta* (as *P. tormentilla* Sibth). Connold (1909) repeats the host-associations.

In 1916 *X. potentillae* was recorded from Kent on *P. anglica* (as *P. procumbens* Sibth) by Bishop and Tremayne (Burkill, 1916). *Xestophanes potentillae* was recorded as widespread on *P. reptans* in northern England and *X. brevitarsis* was recorded on *P. erecta* (as *Tormentilla erecta*) from Birtley Fell, Durham (Harrison, 1916). By 1932 *X. potentillae* was known from Derbyshire, Devon, Durham, Essex, Kent, Middlesex, Northumberland and Yorkshire. The host plant was cited as *P. reptans* and the *P. anglica* record for Kent above was re-cited [but incorrectly given as from Yorkshire] (Niblett & Burkill, 1932).

By 1932 *X. brevitarsis* was known from Derbyshire, Essex, Middlesex, Shropshire, Staffordshire, Surrey and Yorkshire and the host plant was cited as *P. erecta* (Niblett & Burkill, 1932). Niblett was a very active recorder of galls and he gives many records for Surrey (from 1923 to 1956) of *X. potentillae* on *P. reptans* and *X. brevitarsis* on *P. erecta* (Niblett, 1957). Eady & Quinlan (1963) give the host plant for *X. potentillae* as *P. reptans* and that of *X. brevitarsis* as *P. erecta*. *Xestophanes potentillae* was recorded, as new to Ireland, on *P. anglica* by O'Connor & O'Connor

(1995). For Kent, Philp (2000) gives the host plant of *X. potentillae* as *P. reptans* and *P. anglica* (probably re-citing the Kent record above) and for *X. brevitarsis* gives *P. erecta*. Spooner & Bowdrey (2000) cited *P. reptans* and *P. anglica* as host plants for *X. potentillae* and *P. erecta* for *X. brevitarsis*.

More recently *X. potentillae* on *P. reptans* and *X. brevitarsis* on *P. erecta* have been recorded from Kent (Jennings, 2004) and Norfolk (Hancy, 2000). Maidstone (2011) gives reports of *X. potentillae* on *P. reptans* from Buckinghamshire, Essex, Leicestershire and Norfolk. However, although it is very likely that other published records of both *Xestophanes* species, particularly in local lists, have been overlooked, the distribution of both species in Great Britain is still poorly known.

Many records of gall-causing organisms are based on the identification of the gall rather than the identification of the gall inducer itself. In a similar way galls may be identified from a well-known host plant association. Many records of the *Xestophanes* species are likely to have been based on the identification of the host plant i.e. galls on *P. reptans* are from *X. potentillae* and those on *P. erecta* are from *X. brevitarsis*. However, because of hybridisation, the identification of *Potentilla* species can be difficult. The species *P. anglica* (56 chromosomes) is a result of hybridisation (chromosome doubling) between *P. reptans* (28 chromosomes) and *P. erecta* (28 chromosomes). *Potentilla* × *mixta* (42 chromosomes) is a hybrid between *P. anglica* and *P. reptans*. *Potentilla* × *suberecta* Zimmer (42 chromosomes) is a hybrid between *P. anglica* and *P. erecta*. Although separable by pollen examination or chromosome counts in the laboratory, the range of morphology from *P. reptans* to *P. erecta* via the hybrids and *P. anglica* makes the separation of these forms, in the field, difficult (Rich & Jermy, 1998). Stace (2014) suggests that *P. anglica* is over-recorded for *P. × mixta*. It seems likely, therefore, that some records of the *Xestophanes* species may have incorrect host plant associations.

Whilst engaged in an unrelated project at the British and Irish Herbarium, Natural History Museum, London, it occurred to the authors of this paper, that herbarium specimens could provide a source of biodiversity data for gall-causing organisms. It was assumed that while plant collectors would try to obtain “perfect” specimens for preservation they might not notice small galls attached to the plant, and that these too would be preserved. The British and Irish Herbarium collection of a large number of named specimens of *Potentilla* and hybrids made the galls of the *Xestophanes* species an appropriate target group. It was hoped that a search for galled *Potentilla* specimens would provide new biodiversity data for the *Xestophanes* species. Welch (1986) used this approach to provide data on gall inducing cynipid wasps on introduced exotic oaks in Britain. Veenstra (2012) used the same approach to determine the geographical distribution of a gall midge in Australia.

## METHOD

Plant specimens of *P. reptans*, *P. anglica*, *P. erecta*, *P. × mixta* and *P. × suberecta* were searched to find those with attached galls of *X. potentillae* and *X. brevitarsis*. Specimens with galls were documented, digitally scanned and finally returned to the collection. All of the plant specimens had been determined and several had been previously critically examined by acknowledged experts in the *Potentilla* genus. However, the opportunity was taken to get all of the specimen scans re-examined by Dr B. Harold, *Potentilla* referee, of the Botanical Society of Britain and Ireland. Dr Harold re-determined specimen BM001186497 by pollen count analysis. The determination of the gall causer was based on the known host plant associations.

Requests for information on the *Xestophanes* species were made to the relevant local biological record centres.

## RESULTS AND DISCUSSION

### *X. potentillae*

Galls attributed to this species were found on the following plant specimens;

Tavy Valley near Plymouth, South Devon, England, 30th August 1875 on *P. × mixta*. (possibly a mixed series of plants with *P. reptans*), but labelled as *P. reptans*, coll. T. R. Archer Briggs ex. Herbarium Boswell Syme, BM001139425 (Plate ●●, Fig. 1). Archer Briggs sent a galled plant to the “Entomologist” requesting an identification of the gall causer. The query and the reply by E. A. Fitch, a well-known entomologist, was printed in the Entomologist for 1875 (Archer Briggs, 1875). A handwritten note to this effect, by Archer Briggs, is pasted onto the herbarium sheet [Archer Briggs incorrectly cites the “Zoologist” rather than the “Entomologist”].

It is very likely that this is the Devon record cited by Cameron (1893). First known record for Devon and probably Great Britain.

Aberdare, Wales, September 1907 on *P. × mixta*, but labelled as *P. reptans*, coll. H. J. Riddelsdell ex Herbarium W. C. Barton, BM001139429.

First known record for Wales.

Lyn y Groes Merioneth (? Gwynedd) VC48, Wales, 12 August 1915 on *P. × mixta*, but labelled as *P. procumbens (=anglica)*, coll. ex. Herbarium W. C. Barton, BM001186497.

Newcastle, County Tipperary, Ireland, June 1882 on *P. × mixta* (or *P. anglica*), coll. G. G. Nicholson (George Nicholson), BM001161861.

First known record for Ireland.

Hamworthy, Dorset, England, 26th August 1889 on *P. × mixta* (or possibly *P. anglica*), but labelled as *P. procumbens (=anglica)*, coll. E. F. Linton, BM001139426.

First known record for Dorset.

Limestone quarry Cosgrove, Northamptonshire, England, August 1892 on *P. reptans*, coll. H. N. Dixon, ex Herbarium Arthur Bennett, BM001139428.

First known record for Northamptonshire.

Witley, Surrey, England, 22nd August 1892 on *P. × mixta*, coll. E. F. Linton, BM001139424.

First known record for Surrey.

Paddington Canal near Willesden Junction, (old Middlesex) London, England, 1886 on *P. × mixta*, but labelled as *P. procumbens (=anglica)*, ex Herbarium John Benbow, BM000781233.

St. Thomas' Head, Woodspring, North Somerset, England, 20th July 1926 on *P. reptans*, coll. Ida Mary Roper, ex. Herbarium W. C. Barton, BM001168010.

*X. brevitarsis*

Galls attributed to this species were found on the following plant specimens; Woods near Tarff Water, Kirkcudbright, Dumfries and Galloway, Scotland, 27th June 1883 on *P. erecta*, coll. F. R. Coles, BM001161869.

First known record for Dumfries and Galloway. Possibly the earliest known extant documented record for Great Britain.

Ditton Marsh, Surrey, England, 22nd August 1897 on *P. erecta*, coll. H. W. Pugsley, BM001161860

First known record for Surrey.

Matley Bog, Hampshire, England, 8th September 1912 on *P. erecta*, coll. A. J. Wilmott, BM001139430.

## CONCLUSION

This study has provided new records of *X. potentillae* from Ireland, Wales and England (Devon, Dorset, Northamptonshire, Surrey and Somerset) and new records of *X. brevitarsis* from Scotland and England (Hampshire and Surrey). The 1875 herbarium specimen from Devon is a remarkable find with wonderful provenance and is probably the first record and earliest voucher specimen of the gall of *X. potentillae* for Great Britain. *Xestophanes potentillae* from Newcastle in Ireland and Aberdare in Wales are both the first records for each country. Cameron (1893) described *X. brevitarsis* as widespread in Scotland but he gave no records. The 1883 herbarium specimen from Dumfries and Galloway provides some confirmation for this statement and it may be the earliest extant Scottish specimen of the gall. All plant specimens were searched and the “early” dates of those found with galls reflects the history of the formation of the British and Irish Herbarium collection itself.

Galls of the *Xestophanes* species were found on herbarium specimens of *P. reptans*, *P. × mixta*, *P. erecta* and possibly *P. anglica*. However, none of the herbarium specimens had enough material to be confident that *P. anglica* was indeed a host plant. It would be of interest to locate other records of galled *P. anglica* and, where possible, re-determine the host plant. Following the host plant associations outlined in this paper, galls on *P. reptans* were attributed to *X. potentillae* and those on *P. erecta* to *X. brevitarsis*. *Potentilla × mixta* is a new host plant association that has not been previously reported from Britain. Also *P. × mixta* was not mentioned as a host plant in Europe by Melika (2006). Clearly, as adult cynipids reared from galls on *P. × mixta* were not available in this study, the identification of the *Xestophanes* species is not strictly possible. But, for the moment at least, it seems appropriate to attribute the galls to *X. potentillae*.

Recently, however, the taxonomic status of the two *Xestophanes* species has been questioned. Melika (2006) has suggested that only one species is involved. In contrast, the possible presence of sibling species within *X. potentillae* has been suggested by Maidstone (2011). An improved knowledge of the host plant associations will assist with the resolution of this taxonomic issue. Herbarium specimens remain important reference material for plant identification and plant systematics. Increasingly, however, they are also being found to be useful in many other disciplines, from documenting the lives of early naturalists to providing data for climate change studies. This study has used herbarium specimens to provide biodiversity data for the gall-causing Cynipidae.

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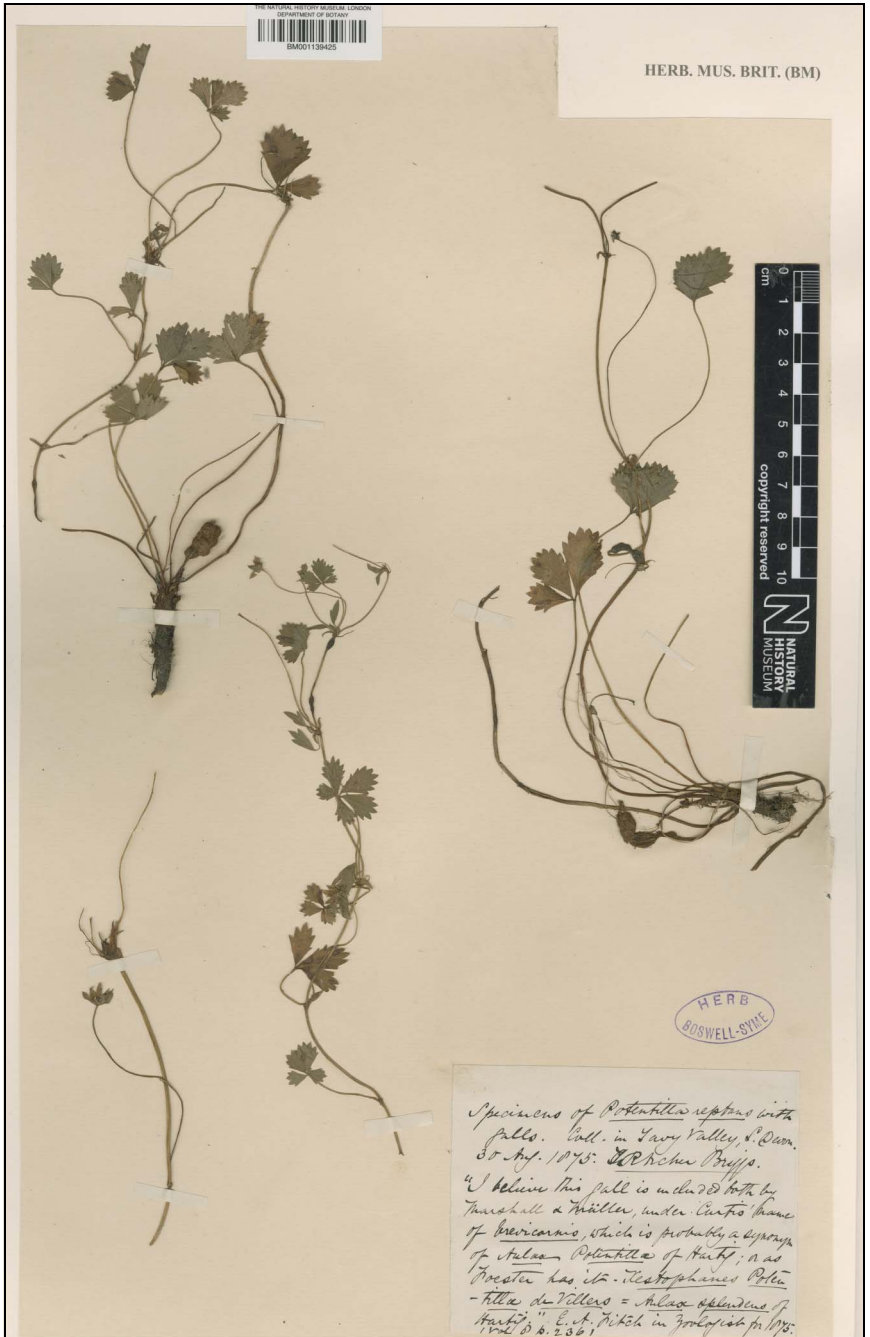


Plate ●● Fig 1. Herbarium sheet NM001139425. Material collected by T.R. Archer Briggs in 1875 from Devon showing galls of the cynipid *Xestophanes potentillae* on *Potentilla* × *mixta*. Reproduced by kind permission of the Natural History museum, London.