

## The history and distribution of *Phyteuma spicatum* L. (Campanulaceae) in Britain

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### ABSTRACT

*Phyteuma spicatum* L. (Campanulaceae) is a rare species in Britain occurring in low numbers in a small area of East Sussex (v.c. 14). Its history has been investigated, and herbarium records and Flora accounts examined, to determine whether it was formerly more widespread and abundant in Britain. It appears that *P. spicatum* has always been confined to East Sussex, but that it was more widespread within this vice-county in the past. Anecdotal information also suggests that it was more abundant at the end of the 19th century and during the early 20th century than it is at present.

**KEYWORDS:** Spiked rampion, rare plant, current distribution, historical distribution, England.

### INTRODUCTION

Thirty species from the family Campanulaceae occur in Britain as natives, introductions or garden escapes (Stace 1997). Three of these species belong to the genus *Phyteuma*. *P. orbiculare* L. (Round-headed Rampion) is native and is found in chalk grasslands from Wiltshire to East Sussex. *P. scheuchzeri* All. (Oxford Rampion) is an introduced species which was formerly on walls and pavements in Oxford and is now naturalised in limestone cracks at Inchnadamph, W. Sutherland (Stace 1997). The third member of the genus, *P. spicatum* (Spiked Rampion), is confined to East Sussex (v.c. 14).

According to Damboldt (1976) there are two subspecies of *P. spicatum*. Subspecies *spicatum* has creamy-white flowers, whereas those of subsp. *coeruleum* are blue. Subspecies *spicatum* is the subspecies found in all the East Sussex sites, and is regarded by many as a native of Britain (Hall 1980; Clapham *et al.* 1987). Garden escapes are usually blue-flowered (Stace 1997). Whereas Bentham & Hooker (1954) place a question mark after "native" in their flora entry for *P. spicatum*, and Grigson (1958) fails to mention the species at all, Hall (1980), Clapham *et al.* (1987) and Stace (1997) all regard it as native. Its inclusion in the second and third editions of the *British Red Data Book of Vascular Plants* (Perring & Farrell 1983; Wigginton 1999), and its addition in 1992 to Schedule Eight, under Section 13 of the Wildlife and Countryside Act of 1981, support this view.

*P. spicatum* is found very locally on roadside verges, on steep roadside banks and in woodlands, on acid soils of the Ashdown Beds and Wealden Clay. The communities in which it is found on roadsides correspond to either the W25a *Rubus fruticosus* agg.–*Pteridium aquilinum* underscrub, *Hyacinthoides non-scripta* sub-community or, in more open areas, the *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community (MG1e), of the National Vegetation Classification. In wooded sites it is a component of *Quercus robur*–*Pteridium aquilinum*–*Rubus fruticosus* woodland (W10), particularly the *Anemone nemorosa* sub-community (W10b) (Rodwell 1991, 1992; Wheeler 1997). *P. spicatum* has also been recorded as a garden escape in Warwickshire, Staffordshire, Merionethshire, Derbyshire and Roxburghshire (Perring & Farrell 1983). Outside the British Isles, *P. spicatum* is endemic to Europe, occurring in many Central and Atlantic European countries. Ellenberg (1988) names *P. spicatum* as a component of the "noble broadleaved wood" (*Fagetalia*), lime and oak-hornbeam woods, silver fir woods, woodland margins, and montane and sub-alpine

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meadows. Full details of the communities in which the species occurs, and of its ecology, are to be presented in a Biological Flora account (Wheeler & Hutchings, in prep.).

Willems (1980) has studied the size of continental populations of *P. spicatum* in the Leudal area of the Netherlands, a country where the species is rare. The number of plants he recorded declined between 1965 and 1980, culminating in population extinction. Detailed study of the demographic behaviour and changes in numbers of plants in three of the remaining British populations of *P. spicatum* will be presented in a future paper (Wheeler & Hutchings, in prep.). The present paper analyses the past distribution and abundance of *P. spicatum* in Britain to determine whether its current limited distribution and rarity has been typical throughout its history, or whether it has suffered a contraction in range and abundance. Evidence for such a contraction would suggest that development of a programme of active management is urgently needed to conserve the species.

#### METHODS

The current and historical distribution and abundance of *P. spicatum* in Britain were analysed using historical records, manuscripts, herbarium specimens and field observations. Records and specimens were examined from herbaria at **BM**, **BTN**, **CGE**, **LIV**, **K** and **NMW**. Records from other herbaria and site locations were supplied by English Nature, Sussex and Surrey Team. The B.S.B.I. vice-county Recorder was consulted for known locations, and the Joint Nature Conservation Committee and the Biological Records Centre at the Institute of Terrestrial Ecology, Abbots Ripton, supplied information on historical locations. In addition, known locations at which *P. spicatum* still occurs, and sites at which it has been recorded but at which its presence was unconfirmed between 1986 and 1996, were searched for the species. All records of *P. spicatum* are listed in the Appendix.

#### THE HISTORY OF *PHYTEUMA SPICATUM* IN THE BRITISH ISLES

The earliest account of *P. spicatum* in the British Isles is in Gerarde's '*Herball*' (1597) under *Rapuntium maius*, an early name for the species. It was described as a garden plant, grown for its culinary and medical properties (the root was boiled and eaten in salads), rather than as a wild species. Gerarde stated that the plant was also known as *Rapunculum alopecuron* because of "the care or spike that is full of flowers, which are like almost to tailes of foxes when they are bloomed". Gerarde's plant was blue-flowered, "sometimes white or sometimes purple", indicating that *P. spicatum* grown in gardens in Britain at that time was subsp. *coeruleum* R. Schulz (Damboldt 1976), which now grows wild in mainland Europe but only grows as a garden escape in Britain. Gerarde (1633) enlarged the list of names given to the species to include *Alopecuri comoso flore*, *Rapunculum sylvestre* and *Rapunculus sylvestris spicatus*. Parkinson (1640) also described the plant under the name *Rapunculus spicatus Alopecuroides*, or the "Long Foxtaile Rampion". He stated that as well as being cultivated as a culinary plant, the species grew wild in "divers places of this land". This is the first record of *P. spicatum* as a wild species in Britain. Parkinson also commented on the origin of the name, stating that *Rapunculus* was a diminutive of *Rapum* (the turnip) and that the species was so-called because of the similarity in appearance and edibility between its root and the vegetable. Further names included *Rapum sylvestre majus*, *Rapunculum alopecuron*, *Rapunculus-Alopecuroides longa spica* and *Rapunculus nemorosus primus*.

The first specific location given for *P. spicatum* as a wild plant is Knight's Farm, Mayfield, East Sussex in 1825. This record forms part of William Borrer's herbarium, now housed in **K**. Borrer's botanical knowledge of Sussex was unequalled in his day (Arnold 1907; Wolley-Dod 1937), lending credence to this record: A specimen from this first record, sent to the Linnean Society "was not considered an English plant" (Branwell 1872).

From 1825 onwards, there are many records and herbarium specimens of the species. The most extensive herbarium collection is in **BM**. Most specimens in other herbaria were duplicates of these. All the documented locations of *P. spicatum* growing wild were in East Sussex, and there is no evidence of the species as a wild plant in other counties – only as a garden plant or nearby escape. Most herbarium records provide information on the abundance and distribution of the species. Although some records are unspecific, referring only to a particular parish, the names of

particular farms or woods are frequently given. A note by W. A. Bromfield, made in 1835 (herbarium of W. B. Hemsley, Booth Museum, Brighton), is typical of the accuracy and form of these records; "...in the middle of a wood on Hole Farm in Buxted Parish, five or six miles from Uckfield; one of many stations about Mayfield and Waldron where this plant occurs, and which is certainly indigenous though so long overlooked by British botanists". Bromfield's view of *P. spicatum* as indigenous is supported by Jenner's (1845) observation on the species in woods at Warbleton where "No one who saw it there could doubt its being native".

In 1907, Arnold suggested that specimens of *P. spicatum* found in the wild were escapes from Warbleton or Michelham Priors. This theory originates from Michelham Priory itself. It was still in the apothecaries' garden at Michelham Priory in the late 1980s (FitzGerald 1987), and an exhibit in the Priory museum claimed that it was "brought to Michelham by the canons from its native France", although no evidence is given to support this claim.

The number and size of populations of *P. spicatum* in East Sussex appears to have been much larger in the past than at present. Throughout the 19th century, herbarium specimens were consistently accompanied by notes referring to its great abundance. In 1835, Bromfield "met this plant in plenty" (BTN) and Jenner's (1945) account of the species states that it "grows in the woods in such abundance ...". A later extract from a letter to W. B. Hemsley in 1875 (Herb. Borrer., K) describes "Abbots Wood which is quite carpeted with *Phyteuma spicatum*. We were there for two hours and which ever way we walked they were as common as dandelions". In 1996, Abbots Wood supported fewer than 30 plants.

Several herbarium specimens from the early part of the 20th century also refer to *P. spicatum* as an abundant species. For example, Bray in 1919 (FitzGerald 1988) stated that "it came from Bramble Grove Wood ... There is a good bit of it." However later records suggest a decline. Druce (1932) described the species as rare, and other records around this time cease to describe the plant as occurring in large numbers. Wolley-Dod (1937) records it in Abbots Wood as "formerly abundant, now much less so". Later records are more specific about the location of the plant, referring to populations in small areas of the wood, rather than throughout. For example, Richards (1942 [in Herb. Babington, CGE]) records it as in a "Felled portion of Abbots Wood near Milton Hide".

#### DISTRIBUTION OF *PHYTEUMA SPICATUM* IN EAST SUSSEX FROM 1825 TO 1996

Figures 1a–c show the presence of *P. spicatum* within tetrads in East Sussex from 1825, the year of the first confirmed record of the species, to 1996. Between 1825 and 1875 (Fig. 1a) most records were from the Heathfield area. They do not support the suggestion that wild populations of *P. spicatum* originated from Michelham Priory (see above), since only one tetrad near the Priory (TQ/5.0T) has records of the species, whereas there are many tetrad records 10 km further north. The location of Warbleton Priory (TQ/6.1P) is closer to the early records and may be more credible as a possible source of *P. spicatum*, if the species is not native.

The distribution of *P. spicatum* appeared to spread between 1875 and 1925 (Fig. 1b), although few records remained in the tetrads in which the species had been previously recorded. This apparent increase in the geographical range of the species may be explained by the increase in regionally specific botanical documents during this period, allowing greater detail and accuracy in recording (Hemsley 1875; Arnold 1887, 1907), and by the increased number of amateur botanists collecting specimens for herbaria. The majority of herbarium specimens of *P. spicatum* originate from this period. The absence of records from many of the earlier locations cannot be explained. Their recurrence in later decades suggests a lack of recording in these locations, rather than that *P. spicatum* had become locally extinct.

The records of *P. spicatum* reached their greatest abundance between 1926 and 1975 (Fig. 1c), but even during this period only 18 tetrads contained records. *P. spicatum* was still confined to a small area within a circle of radius 9 km, with two areas of concentration. These were the Heathfield/Cross-in-Hand area (TQ/5.2) and the woodland in and around Abbots Wood (TQ/5.0). From 1975 to 1989, the range of *P. spicatum* diminished (Fig. 1d), shrinking back to the two stronghold areas where it had formerly been concentrated. The outlying tetrad records shown in Figures 1b and c had been lost. By 1996 the strongholds for *P. spicatum* had declined in size (Fig. 1e),

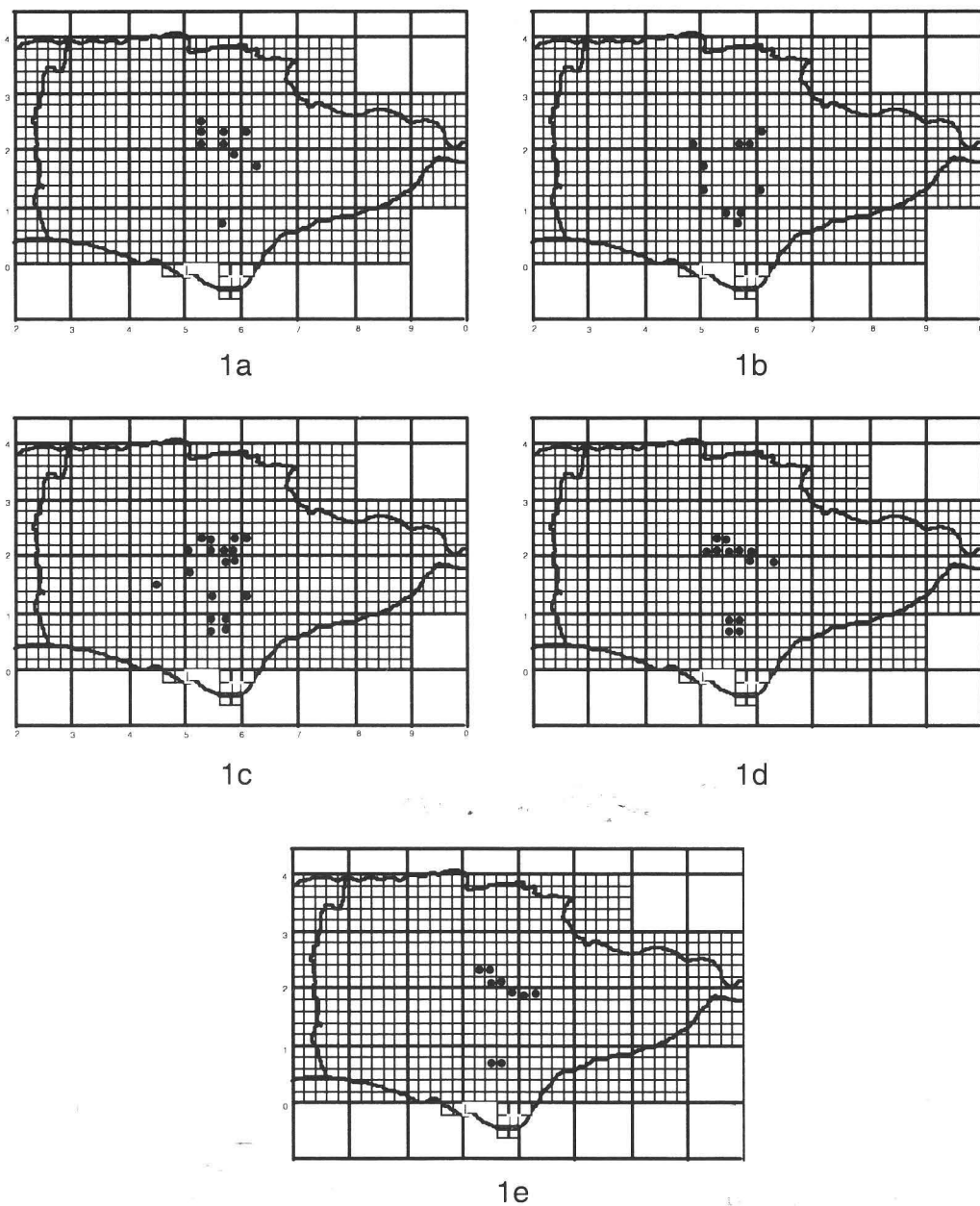


FIGURE 1a-e. The distribution of *P. spicatum* during the period 1825 to 1996, plotted from the historical and extant site records. (a) 1825-1875; (b) 1876-1925; (c) 1926-1975; (d) 1976-1989; (e) 1996-present. Distribution is shown as presence within  $2 \times 2$  km square tetrads in v.c. 14, East Sussex. Those tetrads in which presence is marked as an approximate location only are an attempt by the author to place the earliest (1825 to 1875) historical records of *P. spicatum*. These early records are open to interpretation of location, due to the vagueness of descriptions.

TABLE 1. THE NUMBER OF *PHYTEUMA SPICATUM* PLANTS AT EACH EXTANT SITE DURING THREE RECENT CENSUSES, SHOWING THE PERCENTAGE CONTRIBUTION WHICH PLANTS AT EACH SITE MAKE TO THE TOTAL POPULATION IN BRITAIN.

Sites	1980/1		1986/7		1995/6	
	total number of plants	% of British population	total number of plants	% of British population	total number of plants	% of British population
Pound/Bridgelands Farm	2	<1	0	0	0	0
Brown's Lane	51	13	55	14	1	<1
Little England Farm	50	13	27	7	5	1
Malls Bank Farm	16	4	18	5	7	2
Tinkers Lane	198	50	175	44	285	83
Abbots Wood sites	77	19	30	8	23	7
Dower House	—	—	?	?	?	?
Maynards Green	—	—	78	20	14	4
New Sapperton Farm	—	—	12	30	?	?
Rushlake Green	—	—	—	—	4	1
St Dunstan's Farm	—	—	—	—	4	1
Total	397		395		343	

? Denotes no available information on population numbers during the survey period; — denotes no plants known at the site during the survey period.

leaving only nine tetrads containing records. The appearance of one new tetrad supporting a colony at TQ/5.0N (Abbots Wood) is misleading, since this record, which is adjacent to the older record of TQ/5.0T, is due to improvement in the accuracy of an earlier record. Both TQ/5.0N and T are a single record from one woodland which supports a handful of plants in a very small area crossing the tetrad boundary line (see Appendix records).

An analysis of the recent and current distribution of *P. spicatum* in Britain is given in Table 1, which shows, for three census dates, plant numbers, and the percentage of the total number of plants of *P. spicatum* contributed by populations at each extant site. The 1980/1 census was undertaken by the county recorder of the B.S.B.I. for the Sussex Botanical Recording Society, the 1986/7 census was commissioned by English Nature, and the 1995/6 census was carried out during this study. In 1987 there were eight sites with extant populations, supporting almost 400 plants (FitzGerald 1988). This was a similar number of plants to that recorded in 1980/1, but the distribution across sites had changed between the two dates. The census in 1996 confirmed the persistence of *P. spicatum* in seven of the tetrads occupied in 1987. The eighth had become inaccessible, so that the continued presence of *P. spicatum* here remained unconfirmed. *P. spicatum* was also discovered at two new sites. However, with the exception of one site, the numbers of plants at the sites where the species survived were much reduced since the 1987 census (Table 1), and the total number of plants had declined by 13% between 1987 and 1996. Although the spread of plants across the British sites was uneven at all three census dates referred to above, it has recently become more heavily concentrated on just one site, emphasizing the importance not only of conserving the population at this site but also of increasing the size of *P. spicatum* populations at the other remaining sites in which it survives. A catastrophic event or inappropriate management at the site of its largest population could now destroy over 83% of Britain's *P. spicatum* plants.

#### CONCLUSIONS

Historical records show that, although *P. spicatum* has never been widely distributed in the British Isles, it was formerly more widespread, and occurred in much larger numbers, than it does now. The low numbers of plants which now remain warrant its legal protection under Schedule Eight,

Section 13 of the Wildlife and Countryside Act (1981), and there can be little doubt that an effective plan for management of the sites where it still survives is now vital to safeguard the species against the risk of extinction in the British Isles.

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We thank the following for providing records and/or information on sites; English Nature (Sussex and Surrey Team), Forestry Commission (Weald Forest District), Peter Davys, Desmond Gunner, Paul Harmes (and the Botanical Society of the British Isles), A. W. Jones, Elizabeth Rich, Dr Tim Rich, Dr Francis Rose, Janet Simes, Matthew Thomas; and the Keepers of **BM**, **BTN**, **CGE**, **K**, **LIV**, **NMW** and **RNG** for access to specimens.

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## APPENDIX

A list of records discovered for *P. spicatum*, compiled from the sources described above is given. 10-km square and, where possible, standard B.S.B.I. tetrad reference (Ellis 1986), is given for each site. Only those records of *P. spicatum* growing wild are included and consequently all records are from v.c. 14. Only first and last (most recent) records are given, except where interim records provide valuable information, for example on plant numbers. The source of the record is given either as a publication reference or as a herbarium or report reference. Records courtesy of Paul Harmes, the B.S.B.I. Recorder for v.c. 14, are indicated by BSBI. Records courtesy of English Nature, Sussex and Surrey Team are indicated by EN. Records are arranged numerically by tetrad reference. The symbol < before a date indicates that the record is earlier than the date given, but that its exact date is not known. In such cases the date of the publication or document in which the record was located is supplied instead. The symbol \* against a record indicates a currently extant (June 1996) population of *P. spicatum* at the site.

## EAST SUSSEX, V.C. 14,

Firle (TQ/4.0), 1968, (BSBI); seems unlikely, no records prior to or after this one.

Near Glynde (TQ/4.0), (K). 1934, *Pickard* (BM); specimens of seedlings only in Herb. Musei Britannica – seedling specimens difficult to confirm as *P. spicatum*; also G. C. Druce (Wolley-Dod 1937).

Ringmer/Isfield, Plashett Wood, along ride (TQ/4.1M), 1967, A. W. Jones; searched by David Lang and Paul Harmes in 1993, but no plants found.

Maresfield, a casual at (TQ/4.2), Rev. A. C. D. Ryder (Wolley-Dod 1937).

Uckfield, Hempstead Wood (TQ/4.2V), <1900, J. H. A. Jenner (Wolley-Dod 1937).

Uckfield (TQ/4.2), 1895, *Druce* (K).

Arlington, Park Wood Farm (TQ5.0P), E. Bray (Wolley-Dod 1937).

Near Hailsham (TQ/5.0), 1877, J. H. A. Jenner (BM); 1906, E. Bray (K); probably either Tilehurst, Bramble Grove or one of the Wilmington Forest woods.

Near Berwick (TQ/5.0), 1927, Miss Knox (BSBI); possibly a wood which has disappeared, or perhaps Plackett Coppice, in Wilmington Forest, the nearest known record.

Upper Dicker, Bramble Grove (TQ/5.0U), 1906, E. Bray (BM); "There is a good bit of it...", 1919, E. Bray in a letter to A. J. Wilmott (BM); Bramble Grove Wood searched by FitzGerald in 1987, no plants found, "uncoppiced for many years and very dark", EN.

Upper Dicker, Tilehurst Wood (TQ/5.0U), 1906, E. Bray (BM); 1919, E. Bray (BM); "access not gained", FitzGerald (1987).

Arlington, woodland (TQ/5.0I), 1885, J. H. A. Jenner (LIV); no exact location but could be referring to the nearby Wilmington Forest.

Copse near Michelham Priory, between Hailsham and Abbots Wood (TQ/5.0P or U?), 1933, J. E. Lousley (RNG); could perhaps be Bramble Grove or Milton Hide.

\*Abbots Wood and Wilmington Forest (TQ/5.0N, T and U); there are numerous records for Wilmington Forest; most are Abbots Wood but many are Cane Heath, Nate Wood, Plackett Coppice, Milton Hide or Wilmington Wood – it is often impossible from the herbaria specimens to determine the precise location; first and last records for the Forest as a whole are given here; 1873, F. C. S. Roper (BTN). (also 1875 "dist. abundant"); felled portion of Abbots Wood near Milton Hide 1942, P. W. Richards (EN); "roadside show" along edge of Abbots Wood near Old Oak Inn, 1968, A. W. Jones; TQ/5.0N – ten plants on edge of woodland path in mixed deciduous area, TQ/5.0T – one plant on bank of main forest ride, TQ/5.0T – eleven plants in coniferous woodland edge by path, TQ/5.0T – two plants in overgrown dark woodland on bank of ditch, TQ/5.0T – five plants in a large clearing in the centre of Abbots Wood, and TQ/5.0N – one plant at the side of the road at the car park entrance, 1996, B. R. Wheeler.

Upper Dicker, Mill Wood, woodland ride (TQ/5.0P), 1954, D. Philcox (BSBI).

Nate Wood (part of Wilmington Forest) (TQ/5.0T), 1962, P. Cockburn (BSBI); woodland by stream, 23 plants in small patches, 1980, R. Minor, (BSBI).

Michelham Priory (TQ/5.0P, U) (Arnold 1907); "Originally perhaps an escape from Warbleton or Michelham Priors..." (Wolley-Dod 1937); "It is still grown in the apothecaries' garden", and an exhibit in the museum claims "it was brought to Michelham by the canons from its native France", 1986, R. FitzGerald (EN); the plant was not to be found in the apothecaries' garden in 1996 when a colleague of the authors visited, 1995.

Michelham Priory Wood (TQ/5.0U), 1924, *Foggitt* (CGE); most likely to be Bramble Grove or perhaps Mill Wood.

Laughton Woods, Laughton. (TQ/5.1B), <1900, J. H. A. Jenner, (Wolley-Dod 1937).

Bentley Wood, between Halland and East Hoathly, (TQ/5.1D), 1895, *E. H. Farr* (LIV); this record could refer to Bentley Wood at TQ/5.1D or at TQ/4.1Y; Druce's record for The Nursery, west of East Hoathly is for the same wood, Bentley Wood was named Nursery Wood on early 19th century maps; "NW part of wood, past S. of stream at about 51/506169, not very far east of public footpath.", C. A. Lister, pers. comm. to F. Rose, 1959, (EN); site searched by FitzGerald in 1987, no plants found, "very overgrown", (EN).

Wood near East Hoathly (TQ/5.1D, I, C or H?), 1896, *T. Hilton* (BM); this could be any of a number of woods in the area but may be Bentley Wood since it has confirmed records.

Bolt Wood, Chiddingly. (TQ/5.1L), 1930, *M. Abbott-Anderson* (LIV).

Waldron (TQ/5.1P?), 1835 (Arnold 1907); "This is confined to a few square miles of the county and is not common there only a few hundred plants probably", 1892, *Farr* (NMW).

Little London (TQ/5.1U), H. S. Burder (Wolley-Dod 1937).

Heathfield, woods at Stillyans (TQ/5.1Z), 1869, *Dr Hogg* (BM); Stillyans is the farm just below the wood in which the following records also occur;

\*Maynards Green (TQ/5.1Z); "Cope E. of Maynards Green", 1956 K. E. Bull (BSBI); "Plentiful in narrow bit projecting from main wood", 1957, K. E. Bull to F. Rose (EN), and "There were not so many plants as usual, perhaps a dozen to 20 scattered flowering plants", 1959, K. E. Bull to F. Rose (EN); "Both patches N of the stream (two plants and 69 plants) in tree-fall clearings, plants S (seven plants) of the stream in deep shade and more scattered", 1986, N. Stewart and R. FitzGerald (EN); Approximately 20 plants still to N of stream in main wood but Bull's patch in the copse was not found, nor those S. of the stream, 1996, B. R. Wheeler, 1996.

Maynards Green to Springdale Farm (TQ/5.1Z), 1965, *R. A. Boniface* (NMW); "This area is private gardens and coppices. Access not gained. Stream looks overgrown and dark", 1987, FitzGerald (EN).

New Sapperton Farm, Vines Cross/Maynards Green, twelve plants, (TQ/5.1Z), 1986, N. Stewart (BSBI); site not searched since, so possibly extant.

Sapperton Manor Farm, Vines Cross/Maynards Green, stream bank (TQ/5.1Z), 1968, P. C. Hall (BSBI); this area has not been searched since.

Knight's Farm / Hadlow Down, on the estate of the late Mr Day, at Hudlow (Mayfield).....near the hedge of a hop-garden (TQ/5.2), Rev. R. Price, (Branwell 1872; Arnold 1907); on Hadlow Down, nr Mayfield and Knight's Farm, Mayfield, nr Cross-in-Hand, 1826, herb. *Borrer* (K); Hadlow Down, 1824, *Rev. R. Price* (herb. *Borrer*) (BM); Knight's Farm, Mayfield, a mile from Cross-in-Hand, 1829, (Wolley-Dod 1937); Wolley-Dod says "these two are the same station, and though formerly in Mayfield Parish, it is fully four miles from that village"; "The plant was growing in the wood and lane near the field, formerly a hop-garden, last July, A. E. Branwell (Branwell 1872).

Mayfield (TQ/5.2), 1887, *Rimington* (CGE); "Between Mayfield and Broadoak", T. Atkinson, (Wolley-Dod 1937).

Heathfield, on the old iron-foundries (TQ/5.2), E. Head in Wolley-Dod's notebook, (BTN); also in Notes on herb. *Borrer*. (BTN).

Heathfield, streambanks south of (TQ/5.1/TQ/5.2) (Wolley-Dod 1937).

Heathfield Golf Links (TQ/5.2), Mrs Morton. (Wolley-Dod 1937).

Old Heathfield, corner of Mill Pond, (TQ/5.2?) no date but pre-1980 (BSBI).

Hudlow (Hadlow Down?), "I have found it in hedgerows, scattered for miles, near Hudlow" (TQ5.2), A. E. Branwell (Branwell 1872).

Framfield, Pound Lane, "both sides of lane going north from A272, perhaps 1/3 of distance from main road to fork of lane", (TQ/5.2A), 1949, B. Welch, (BSBI) – this site refers incorrectly to the A272 – the road at those co-ordinates stems from the B2102 and joins the A272 further north.

Framfield, between Pound and Bridgelands Farm (TQ/5.2A), 1974, P. B. Clarke (BSBI). Roadside verge, 1983, P. Donovan (BSBI); site searched in 1986 by FitzGerald, (EN), and in 1987 by E. J. Rich – no plants found.

\*Dower House Farm, Blackboys, woodland edge (TQ/5.2F), 1986, P. Donovan (EN); edge of ditch at woodland edge, 1996, D. Gunner.

Passingworth, Waldron Down (TQ/5.2F or K), no date, *J. Woods* (BM); "Borders of Passingworth Wood", Mrs Baines, (Wolley-Dod 1937).



- \*Tinkers Lane, Cross-in-Hand (TQ/5.2G); "literally 100's of flowers..", 1967, E. J. Ashdown (courtesy of T. G. C. Rich), 1970; steep roadside bank off lane called Tinkers Lane, 285 adult plants in 1996 – main concentration at eastern end of lane with smaller numbers spread along verge, 1996, B. R. Wheeler.
- Hole Farm, "In the middle of a wood on the Hole Farm in Buxted Parish...", (TQ/5.2G), 1835, *Bromfield (herb. Roper)* (BTN); "In Hole Wood on border of field between that and Knight's in great abundance.", 1941, *E. Forster* (BM).
- Loudwell/Little England Farm, Hadlow Down. (TQ/5.2L), – the woods are owned by Little England but often recorded under the nearby Loudwell Farm – "Stream at edge of small wood SE of Loudwell Farm.", 1974, P. C. Hall (BSBI); 50 plants counted, 1980, E. J. Rich, (BSBI); eight plants found in "overgrown disused coppice", 1986, N. Stewart and R. FitzGerald, (EN); area searched by B.R. Wheeler in 1996 but no plants found, area very dark.
- \*Loudwell/Little England Farm, Hadlow Down. (TQ/5.2L), 16 plants found, "...some daylight is needed.", 1986, N. Stewart and R. FitzGerald, (EN); 5 vegetative plants found in dark overgrown coppice on streambank at Western corner of Homegrove Wood, 1996, B. R. Wheeler.
- Mill Lane, Cross-in-Hand, roadside verge (TQ/5.2K), 1973, E. Norman (BSBI); not found in 1980 by R. Minor, (BSBI).
- \*Malls Bank, Nursery Lane, Cross-in-Hand (TQ/5.2K), 1974, P. C. Hall, (BSBI); plants on a roadside verge where the verge borders Malls Bank Farm – seven plants divided between two small areas of the verge, B. R. Wheeler. This is a reduction from 16 plants in 1980, R. Minor, and 18 in 1987, R. Fitzgerald and E. Wood, (EN).
- Selwyns Wood (TQ/5.2K), 1943, *F. Rose* (NMW).
- A lane east of Hadlow Down (TQ/5.2L or M?), (Wolley-Dod (1937) – this record could be the Knight's Farm record.
- Cross-in-Hand (TQ/5.2Q?), 1832, *W. Christy* (CGE); also 1892, *E. H. Farr* (BTN); 1924, *Wolley-Dod* (BM); these could be a number of extinct or extant sites in the Cross-in-Hand area.
- \*Brown's Lane, nr Cross-in-Hand, 51 plants, Plants on south bank of lane – not in adjoining field. (TQ/5.2Q), 1980, R. Minor (BSBI); >55 plants in 1986, (EN); only 4 plants by 1994, B. R. Wheeler; overgrown hedge which had been shading verge in recent years had been cut in 1996 – it is possible that the verge may recover.
- Tilesmore Wood (TQ/5.2Q or R), 1827, *W. Borrer* (Wolley-Dod 1937).
- Field borders east of Dunsley Wood (TQ/5.2Q or R?), 1827, *W. Borrer*, (Wolley-Dod 1937) – this is probably Dunly Wood.
- East of The Pheasantry, Heathfield. (TQ/5.2W), 1968, H. Hartwell (BSBI); site searched by FitzGerald in 1986, no plants found, (EN).
- Warbleton, in the woods at Warbleton in such abundance...(TQ/6.1), 1845, E. Jenner (Wolley-Dod 1937); only remaining Warbleton Parish sites are Rushlake Green and St Dunstan's Farm.
- \*St Dunstan's Farm, three plants in woodland edge (TQ/6.1A), 1994, J. Simes; still extant, 1996, P. Harnes.
- Between Herstmonceux and Hellingly (TQ/6.1B?), 1929, *Miss K. M. Morris* (BM) – this record could be Park Wood. Park Wood, Hellingly, woodland ride (TQ/6.1B), 1880, *F. C. S. Roper* (BTN); "Eastern ride towards Carters Corner.", 1961, D. P. Young (BSBI).
- \*Rushlake Green, single plant by path in woodland (TQ6.1J), 1990, M. MacFarlane and G. Stevens (BSBI); 4 flower spikes, 1995, J. Simes; unconfirmed for 1996, but likely to be extant, well known site.
- Warbleton Priory (TQ/6.1P) (Arnold 1907).
- "Wood near Parson's Mill" (TQ/6.2), 1835, *W. M. Borrer* (CGE) – exact location unidentified.
- Street End, Broad Oak (TQ/6.2B), *no name* (LIV). 1917, *W. Byrne* (BM); 1925, Mr Payne (BSBI).