Nature in Cambridgeshire

No 51 2009

Plate 1. Common Polypody (*Polypodium vulgare*) growing as an epiphyte in Fordham Woods (Photograph by David J. Barden). (See article on page 12)

Plate 2. Mike Majerus (right) with Helen Roy and Lionel Kellaway in Thetford Forest. (See page 102)

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Cover illustration: Sulphur Clover (*Trifolium ochroleucon*). Photograph by Kevin Walker.

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ISSN 0466-6046

Published in association with the Cambridge Natural History Society

EDITORIAL

For much of its life, Nature in Cambridgeshire has concentrated on covering Watsonian vice county 29, which is often called ‘old’ Cambridgeshire. We have occasionally published articles that involve neighbouring counties. Now that more and more people think of Cambridgeshire as being the ‘new’ administrative county, and cover that area in their studies, it makes sense to include articles covering the whole of administrative Cambridgeshire, and even vice county 31 (Huntingdonshire) alone. We may also publish the occasional article on more distant regions, if some Cambridgeshire context is included.

Costs continue to rise, and this year we reluctantly decided that we need to charge postage and packing for those who receive their copies through the post.

This issue is, I hope, as diverse as its predecessors, with articles on flowering plants (Sulphur Clover in Huntingdonshire, Mistletoe in Cambridge, Cambridge Milk-parsley and Black Poplars in Cambridgeshire), non-flowering plants (Polypodies in Cambridgeshire), vertebrates (Barn Owl diet in fenland) and invertebrates (a new pea-mussel to the county, the Great Green Bush-cricket in Cambridgeshire, click beetles in Wimple and the south west of the county, and ladybirds in Cambridgeshire and Huntingdonshire).

The last mentioned article (and one of our book reviews) sadly links to one of our obituaries. Mike Majerus, well known to many for his work on ladybirds, and especially on the introduced Harlequin Ladybird, died at the beginning of 2009. All those who knew him will miss him greatly. I only met him a few times, but still find it hard to believe that he is no longer with us.

We also have the fourth part of Hilary Belcher and Erica Swale’s Algal Flora of Cambridgeshire, reports of surveys by members of Cambridge Natural Society, the regular sections on vascular plants, bryophytes and invertebrates, and book reviews. John Kapor has again contributed weather notes.

James Cadbury’s article on Cambridge Milk-parsley is illustrated with a beautiful drawing by Lucy Hulmes, of CEH Wallingford. We are very grateful to her for her hard work and skill.

The status of *Trifolium ochroleucon* Huds. in Huntingdonshire (v.c. 31)

Kevin J. Walker and Clare E. Pinches

Abstract

Sulphur Clover (*Trifolium ochroleucon* Huds.) is a nationally scarce plant, which is locally abundant on clay soils in southeast England. In Huntingdonshire 35 populations have been recorded in a variety of grassland habitats. Since the 1960s over half (57%) have been lost to agricultural improvement of meadows and reduced management of linear strips of grassland (e.g. road verges, green lanes, woodland rides). Surviving colonies are confined to meadows and road verges where they are susceptible to eutrophication, physical disturbance and changes in management regime. The results highlight the importance of linear habitats such as roadside verges, as well as meadows, for ancient grassland species that have been lost from enclosed habitats in lowland England.

Introduction

Sulphur Clover is a nationally scarce perennial herb of ancient meadows, roadside verges, trackways and wood-borders on chalky boulder-clays or, more rarely chalk (Bourne 1964; Adams 1984; Coombe 1994). It can also colonise rough grassland on railway embankments, disused airfields and newly created road verges where populations have presumably arisen from introduced seed. In Britain it has a Continental-type distribution being restricted as a native plant to southeast England. Like Crested Cow-wheat (*Melampyrum cristatum*), with which it sometimes grows, it is relatively common in parts of Suffolk (v.cs 26 & 25) and North Essex (v.c. 19) (Jermyn 1974; Simpson 1982). It is also locally abundant on chalky boulder clays in the adjacent counties of Hertfordshire (v.c. 20), East Norfolk (v.c. 27), Cambridgeshire (v.c. 29), Bedfordshire (v.c. 30) and Huntingdonshire (v.c. 31). It is very rare in Rutland (v.c. 55), Northamptonshire (v.c. 32) and South Lincolnshire (v.c. 57). Elsewhere it occurs as a casual from imported seed.

Sulphur Clover is unable to withstand competition from coarse grasses and is therefore dependent on physical disturbance, cutting or grazing to persist in closed communities. It is probably a glacial relict that colonised chalky till left *in situ* when the East Anglian ice sheets retreated (Adams 1984). As weathering leached the till surface its distribution would have contracted to areas where soils had high concentrations of chalk or where grazing reduced competition from other species. Such ancient grasslands have declined markedly in both quality and extent due to ploughing or improvement of meadows and pastures, realignment and widening of roads and ‘manicuring’ of roadside verges (Coombe 1994). As a consequence Sulphur Clover is now listed as ‘Near Threatened’ in the new Red Data List (Cheffings & Farrell 2005). British populations occur at the absolute northern limit of their European range (Preston

2007), which extends throughout western and central Europe to Iran in the east and North Africa in the south.

In this paper we describe the distribution and habitats of Sulphur Clover in Huntingdonshire (v.c.31, now part of administrative Cambridgeshire) at the northern edge of its European range, and provide an account of its decline since the start of detailed botanical recording began in the county in the 1960s.

Method

Historical records for v.c. 31 were extracted from a variety of published and unpublished sources, including the card indexes of the BSBI vice-county recorder, plant records of the Huntingdonshire Fauna and Flora Society and Natural England Lowland Grassland Inventory. Additional records were compiled from discussions with botanists, unpublished surveys, floras and checklists (e.g. Gilbert 1965; Wells 2003). These provided localised records (to six figure grid references) for 35 site-populations (Table 1). With the exception of five sites with restricted access all were visited by the authors in 2007 (late May to early July). At each location all suitable habitats were searched, the extent of the population recorded using a GPS and the number of patches counted within 100 × 100 m grid squares. At one site (Brampton Racecourse SSSI) the population was too large to count all patches; we therefore counted the number of patches in 20 random 10 × 10 m squares and then estimated the total population for the whole area. A single 1 × 1 m quadrat was recorded at each extant site to characterise the associated species and National Vegetation Classification (NVC) communities (assigned using the computer programme Tablefit; Hill 1996). In each quadrat the percentage cover of all species was recorded. Management was recorded for extant sites and reasons for loss on sites where Sulphur Clover had disappeared.

Results

Number and size of populations

We traced 59 records for Sulphur Clover in v.c. 31 covering 40 1 × 1 km and 10 10 ×10 km squares (Fig. 1). Eight records could only be assigned to 1 km squares including seven for roadside populations around Easton in 1967 (TL1270, 1370, 1472, 1574, 1674, 1675, 1774) and a single unlocalised G.C. Druce record from Wennington Wood (TL2478). A further nine records were only attributable to 10 km squares and included old records for Alconbury (TL17), Houghton (TL27), Colne, Somersham (both TL37), Upton (TL17), Woodwalton Fen (TL28) for which there are no subsequent records. In total 42 records were attributable to 100 × 100 m squares representing 35 discrete site-populations (Table 1).

Sulphur Clover was re-located on 13 of the 30 site-populations visited in 2007 (five could not be re-visited due to restricted access). Nine of these populations, including six on protected roadside verges, held 65 plants. A further three sites held 236 plants (two road verges and a small meadow) including a meadow bank on one site that had escaped improvement. By far the largest population, Brampton Racecourse SSSI, held an estimated 10,000 flowering

patches scattered over 20 ha of ancient ridge and furrow grassland within the precincts of Huntingdon Racecourse. Here there was an average of 13 plants (± 4) per 10 × 10 m.

Table 1

Details of 35 site-populations of *Trifolium ochroleucon* in Huntingdonshire

Locality*	Grid reference	Habitat	Last record	Number in 2007	Management
(a) Extant populations (n = 13)					
Tilbrook, Bustard Hill RSV	TL085698	Roadside verge	-	31	Cut
Kimbolton Airfield	TL108696	Rough grass	-	2	No mgt
Stonely, Stocking Lane RSV	TL123695	Roadside verge	-	10	Cut
Woolley Hill RSV	TL149732	Roadside verge	-	13	Cut
East Perry, around lagoons	TL156667	Roadside verge	-	?	No mgt
Horse Close, Midloe Grange CWS	TL162648	Meadow	-	85	Grazed
Grafham Water, E of car park	TL163664	Roadside verge	-	7	Cut
Grafham Water RSV, near dam	TL171668	Roadside verge	-	120	Cut
Brampton Racecourse SSSI	TL203721	Meadow	-	10,000	Cut for hay
Woodwalton Hill RSV	TL210800	Roadside verge	-	6	Cut
Woodwalton Marsh CWS	TL212812	Meadow	-	10	Cut & raked
Great Paxton RSV	TL217653	Roadside verge	-	5	Cut
Upwood Meadows NNR	TL251827	Meadow	-	12	Grazed
(b) Not present in 2007, probably extinct (n = 17)					
Easton	TL125698	Rail embank	1968	0	Ploughed
Grafham Water, Littless Wood	TL133679	Rough grass	1974	0	Overgrown
Easton, opposite Sewell's Barn	TL135705	Meadow	1969	0	Ploughed
Grafham Water, W of carpark	TL136675	Rough grass	1972	0	Improved
Easton, NE of	TL143718	Meadow	1968	0	Improved
Sawtry, Lodge Farm	TL147836	Meadow	1971	0	Ploughed
Norman's Cross	TL161904	Roadside verge	1974	0	Destroyed
Coppingford Lane	TL170792	Green lane	1985	0	Unknown
Hotel Ride, Monks Wood	TL196806	Woodland ride	1985	0	Overgrown
Saul's Lane, Monks Wood	TL198794	Green lane	1963	0	Destroyed
Great Paxton, Bankside	TL213653	Meadow	1979	0	Unknown
Offord-Buckden Mills	TL216669	Riverbank	1979	0	Overgrown
Hardwicke, Weald Farm	TL226596	Green lane	1972	0	Overgrown
Papworth St. Agnes, N of	TL272649	Meadow	1974	0	Improved
Hardwicke Road, Hardwicke	TL283572	Meadow	1969	0	Improved
Great Gransden, Caxton	TL294571	Roadside verge	1985	0	Overgrown
Hilton, SE of	TL297661	Meadow	1980	0	Ploughed
© *Not visited in 2007 (n =5)*					
Abbots Ripton, railway cutting	TL218797	Rail embank	1972	?	No access
Staughton Moor, old airfield	TL125616	Rough grass	1973	?	No access
Great Stukeley Lodge	TL234755	Rail embank	1981	?	No access
Sapley Railway cutting, E face	TL236743	Rail embank	1978	?	No access
Bluntisham, disused railway	TL345752	Rail embank	1969	?	No access

RSV – protected roadside verge.

CWS – County Wildlife Site

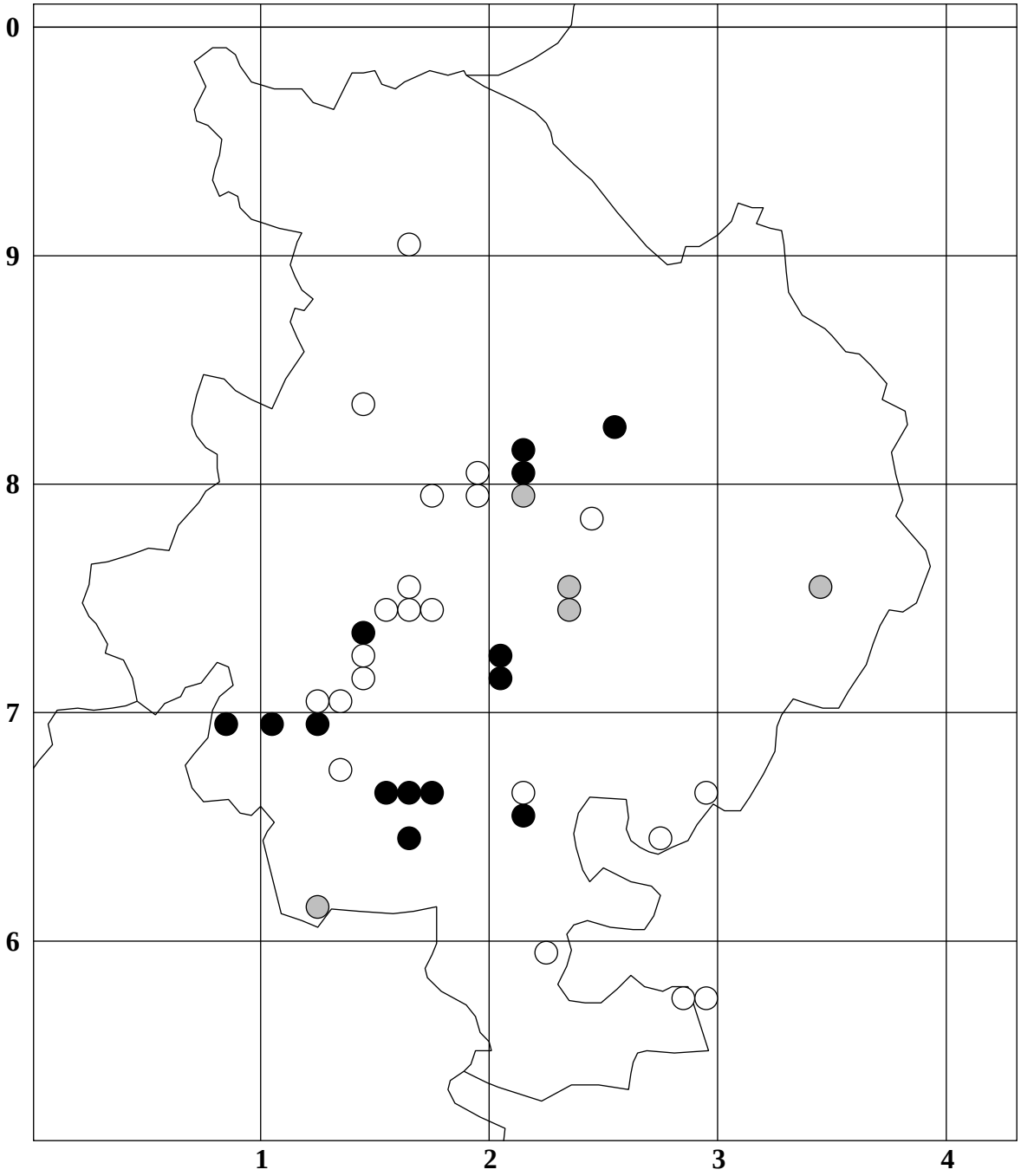

Figure 1

The 1 × 1 km distribution of *Trifolium ochroleucon* in Huntingdonshire (v.c. 31). Black dots, recorded since 2000; circles, last recorded before 2000; grey dots are monads with populations not visited in the current survey due to restricted access. All squares are within TL.

Habitats

In Huntingdonshire, as elsewhere in southeast England, the majority of populations are confined to chalky boulder clay (till) which was deposited over Oxford Clays during the penultimate (Wolstonian/Gipping) glaciation around 200,000 years ago (Wells 2003). This glacial drift has a high content of chalk, flints, quartzite pebbles, limestone and ironstone fragments which have been

weathered differentially to produce soils with a range of pH from strongly calcareous to mildly acidic. It is often well-structured and slowly permeable, although it becomes waterlogged in the winter but completely dries out in the summer. On these soils Sulphur Clover tends to occur in species-rich meadow and roadside grassland (Table 2), with smaller numbers in linear strips of grassland (e.g. railway banks, green lanes) and rough, unmanaged grassland. In Huntingdonshire single populations have also been recorded from riverbanks and species-rich woodland rides, but no plants were found in either of these habitats in 2007.

Table 2

The habitats of *Trifolium ochroleucon* in Huntingdonshire

Habitat	Total	Extant	Lost	% lost	Not visited
Meadow (grazed and/or cut)	11	4	7	64	0
Roadside verge (cut)	10	8	2	20	0
Railway embankment (inc. disused)	5	0	1	100	4
Rough grassland (unmanaged)	4	1	2	67	1
Green lane	3	0	3	100	0
Riverbank	1	0	1	100	0
Woodland ride	1	0	1	100	0
Total	35	13	17	57	5

All the Huntingdonshire sites support relatively short, species-rich grassland conforming to a range of NVC grassland types (Rodwell 1992; Table 3): the vegetation on road verges is relatively uniform either supporting short, species-rich *Centaurea nigra* sub-community of *Arrhenatherum elatius* mesotrophic grassland (MG1e) or, where the soils are more chalky *Helictotrichon* [*Avenula*] *pratensis-Thymus polytrichus* [*praecox*] and *Holcus lanatus* sub-communities of *Brachypodium pinnatum* calcareous grassland (CG4a/c).

Table 3

The National Vegetation Classification communities in which *Trifolium ochroleucon* occurs in Huntingdonshire

NVC type		Verge	Meadow
MG1e	*Arrhenatherum elatius* mesotrophic grassland	4	0
MG5b	*Centaurea nigra – Cynosurus cristatus* grassland	0	1
MG6a	*Cynosurus cristatus – Lolium perenne* grassland	0	1
CG4a/c	*Brachypodium pinnatum* calcareous grassland	3	0
CG6b	*Helictotrichon pubescens* calcareous grassland	0	2
U1f	*Festuca ovina-Agrostis capillaris-Rumex acetosella* acid grassland	0	2
W24b	*Rubus fruticosus* agg. -	0	1

In contrast, meadow habitats are more diverse. These range from mesotrophic *Cynosurus cristatus* grassland (MG5-6), *Helictotrichon* [*Avenula*] *pubescens* calcareous grassland (CG6) and the *Hypochaeris radicata* sub-community of the *Festuca ovina-Agrostis capillaris-Rumex acetosella* acid grassland (U1f). The variation within meadow communities presumably reflects the differential leaching, disturbance and moisture regimes that occur over very small distances on the ridges, furrows and banks.

In these habitats Sulphur Clover usually grows with *Achillea millefolium, Centaurea nigra, Dactylis glomerata* and *Festuca rubra* (Table 4). Associates more characteristic of road verges include *Arrhenatherum elatius, Brachypodium pinnatum, Carex flacca, Heracleum sphondylium, Lathyrus pratensis, Medicago lupulina, Plantago lanceolata* and *Potentilla reptans* whereas those more frequent in meadows include *Briza media, Cynosurus cristatus, Galium verum, Holcus lanatus, Lolium perenne, Primula veris, Sanguisorba minor* and *Trisetum flavescens.* The roadside verge grassland is usually less than 15 cm high and relatively species-rich (24 ± 2 species m^{-2}; range 17-36) whereas meadow grassland tends to be slightly shorter and more species-rich (27 ± 3 species m^{-2}).

Management

With the exception of three sites, all grasslands receive some form of protection and are managed to maintain a species-rich sward. Six populations occur on protected roadside verges that are mown twice a year, usually in late July after *Trifolium ochroleucon* has set seed and again in September-October. Two populations occur on County Wildlife Sites, one of which is cut and raked in the summer to prevent coarse grasses from becoming rank (Woodwalton Marsh). The other meadow shows signs of past improvement, although Sulphur Clover is confined to low banks that have obviously escaped the worst of these activities. The site is now grazed intermittently throughout the year but under regime that is favourable for meadow species (D. Felce, pers comm.). Two other meadows receive statutory protection: one is grazed by cattle in the summer and autumn months (Upwood Meadows NNR) and the other is cut for hay in July but not aftermath grazed (Brampton Racecourse SSSI). Both are in favourable condition and populations at both sites appear to be thriving. Two populations occur on sites that receive no management (Kimbolton Airfield, East Perry) although the grassland is kept relatively open by rabbits. Although not visited in 2007 populations on railway embankments receive no direct management, though in the past the scrub would have been controlled by fires. These now only occur infrequently although some sections are kept open by rabbits.

Change in distribution since the 1960s

Of the 30 populations visited in 2007, Sulphur Clover could not be relocated on 17 sites, representing a 57% decline over the last 40 years. This is a conservative estimate as at least seven further populations for which there were no detailed records have been lost from roadsides around Easton (B.N.K. Davis, pers comm.). The most common reason for these losses was sites becoming

overgrown or partially shaded, presumably because of the decline in the cutting of linear strips of grassland over recent decades (riverbanks, woodland rides, green lanes, roadside verges) (Table 4). Eight meadows or areas of rough grassland had been converted to arable or improved. Some of the latter were clearly reverting to moderately species-rich grassland but lacked ancient grassland species such as Sulphur Clover. Two populations had been destroyed by road and track improvements and at two sites the habitat still appeared suitable but no plants could be found, presumably because plants failed to flower in 2007.

Table 4

Species associated with *Trifolium ochroleucon* (in >40% of quadrats) in roadside verges (n = 6) and meadows (n = 7) in Huntingdonshire. A further 67 species were recorded in < 40% of quadrats

	Road verge	Meadow	% frequency
(a) Species constant in both roadside verges and meadows			
Achillea millefolium	**V**	**V**	85
Centaurea nigra	**V**	**IV**	85
Dactylis glomerata	**V**	**IV**	85
Festuca rubra	**V**	**IV**	85
(b) Species more abundant on roadside verges			
Plantago lanceolata	**V**	III	69
Carex flacca	**V**	III	62
Potentilla reptans	**V**	I	54
Arrhenatherum elatius	**IV**	III	54
Lathyrus pratensis	**IV**	III	54
Brachypodium pinnatum	**IV**	II	46
Heracleum sphondylium	**IV**	II	46
Medicago lupulina	**IV**	II	46
(c) Species more abundant in meadows			
Briza media	I	**V**	54
Cynosurus cristatus	I	**V**	54
Trisetum flavescens	III	**IV**	62
Galium verum	II	**IV**	54
Lolium perenne	II	**IV**	54
Holcus lanatus	I	**IV**	46
Primula veris	I	**IV**	46
Sanguisorba minor	I	**IV**	46
(d) Species relatively common in both habitats			
Lotus corniculatus	III	III	54
Festuca pratensis	III	III	46
Trifolium pratense	III	III	46
Helictotrichon pubescens	II	III	46

Therefore in Huntingdonshire the greatest losses of Sulphur Clover have been from meadows (64% decline since the 1960), green lanes, riverbanks and woodland rides (Table 5).

Table 5

Reasons for the loss of *Trifolium ochroleucon* populations in Huntingdonshire

Reason for loss	Number	%
1. Overgrown/shaded	5	29
2. Ploughed, now arable	4	24
3. Improved, now species-poor grassland	4	24
4. Destroyed by track improvements	2	12
5. Unknown, habitat still suitable	2	12

In contrast, populations on road verges have only declined by 20%. One can only presume that those on railway cuttings have suffered similarly losses due to lack of management, although this requires further investigation.

Discussion

The decline of Sulphur Clover in Huntingdonshire is likely to be representative of many ancient grassland species associated with low fertility soils in lowland England. With the exception of nature reserves, species such as Sulphur Clover and *Orchis morio* have virtually disappeared from agricultural habitats, and now only survive in scattered remnants of grassland (Stroh 2007). Although many meadows support large populations of these species, their widespread decline means that linear strips of grassland, such as road verges, railways, woodland rides and green lanes, have become much more important as refuges in areas where land use pressure is greatest.

The reason for this is clearly shown in Figure 2. The wholesale conversion of grassland to arable began after the Second World War and continued into the mid-1980s by which time the majority of species-rich grassland had disappeared. Today Sulphur Clover is therefore almost exclusively confined to protected roadside verges and meadows under sympathetic cutting or grazing management. However, roadside verges are extremely small and therefore susceptible to eutrophication from fertiliser drift and rainwash, physical disturbance from road traffic and road workings and the installation of cabling and pipes as well as changes to frequency and severity of mowing regimes. In North Essex, where the species is probably most abundant, the frequent mowing and scuffing of road verges served to reduce competition from other plants unable to colonise the raw mineral soils (Adams 1984). However, in recent years many populations have been destroyed by the dumping of surplus topsoil and decayed road metal.

The four extant meadow populations in Huntingdonshire are probably more secure: numbers of plants appear to be increasing on one site, where there are thousands of plants, and there are apparently stable, albeit much smaller

populations, on the other three. Although not visited during the current survey populations on railway embankments may be in decline due to scrub encroachment and spread of *Brachypodium pinnatum*.

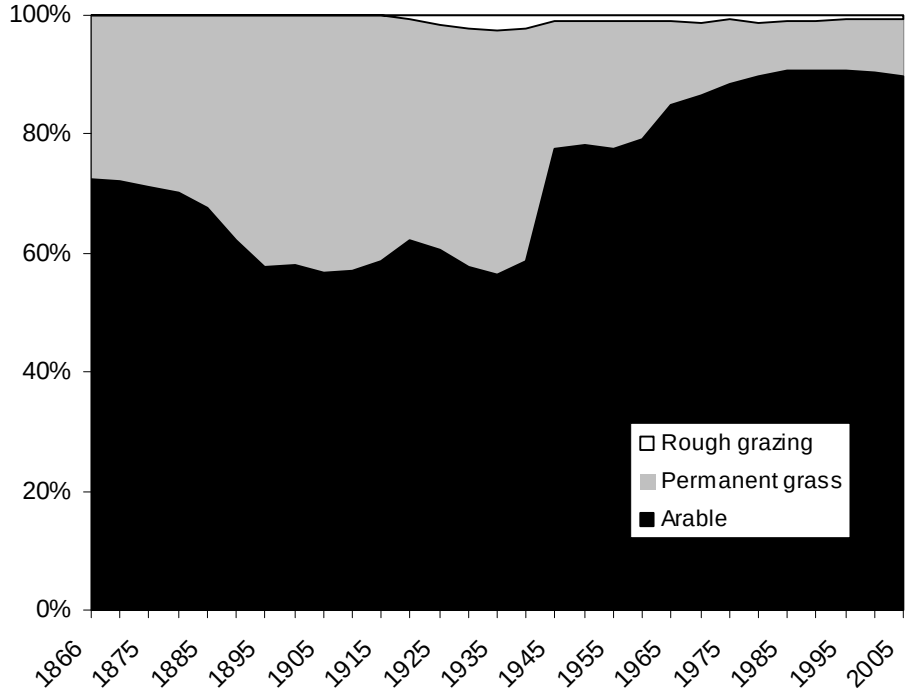

Figure 2
Changes in the proportion of land used for arable (including temporary grass), permanent grassland and rough grazing in Huntingdonshire and the Soke of Peterborough since 1860. Rough grazing was not recorded before 1895.

These results highlight the vital importance of surviving ancient meadows as well as linear fragments of grassland for ancient grassland species that have disappeared from many intensively managed areas of lowland England.

Acknowledgments

We would like to thank Terry Wells, Louise Bacon, Brian Davis, Lynne Farrell and Peter Stroh for providing help and assistance with tracing records and to David Felce for allowing us access to Midloe Grange Farm. Figure 1 was plotted using DMap for Windows (v. 7.2f) supplied by Alan Morton.

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Are *Polypodium interjectum* and *P. vulgare* increasing in Cambridgeshire (v.c. 29)?

David J. Barden and C. D. Preston

Introduction

In 2000, Chris Preston reported on the records of the two species of polypody native to vice-county 29, the tetraploid *Polypodium vulgare* and the hexaploid *P. interjectum* (Preston, 2000). In that study, all the existing herbarium material and specimens from some extant sites were examined, and the majority found to be *P. interjectum*. However, a number of older sites for the aggregate remained to be traced, and in addition, a substantial number of new sites have come to light since 2000. The purpose of this article is to report the findings of these investigations, and to describe the ecology of the two species in the vice-county in the light of the newly available records.

Records of *Polypodium* in v.c. 29

The list of records below supplements that in Preston (2000), and follows the same layout, records being listed under the appropriate 10-km square (in bold). All specimens were determined by C.D.P.

***Polypodium interjectum* Shivas** (*P. vulgare* subsp. *prionoides* (Asch.) Rothm.)
25 Ash-stump, Gamlingay Wood, TL238532, S. Hartley, 2007; wall by road north-east of church, Little Gransden, TL271552, D.J.B., 28.4.2007.

38 Top of wall, Station Rd, Chatteris, TL391859, A.C. Leslie, 29.12.2007 (specimen collected by D.J.B., 29.11.2008).
45 Wall, Lower Park St., Cambridge, TL449589, D.J.B., 17.3.2007; wall, Park Parade, Cambridge, TL449589, D.J.B., 2.11.2008 (vegetative but growing <20cm away from a large planted colony of fertile *P. interjectum*, and thus very likely this species); wooden walkway by River Cam, Cambridge, TL448591, D.J.B., 17.2.2007; roof of building opposite The Old Vicarage, Great Shelford, TL459.518, C.D.P., 5.8.2001 (specimen collected by D.J.B., 30.6.2007); wall of The Grange, Great Shelford, TL459518, D.J.B., 17.3.2007 (vegetative but growing close to the large rooftop colony of *P. interjectum*, and thus very likely this species); wall of mill-race, Hauxton Mill, TL432526, D.J.B., 17.3.2007.
46 Roof of house opposite primary school, Waterbeach, TL495657, A.C. Leslie, 31.3.2002 (specimen collected by D.J.B., 10.2.2008).
47 Roof, High St., Willingham, TL403704, D.J.B., 31.5.2007 (specimen collected by A.C. Leslie, 21.6.2007).
49 Wall, Doddington church, TL400905, R.M. Payne, 3.2002 (specimen collected by A.C. Leslie, 15.4.2002), *cf.* Payne (2005); wall down line of drainpipe, 89 High St., March, TL416963, D.J.B., 14.2.2009.
54 Wall of Hildersham church, TL545488, A.C. Leslie and J.L. Sharman, 17.2.2002 (first recorded here by J. Rishbeth, 1946; specimen collected by D.J.B., 7.10.2007); wall by River Granta, Linton, TL560.468, D.J.B., 20.5.2007; wall of outbuilding, Catley Park, TL540449, D.J.B., 24.1.2009.
57 Wall and roof, Barton Square, Ely, TL540799, R.M. Payne, 2000 (specimen collected by R.M. Payne, 19.4.2002), *cf.* Payne (2002, 2005).
58 Wall, Church Way, Little Downham, TL527841, A.C. Leslie, 7.8.2005 (specimen collected by D.J.B., 17.1.2009).
65 Wall c. 100m W of B1061 crossroads, Station Rd, Dullingham, TL629578, A.C. Leslie, 27.10.2007 (specimen collected by D.J.B., 29.3.2008); wall of bridge to no. 63, Station Rd, Dullingham, TL624581, A.C. Leslie, 1978 (specimen collected by D.J.B., 12.5.2007); wall c. 100m NW of bridge to no. 63, Station Rd, Dullingham, TL624581, A.C. Leslie, 5.4.2003 (specimen collected by D.J.B., 10.1.2009).
40 Wall, Alexandra Rd, Wisbech, [TF461094], G.M.S. Easy, 12.1.2001 (specimen collected by R.M. Payne, 30.12.2002), *cf.* Payne (2005).

***Polypodium vulgare* L.**
36 Roof and coping, Longstanton All Saints church, TL399664, D.J.B., 13.7.2008 (specimen collected by D.J.B., 6.12.2008).
45 Crevice between wall and roof, St John's College Chapel, TL447587, L.A. Spence, 17.12.2008.
48 Wall, Holly House Farm, Horseway, TL427872, D.J.B. (CFG excursion), 21.7.2007.
49 Wall, corner of West Rd and Rookswood Rd, March, TL414968, R.M. Payne, 9.2002.
67 Fallen *Salix fragilis*, Fordham Woods, TL63137005, A.C. Leslie (CFG excursion), 16.8.2008 (specimen collected by A.C. Leslie, 31.1.2009).
41 Brick wall, ruined school, Tydd St Giles, TF426164, R.M. Payne, 6.2002.

***Polypodium* localities that have come to light since 2000 but where the species remains undetermined** (*the reason for this is given in italics*)
34 Roof, Gaillard's Lane, Royston, TL355408, D.J.B., 30.9.2007 (*inaccessible*).
35 Roof, Great Eversden church, TL366533, A.C. Leslie, 28.12.2008 (*inaccessible*).
45 Wall, alleyway at back of The Maypole, Cambridge, TL449589, D.J.B., 2.11.2008 (*vegetative*); wall, Downing Place, Cambridge, TL452581, A.C. Leslie, 16.8.2007 (*inaccessible*); top of wall-pillar under drainpipe, Cambridge railway station car-park, TL462573, D.J.B., 22.7.2007 (*inaccessible*); wall on SW side of Bridge St., TL448587,

D.J.B., 11.8.2007 (*destroyed during renovation works, winter 2007–8*); wall, 40 Milton Rd, TL453596, A.C. Leslie, 13.9.2001 (*none seen, 17.3.2007, D.J.B.*).
49 Wall behind Salvation Army building, March, TL416963, A.C. Leslie, 16.8.2001 (*inaccessible; none seen, 14.2.2009, D.J.B.*).
55 Wooden footbridge, Little Wilbraham, TL545582, I. Webb, c. 1996 (communicated to D.J.B., 2008) (*not visited*).
58 Hawthorn branch overhanging water below Ely Common, TL553808, C.D.P., 29.12.2003 (*vegetative; none seen, 17.1.2009, D.J.B.*).
64 Wall opposite West Wickham church, TL612491, A.C. Leslie and J.L. Sharman, 2.1.2006 (*vegetative; none seen, 16.12.2007, D.J.B.*).
65 Front portico, Dullingham House, TL626580, A.C. Leslie, 28.5.2008 (*vegetative*).
66 Wall down line of drainpipe, Old Police Station, Lisburn Rd, Newmarket, TL647633, D.J.B., 14.9.2008 (*inaccessible*); wall of Machell Place, All Saints Rd, Newmarket, TL649633, D.J.B., 10.1.2009 (*inaccessible*).
41 Wall, Tydd St Giles church, [TF427164], R.M. Payne, 6.2002 (*not visited*).

Discussion

The distribution and frequency of the two species

As many of the accessible sites for *Polypodium* as possible have now been examined microscopically, with the result that at the time of writing (February 2009) we have 27 extant sites for *P. interjectum* and 6 for *P. vulgare*, 9 colonies remaining undetermined. Looking at *all* the available data, 83 sites have been recorded for *Polypodium* in the vice-county, 34 having been confirmed as *P. interjectum* and 8 as *P. vulgare* (for a distribution map see Figure 1). This supports the statement that *P. vulgare* is "rarer than *P. interjectum* in S.E. England" (Preston *et al.*, 2002). None of the specimens examined have proved to be the hybrid between *P. vulgare* and *P. interjectum*, but the possibility of a hybrid arising naturally should not be discounted, especially as fertile plants of the two species grow within 400m of each other in Cambridge city. The variants and hybrids available horticulturally have the potential to complicate matters, but we have not yet seen any of these in the wild, even as throw-outs.

It is difficult to compare the situation in Cambridgeshire with that in adjacent areas, as critical assessments of the distribution of the two species are not available for most of the neighbouring counties. Polypodies are scarce in the counties to the south and west, Bedfordshire, Hertfordshire, Huntingdonshire and northern Northamptonshire (Dony, 1976; Gent, Wilson *et al.*, 1995; Wells, 2003; C.R. Boon & T.J. James, *in litt.*). In Norfolk polypodies are rare in the west but remarkably frequent further east, and are recorded from almost all tetrads in the north-east of the county. The rather provisional account in the Norfolk Flora (Beckett *et al.*, 1999) suggests that *P. interjectum* is much the commoner species, growing on walls and hedgebanks; this would seem to be the conspicuous plant of walls in the coastal villages. *P. vulgare* is recorded from acidic shady banks, sand dunes and only occasionally on walls. The hybrid is sometimes present as extensive colonies, and may be more abundant at some sites than either parent.

Analysis of the data for the populations in v.c. 29 recorded from 2000 onwards (available in 46 out of 49 cases) shows that, of these sites, single plants and small colonies both comprise about 45%, large colonies (with more than

about 40 fronds) accounting for the remaining 10%. One-sixth of these populations were vegetative, and these were mostly of single plants, as would be expected. There is no obvious pattern in the habitats of the largest populations – on old walls at Gamlingay and Doddington, on mossy roofs at Great Shelford and Waterbeach, and on the walls of a mill-race at Hauxton.

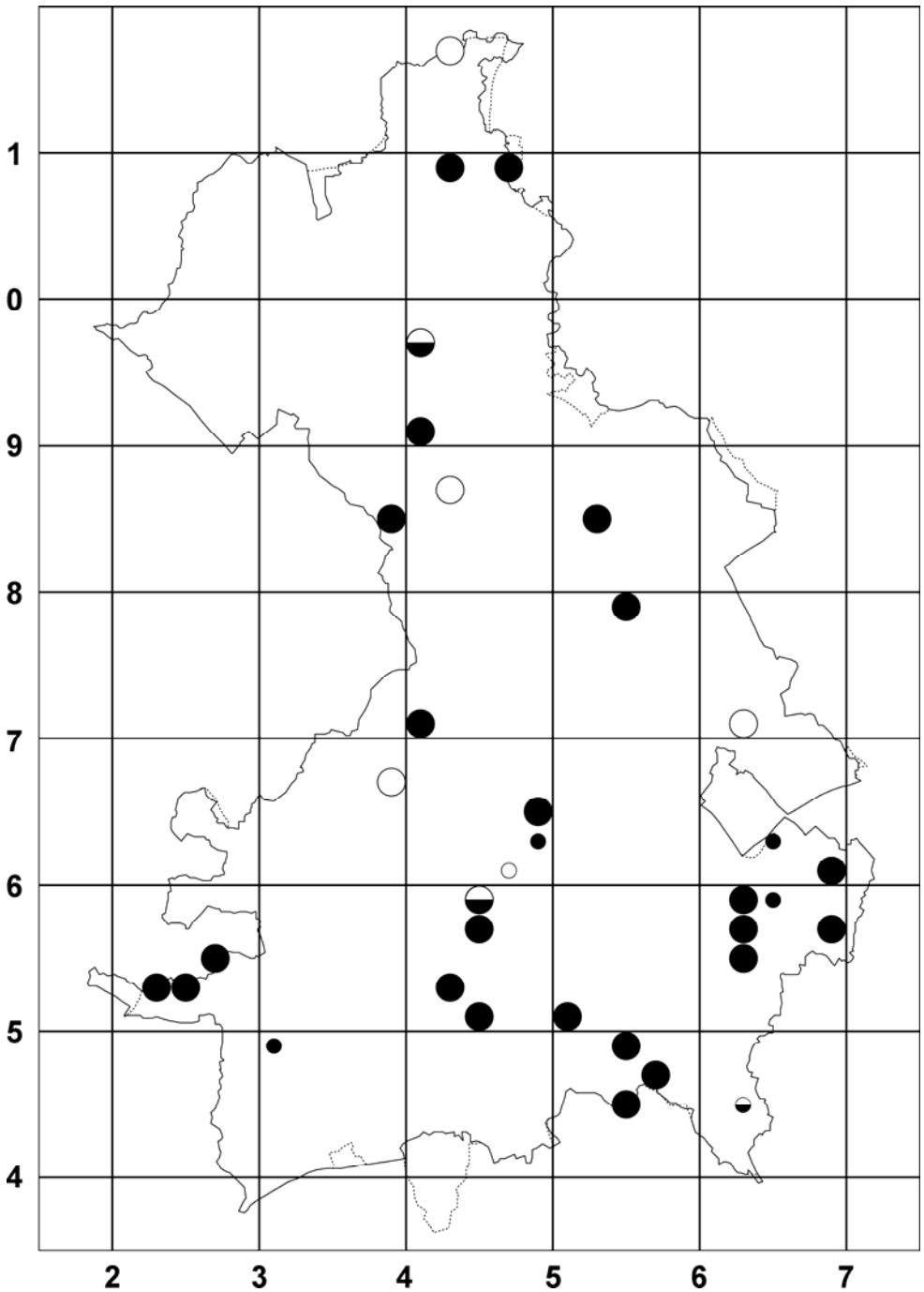

Figure 1. Distribution of records of *Polypodium* in v.c. 29 determined to species, plotted in tetrads. Small symbols: before 2000; large symbols: 2000 onwards. Filled symbols: *P. interjectum*; unfilled symbols: *P. vulgare*. The small and large half-filled circles indicate the tetrads in which both species were found before 2000 and from 2000 onwards, respectively. In the absence of precise localities, the positions of the symbols for the Woodditton and Shudy Camps records (65P and 64H) are best-guesses.

Habitat preferences

Taking all sites recorded from 2000 onwards, mortared walls held 38 colonies, with mossy (usually north-facing) roofs providing 7, and wood (living or dead) holding only 4. This latter figure is in contrast to the western parts of Britain, where polypody can be abundant on boughs in damp shady woods, a habitat that is rare in Cambridgeshire. However, unlike several other Cambridgeshire ferns, polypodies do not seem to favour damp areas of walls such as those near drainpipes or leaking gutters. Across Britain, *P. vulgare* has a preference for more acidic habitats than those in which *P. interjectum* grows. Although this preference is borne out by the larger number of colonies of *P. interjectum* in Cambridgeshire, an area where there are few acidic habitats, it does not seem to be apparent when the habitats of individual *P. vulgare* colonies are examined. It is not clear whether the the lack of any modern records of *P. vulgare* from the south of the county (Figure 1) is significant. However, only at one of the six extant sites (Fordham Woods) are *P. vulgare* plants *not* associated with a mortared substrate, although at Longstanton All Saints plants are growing both on the coping of the church and on the adjacent mossy roof. It may well be that the habitat preferences of the two species are expressed when they are in competition in areas where one or both are frequent, but not when populations arise from long-distance spore dispersal in areas where polypodies are rare.

The two epiphytic sites are worthy of note, as until 2003 polypody had not been seen in this habitat in the vice-county since the early 1890s, when it was noted growing on pollard willows by the River Cam north of Fen Ditton (Willis & Burkill, 1893). The *P. vulgare* at Fordham Woods was growing on the horizontal mossy trunk of a fallen but still living crack-willow (see Plate 1, inside front cover), and below Ely Common a vegetative (and hence undetermined) plant was found on a mossy hawthorn bough overhanging the water. Both sites were shady and distinctly damp. In addition to these sites, we have three recent records of polypody growing on *dead* wood – on a rotting ash-stump in Gamlingay Wood, on the mossy boardwalk running alongside the River Cam near Quayside, and on a wooden bridge near Little Wilbraham.

Lack of continuity of colonies

Although they are native species, *P. interjectum* and *P. vulgare* lack any long-established localities in Cambridgeshire, this lack of continuity being reflected in Figure 2. Historically there was only one colony which appears to have lasted more than a few decades, that at Garret Hostel Lane, Cambridge, which was recorded by Ray in 1660 and survived until the wall was rebuilt in 1949. The oldest extant site (Hildersham church) was first reported in 1946, although it is possible that the unlocalised record from a wall at Dullingham by C.E. Moss, made at some point before 1918, could refer to one of the current populations. This lack of persistence is clearly a result of their reliance on man-made substrates, and the fact that sooner or later a wall is likely to be rebuilt or repointed, or a mossy roof cleaned or retiled, with the loss of any associated ferns. The visibility of a good colony of polypody (compared to the diminutive

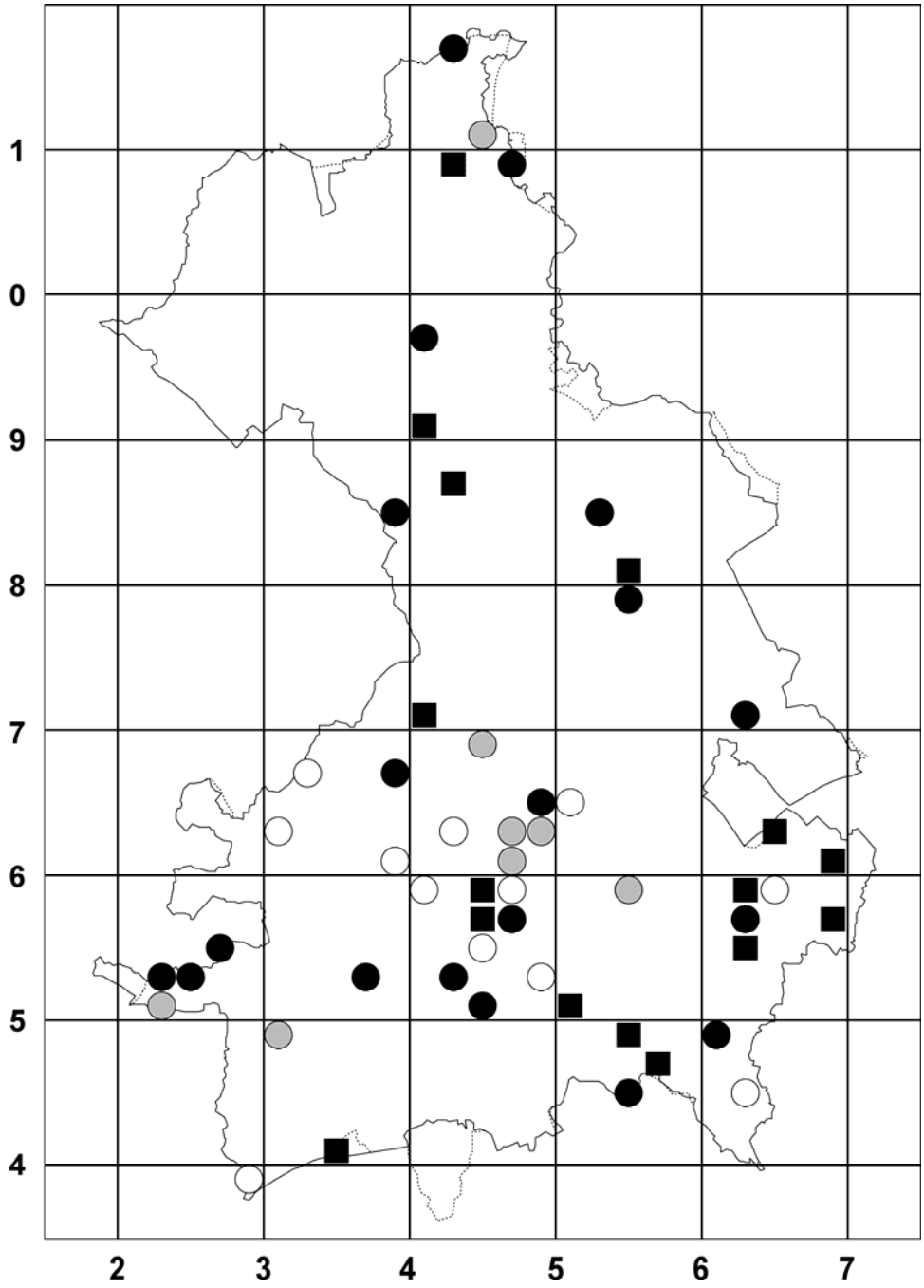

Figure 2. Distribution of all *Polypodium* records in v.c. 29. White circles: before 1950; grey circles: 1950–1999; black circles: 2000 onwards. Squares indicate tetrads for which there are records both before 2000 and from 2000 onwards. In the absence of precise localities, the positions of the symbols for some of the older records are best-guesses.

stature of most wall- or roof-dwelling ferns) may make this more likely. However, certain sites have escaped such treatment, and it is pleasing that of the 17 polypody sites reported in the 40 years after 1946, eight still remain. Of these, five are on churches or their boundary walls, underlining the importance of ecclesiastical sites noted by Walters (1969). It is also noteworthy that three-quarters of the extant sites for *Polypodium* have been found since 2000,

suggesting that environmental factors may currently be favouring fern reproduction.

It was noted above that several colonies of polypody remain undetermined due to being out of reach on a wall or roof. However, one should not concede defeat too easily in these circumstances – at Great Shelford and Longstanton fertile fronds were found lying on the ground below the high roofs on which the plants were growing! Polypodies are unusual amongst ferns in having petioles which articulate at the connection to the rootstock, allowing them to fall off at the end of their life (Step, 1908). This might well be what happened at these two sites, although at Longstanton one frond was still attached to its rootstock, suggesting that it had been dislodged by birds poking about in the moss.

Are polypodies increasing in the county?

From the number of polypody records received in the last 10 years or so, it seems that the aggregate as a whole (and *P. vulgare* in particular) is commoner in the vice-county than had been thought – 42 sites are extant at the time of writing, many more than have ever been known at one time. The large proportion of colonies with single plants suggests that polypodies are currently colonising new sites in the county. This increase does not seem to be a very recent phenomenon, the increase in *Polypodium* records having first been noted by Crompton and Whitehouse (1983). Interestingly, this was rather earlier than the marked spread of epiphytic bryophytes which has been chronicled in this journal since the mid-1980s, and which is generally attributed to a reduction in air pollution. There is also strong evidence for a moderate increase of *Polypodium* in Hertfordshire (T.J. James, *in litt.*) and the increase nationally of another fern of walls, *Phyllitis scolopendrium* (Braithwaite *et al.*, 2006).

It might be argued that *P. interjectum* and *P. vulgare* have always been present as small, rather transient colonies and that an increase in recording effort is solely responsible for the apparent increase in records in recent years. However, there is no reason to suspect that recording now is any more intensive then it was when records were being collected for the 1964 Flora, for the projected tetrad Flora launched in the 1970s, or for the *New Atlas* and Cambridgeshire parish Floras in the 1980s and 1990s. Instead, likely factors are the increased availability of brickwork of sufficient age, cleaner air favouring development of prothalli, milder winters and perhaps a couple of wet summers. Introduced plants could also be acting as sources of spores – several plants have recently appeared on brickwork and mossy wood within a couple of hundred metres of a sizeable planted border of *P. interjectum* on Park Parade, something that is unlikely to be a coincidence.

The rewards of roof-top botany

It was previously suggested (Preston, 2000) that tracking down sites for polypody might throw up additional sites for other ferns, and this has indeed been the case. However, close inspection of the sort of sites favoured by *Polypodium* has also provided an unexpected result – the discovery of two new sites for *Minuartia hybrida* (Fine-leaved Sandwort), a rare annual usually found

on well-drained calcareous substrates. At Dullingham, over 100 plants were found growing close to *P. interjectum* on a crumbling roadside wall, and at Willingham it was seen growing in large quantity on a mossy roof, again with *P. interjectum* (Leslie, 2008). Similarly, a mossy roof at Royston on which Alan Leslie found *M. hybrida* in abundance in 2001 (Crompton and Preston, 2002) was later found to be home to a few plants of polypody, but here the site is too high to enable a specimen to be easily procured for determination. Interestingly, no sources we have found mention mossy roofs as being a habitat for *M. hybrida*, although it seems to be quite at home in these localities. Given the inherent challenges of roof-top botanising, it is quite possible that more sites for both *Minuartia hybrida* and *Polypodium* might await discovery in Cambridgeshire!

Acknowledgments

We would like to thank all those mentioned in the records above – especially Alan Leslie and Ron Payne – for reporting new sites, procuring specimens for determination, and responding to enquiries. Trevor James kindly sent us the draft account of *Polypodium* from his forthcoming *Flora of Hertfordshire* and Chris Boon updated us on the position in Bedfordshire. We would also like to acknowledge the invaluable work of Gigi Crompton in compiling the *Cambridgeshire Flora Records since 1538*, which provided virtually all the historical data used in this article (www.cambridgeshireflora.com/index2.html). The maps were plotted using the DMAP software written by Dr A.J. Morton.

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Cambridgeshire and Huntingdonshire ladybirds

Robert Frost and Peter M.J. Brown

We dedicate this paper to our mentor, Professor Mike Majerus. What we know about ladybirds, we learnt from Mike. Mike very sadly passed away in January 2009.

Introduction

The idea of carrying out a study of the distribution of ladybirds in the old counties of Huntingdon and Cambridge emerged with the arrival of the Harlequin ladybird (*Harmonia axyridis*) to England in 2004. This species originates from Asia and was introduced in North America and Europe to control pest insects in greenhouses and field crops. Unfortunately it is a generalist species that was quickly able to establish in countryside and urban areas. Michael Majerus from Cambridge University realised that the Harlequin could cause significant problems in this country, and wanted to monitor its effects on native ladybird species and other insects. It was also a unique opportunity to follow the spread of an invasive species from the year of arrival. Therefore, members of the general public were encouraged to send records of their sightings of the Harlequin to the Biological Records Centre (BRC) at Monks Wood. Simultaneously, entomologists and wildlife enthusiasts throughout the country were asked to monitor the occurrence and abundance of the native ladybird species.

In the year 2000 the Surrey Wildlife Trust published a superb local atlas of ladybirds (Hawkins, 2000). A few ladybird enthusiasts in the Cambridge area thought that there was a good opportunity to produce a similar atlas of the ladybirds of our area, i.e. the Watsonian vice counties of Huntingdon (VC31) and Cambridge (VC29), and to make comparisons with records from the past (Brown *et al.*, 2006). The book by Roger Hawkins was used as a model on which to base our atlas.

Britain has 46 species in the ladybird (Coccinellidae) family, including 20 small and inconspicuous species. The plan is to map all 31 species recorded in our vice counties at tetrad (2 km square) resolution. Our target is to record 10 or more ladybird species per tetrad.

A total of 965 tetrads make up the two vice counties. A good proportion of VC31, the old county of Huntingdon, has been completed (Figure 1), but there is much still to be done in VC29, Cambridge. The Surrey atlas was carried out over a 20 year period, with over 500 tetrads to be visited. Our project is planned

to take less time, but that may be a goal too far. The records shown were made during the first five years of this project.

Methods

Ladybirds occur in most terrestrial habitats, particularly grassland, hedgerows, deciduous and coniferous woodland, and river, pond and lake edges (Majerus and Kearns, 1989). Searching for ladybirds solely by eye tends not to be rewarding, but with a couple of simple tools one can find much more. To look for ladybirds among the foliage of bushes and trees it is best to use a beating tray. This folds down when not in use and opens up like a fan into the form of a tray, for operation. The tray is placed close to the bush or under the branch of the tree and when the bush or branch is struck briskly with a stick, any ladybirds present should be dislodged and fall onto the tray. In low vegetation such as grassland, marshy areas and roadside verges, the sweep net is best. Somewhat like a butterfly net in appearance, the sweep net is swept from side to side as one walks through the vegetation. With practice the net can be swept to within a short distance of the ground. An alternative to these tools is an old umbrella, ideally of a light colour so that insects show up clearly against the material. The umbrella is an effective substitute for a beating tray, and can also be used in low vegetation in place of a sweep net, by tapping the vegetation towards the umbrella.

Most of our records were gathered from areas adjacent to public roads, public paths and bridleways, accessible woodland, gravel pits and accessible waterways.

Results

A total of 395 tetrads within the two vice counties have one or more species of ladybird recorded (Figure 1). The Seven-spot Ladybird has been recorded in the highest number of tetrads (293), followed by the Two-spot, Fourteen-spot and Harlequin (Table 1).

Table 1 – Number of tetrads in VC29 and VC31 with records of ladybird species

No. tetrads	Species name (exact no. tetrads with records)
200 and over	Seven-spot (293), Two-spot (225)
150 to 199	Fourteen-spot (195), Harlequin (176), Ten-spot (161), Twenty four-spot (151)
100 to 149	Twenty two-spot (132), Sixteen-spot (110)
50 to 99	Pine (93), Orange (90), *Rhyzobius litura* (75), Cream-spot (66)
25 to 49	Kidney-spot (41), Cream-streaked (33)
10 to 24	Water (19), Adonis' (18), *Coccidula rufa* (15), Eleven-spot (12), Eyed (11), *Scymnus suturalis* (10), Eighteen-spot (10)
1 to 9	Larch (8), *Stethorus punctillum* (4), *Scymnus frontalis* (4), *Scymnus auritus* (3), *Coccidula scutellata* (3), *Nephus quadrimaculatus* (2), *Rhyzobius chrysomeloides* (1)

The Ladybird Species Recorded

Epilachninae

In Britain there are two species of ladybird in this sub-family. Both are herbivorous, but only one occurs in VC29 or VC31; the Bryony Ladybird (*Henosepilachna argus*) is restricted to Surrey.

Twenty four-spot Ladybird (*Subcoccinella vigintiquattuorpunctata*)

Not an uncommon species in grassland habitats and often found in long grasses of roadside verges. It is quite widespread in the vice counties and most tetrads are expected to have a record of this species.

Coccinellinae

This sub-family contains the majority of our ladybirds. Few British species are rare, but some are local due to specific habitat requirements. Such ladybirds may generally be uncommon, but where they do occur, can often be abundant.

Thirteen-spot Ladybird (*Hippodamia tredecimpunctata*)

This is a species which was thought to be extinct in Britain, but it occasionally arrives from Europe, where it is more common, and establishes for a while before dying out again. There are a few recent records from the south of the country. It has been recorded in VC31, but not since the eighteen and early nineteen hundreds (Frost and Brown, 2008). This is chiefly an insect of marshy habitats.

Adonis' Ladybird (*Hippodamia variegata*)

An uncommon ladybird (but probably on the increase) which has been recorded from sandy habitats such gravel pits and waste ground. Initially thought to be a coastal insect, it was not until 1984 that it was realised that the species also occurred inland (Hawkins, 2000).

Water Ladybird (*Anisosticta novemdecimpunctata*)

Another uncommon ladybird, associated with pond, dyke and river banks where Reed (*Phragmites* species) and Reedmace (*Typha* species) occur. With the number of dykes and wetland habitats in the fens, this species ought to be encountered more frequently.

Larch Ladybird (*Aphidecta obliterata*)

Although having the shape of a ladybird, this species is somewhat unlike most species, being brown with no spots on its wing cases. As the name suggests this is a ladybird of larch, but also other conifers. The tetrads where it has been reported are well spread out, and mirror its habitat.

Sixteen-spot Ladybird (*Tytthaspis sedecimpuntata*)

The smallest of the conspicuous ladybird species, being only 2.5 to 3 mm long. It is a common ladybird in its grassland habitat and can sometimes be found in large aggregations. It has been discovered that mildew is among its food items, as are thrips, mites and the pollen of grasses.

Two-spot Ladybird (*Adalia bipunctata*)

This is one of our most familiar ladybirds and is very common throughout the two vice counties. It is expected that at the end of this project this species will have been recorded in nearly all tetrads. It is one of only two species (the other being the Harlequin Ladybird) that tends to overwinter in buildings and is one that may be particularly vulnerable to the effects of the Harlequin. Most Two-spot Ladybirds are red with two black spots, but there are many other variants, and melanic (black) forms with two, four or six red spots can be common.

Ten-spot Ladybird (*Adalia decempunctata*)

A very closely related ladybird to the previous species, and can be a tricky one to identify due to a multitude of colour forms. Another very common species, associated with broad-leaved and (to a lesser extent) coniferous trees.

Hieroglyphic Ladybird (*Coccinella hieroglyphica*)

Because there is very little, if any, heathland left in the two vice counties, we do not expect to find this habitat-specialist. There is a very old report from VC31, dated 1828-1836 from an unknown recorder.

Seven-spot Ladybird (*Coccinella septempunctata*)

Our most widespread and familiar ladybird, with its bright red wing cases and seven black spots. It is a generalist species, feeding on aphids, and a common resident of gardens. It is found on low growing vegetation of many types, including Nettle (*Urtica dioica*). It is expected to be recorded from all tetrads by the end of the project.

Eleven-spot Ladybird (*Coccinella undecimpunctata*)

Like Adonis' Ladybird, this was thought to be primarily a coastal species. Formerly more common, this species is now difficult to find in our area. It may be found in similar habitats to Adonis' and is somewhat similar in appearance to that species.

Cream-streaked Ladybird (*Harmonia quadripunctata*)

A close relation of the Harlequin Ladybird, but without that species' infamous reputation. This ladybird is associated with pine trees, including exotic species.

Harlequin Ladybird (*Harmonia axyridis*)

The notorious alien ladybird that arrived in Britain in 2004. Now recorded in all English counties except Cumbria, most Welsh counties and several Scottish ones, plus found on two occasions in Northern Ireland. In the short period that this study has been in operation, this ladybird has been found in 176 tetrads within our two vice counties, making it one of the most common species. The species was initially found primarily on sycamore and lime trees (where it still tends to be abundant), but is now also found in most other habitats, including reedbeds, grassland and on coniferous trees.

Fourteen-spot Ladybird (*Propylea quattuordecimpunctata*)

Another of the more common species of ladybird in Britain and in the two vice counties. It is a ladybird of tall vegetation, brambles, nettles, low growth young trees and hedges. A widespread species with a short active season, from April to September (Hawkins, 2000). At the end of this survey it is expected to be reported from the majority of the tetrads.

Cream-spot Ladybird (*Calvia quattuordecimguttata*)

This is a ladybird of broad–leaved trees, especially hornbeam, ash and lime. A handsome species, the spots are a creamy white on chestnut-coloured wing cases. Tends only to be found in small numbers.

Eyed Ladybird (*Anatis ocellata*)

This is the largest ladybird in Britain, at about 8 mm long, and is mainly associated with Scots Pine (*Pinus sylvestris*). In laboratory tests the larval stage of this species was the only ladybird to hold its own against the larval stage of the Harlequin (Ware and Majerus, 2008). Because of its specific habitat requirements it is an uncommon ladybird in the two vice counties.

Eighteen-spot Ladybird (*Myrrha octodecimguttata*)

Another Scots Pine specialist, similar in appearance to the Cream-spot Ladybird. This species is thought to breed towards the tops of mature pine trees (Majerus, 1994) and the larvae are rarely seen, although we have recorded them at Chippenham Fen.

Orange Ladybird (*Halyzia sedecimguttata*)

This ladybird feeds on mildews that grow on the leaves of broad-leaved trees. At present this species is becoming more common, probably because of increasing the range of trees which it utilises (Majerus and Williams, 1989). It is quite widespread throughout the two vice counties, and (like the Harlequin Ladybird) is often reported from mercury-vapour light-traps by moth recorders.

Twenty two-spot Ladybird (*Thea vigintiduopunctata*)

Quite a common species, this is one of our favourites. The wing cases are a beautiful lemon-yellow adorned with approximately 22 black spots. It feeds on mildews growing on low-vegetation and Hogweed (*Heracleum sphondylium*). Unusually for ladybirds, the larvae of this species have similar colouration to the adults.

Coccidulinae

The following group comprises the less conspicuous coccinellid species, which have not been allocated common names. As many of these ladybirds are small it is difficult to find many of them, let alone identify them.

Coccidula rufa

This ladybird is linked to the tall vegetation in marshland or by water. It is quite a common species in our area.

Coccidula scutellata

A ladybird associated with Reedmace species, and a difficult one to find.

Rhyzobius litura

Probably the most common and widespread of the smaller ladybirds. Often found among the grasses along roadside verges.

Rhyzobius chrysomeloides

This species was found for the first time in VC29 (tetrad TL4858) by a small party of enthusiasts on 30 July 2008 (Hall *et al*., in press). It is very similar to the previous species and was first found in Britain in Surrey, in 1996.

Stethorus punctillum

A species of deciduous trees, this is the smallest of the ladybirds found in Britain, measuring less than 1.5 mm long. This partly accounts for the paucity of records of this species.

Scymnus frontalis

This ladybird is associated with bare ground and sparse vegetation. Nationally a common species, so expected to be found more often as the project progresses.

Scymnus auritus

Found among the leaves of the Oak (*Quercus robur*).

Scymnus limbatus

This species has not been recorded so far during this project. However there is a record from 1990, reported by Dr. Peter Kirby near Hemingford Grey.

Scymnus suturalis

This species is generally restricted in its habitat preference to Scots Pine, although we have also found it on a Lime tree (*Tilia* species). Like a number of these smaller species, nationally common but sparsely recorded in our survey.

Nephus quadrimaculatus

Although small, this is one of the easier inconspicuous ladybirds to identify, being black and hairy with four red spots. The story of the first of our two records of this species is worth repeating. It was found by Jeremy Milne in his father's garden in St. Ives, tetrad TL3072. His father had been working in the garden tidying the vegetation and cutting back the ivy. After this disturbance, the ladybird was found on the back door of the house.

Chilocorinae

Two of the three species from this sub-family occur in VC29 and VC31 (the Heather Ladybird (*Chilocorus bipustulatus*) has not been recorded). They are characterised by a flange around the edge of the wing cases. Both species are quite common and can be found on the trunks of deciduous trees.

Kidney-spot Ladybird (*Chilocorus renipustulatus*)

This species has black wing cases with two red kidney-shaped spots, one on each wing case.

Pine Ladybird (*Exochomus quadripustulatus*)

The common name of this ladybird is somewhat confusing. The species does occur on coniferous trees as the name implies, but it is as likely to be found on deciduous trees. This is more common than the previous species.

Conclusion

As can be seen from Figure 1, there is a lot of work still to be carried out to complete this venture, but a lot has been achieved, mostly by a small number of people. A few extra enthusiastic field workers to help with the survey would be most helpful. It is a project that our small group thinks is very worthwhile, but with the closure of Monks Wood a great amount of experience in the field of insects has been lost to VC29 and VC31. If anyone is interested in contributing records, please email mail@fro5t.plus.com

Acknowledgments

We are very grateful to the many contributors of records to this project. Specifically we thank the following people: Andrew Frost, Kevin Royles**,** Henry Arnold, Jon Shanklin and Cambridge Natural History Society for records; Jeremy Milne for identifying the inconspicuous species and for habitat information and records; Brehon Frost for mapping; Michael Majerus, Trevor James, Helen Roy, Remy Ware, Ian Wright and L.J. Michie for background information, guidance and records; and finally, various landowners who have given permission to carry out surveys on their land, including RAF Wyton, Huntingdon Racecourse and Anglesey Abbey.

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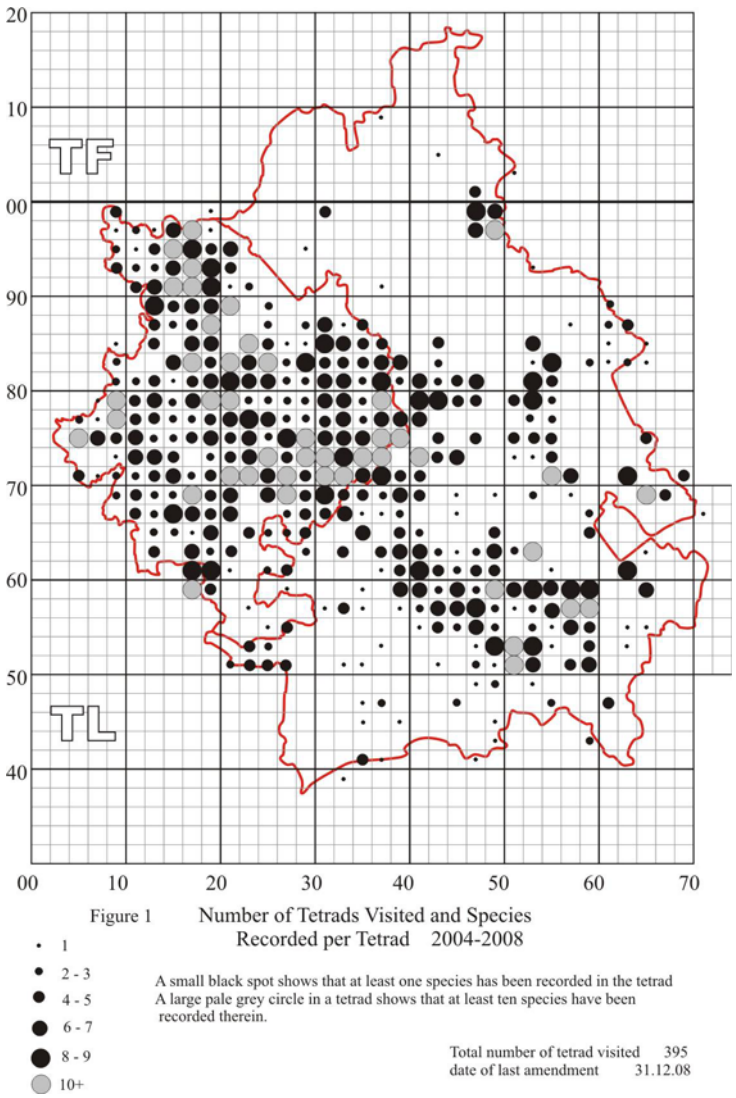
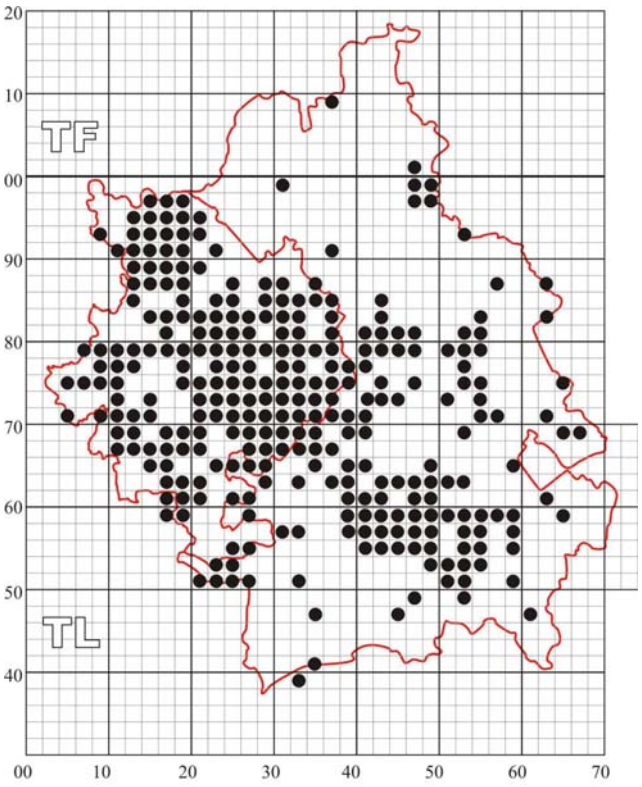


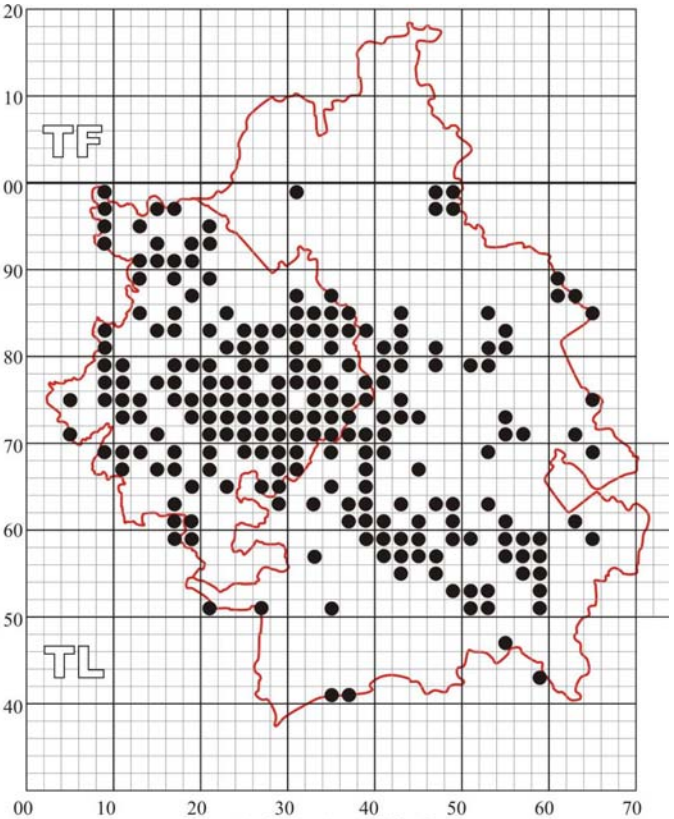
Figure 1 Number of Tetrads Visited and Species Recorded per Tetrad 2004-2008



7-Spot Ladybird

Coccinella septempunctata

2004-2008



2-Spot Ladybird

Adalia bipunctata

2004 - 2008

Cambridge Milk-parsley (*Selinum carvifolia*) needs a helping hand in Cambridgeshire

C. James Cadbury

Abstract

In recent years Cambridge Milk-parsley (*Selinum carviflora*) has been known in Britain from only three sites, all in Cambridgeshire (v.c. 29). A survey of all three in August 2008 revealed an alarming decline. At Chippenham Fen there were 652 flowering plants, 77 non-flowering mature ones and, in two small heavily grazed areas, hundreds of seedlings. At Snailwell meadows only 27 plants (23 flowering) were observed. For the second consecutive year none was recorded at Sawston Hall Fen. All three sites have suffered from a lack of grazing and mowing, but this is being rectified at Chippenham Fen, by using Water Buffaloes and Red Poll Cattle, and at Sawston Hall Fen, with Highland Cattle. *Selinum* produces seeds freely and these germinate readily when given bare damp ground and freedom from rank vegetation. Once mature, it can compete with other species provided that ground conditions do not become waterlogged. A small but regenerating population of *Selinum* grown from Chippenham stock has been established at Kingfishers Bridge, a created wetland near Wicken.

Introduction

Cambridge Milk-parsley is one of Cambridgeshire's special plants, along with Water Germander (*Teucrium scordium*), Fen Violet (*Viola persicifolia*), the fenland subspecies of Heath Dog-violet (*V. canina* subsp. *montana*), Moon Carrot (*Seseli libanotis*) and Ribbon-leaved Water-plantain (*Alisma gramineum*). Of these, *Selinum* is the only one that is now confined to the vice-county, having become extinct in Lincolnshire and Nottinghamshire (Walters, 1956).

Selinum is considered to be Vulnerable in Britain (Cheffings & Farrell, 2001). It was first discovered in Cambridgeshire in the grounds of Fordham Abbey in 1882 and was still there in 1949 (Walters, 1956) but has subsequently disappeared. In recent years it has been restricted to three sites – Chippenham Fen (a National Nature Reserve) and Snailwell Meadows (a Site of Special Scientific Interest), both within 2 km of the Fordham site, and Sawston Hall Fen (another SSS1), where it was discovered in 1949 (Walters, 1956).

Populations

There have been considerable fluctuations in the number of flowering plants recorded at the three sites. At **Chippenham Fen** there were 387 in 1989 and 959 in 1990, a change related to relaxation in summer grazing by cattle (Grimshaw, 1991). In 1996, 17,527 plants flowered at this reserve (Grimshaw, 2004). At **Snailwell Meadows** there were 650 flowering plants in 1988, 480 in two colonies in 1990, just over 600 in 1995 and 230 in 2003 (O'Leary, 1989, 1995; Grimshaw, 2004).

At **Sawston Hall Fen** between 1970 and 1986 *Selinum* was considered to be abundant in five years and plentiful or 'vigorous' in nine (Meade, 1989), while in 1988 there were up to 1,000 flowering plants, more than at either Chippenham or Snailwell that year (O'Leary, 1989); 580 and 895 were counted at Sawston in 1997 and 1998 respectively (D. Radley, 1998 *in litt.*). Subsequent counts revealed a considerable decline in flowering plants at this site, with about 100 in 2002, 71 in 2003, 179 in 2004, 167 in 2005 (Cadbury & Mountford, 2007), 44 in 2006 and none in 2007 (T. Barfield, C.J. Cadbury and L. Knight).

The situation in 2008

In 2008 I took the opportunity, with the help of others, to survey all three sites in August, when *Selinum* is in flower. A careful search (with T. Barfield, A. Gilbert, L. Knight and A. Ramsey) at **Sawston Hall Fen** on 11 August failed to find a single plant. **Snailwell Meadows** were surveyed on 16 August by the Cambridgeshire Flora Group led by A. Leslie and N. Millar. We found a total of only 27 plants – 25 plants (23 flowering) in a meadow east of the River Snail, just south of the road and to the north of Snailwell village (TL 640681), and two plants (one flowering) in a meadow to the west of the river and well south of the road (TL 639678). On 21 and 27 August I attempted a comprehensive survey of *Selinum* at **Chippenham Fen** with K. Warrington, Natural England's site manager. We counted a total of 652 flowering plants, 77 non-flowering mature plants (over one year old) and in two areas a large number of small non-flowering plants, most of which were assumed to be in their first year (Table 1).

Table 1 *Selinum carvifolia* plant counts, Chippenham Fen, 21 and 27 August 2008

	North Meadow		Central Fen		Total
Compartment	1	2	10	11	
Flowering plants	122	1	491	38	652
Non-flowering mature plants	46	4	20	7	77
Seedlings <1 year old (non-flowering)	33	–	100s	–	100s

Compartment	1	TL	647697, 647698, 648700, 649699, 649700
	2		646698
	10		647691, 647692, 648691, 648692, 649692
	11		651693

All three of the Cambridgeshire sites are base-rich fens that were damp at the time of the survey but can flood even in summer, as occurred at Sawston Hall Fen in 2007. All three were also regularly grazed and/or mown in the past but have in recent years suffered from a lack of such management. These conditions have favoured the development of rank vegetation. At Sawston it is the spread of Blunt-flowered Rush (*Juncus subnodulosus*) (**M22** fen-meadow in terms of the National Vegetation Classification) in the wetter areas and tussocks of Purple Moor-grass (*Molinia caerulea*) (**M24** fen-meadow), Tufted Hair-grass (*Deschampsia cespitosa*) and even Tor-grass (*Brachypodium pinnatum*) (**CG4** calcareous grassland) along with Hemp Agrimony (*Eupatorium cannabinum*) in the drier parts (Cadbury & Mountford, 2007). At Snailwell, Hard Rush (*Juncus*

inflexus) (a form of **M22**) and Tufted Hair-grass now dominate many areas. There are indications that at Chippenham Fen a sward of Blunt-flowered Rush (**M22**) together with Common Reed (*Phragmites australis*) and, locally, Great Fen-sedge (*Cladium mariscus*) may have replaced a community in which *Molinia* was dominant (**M24**), though this is still a feature of the eastern part of Compartment 1, North Meadows.

Selinum appears to be a poor competitor in its early stages of growth and loses out in the matted sward produced by Blunt-flowered Rush, as in the central and southern sectors of Sawston Hall Fen and in much of Compartments 1 and 2 (North Meadows), 8 (no *Selinum* found) and 10 and 11 (Central Fen) at Chippenham Fen. At Snailwell it was 'hanging on', with 14 flowering plants within an ungrazed barbed wire exclosure with tussocks of Hard Rush in the field east of the River Snail, but it was absent from a similar-sized exclosure in a field to the west of the river.

Selinum has the potential to be a long-lived perennial (Grimshaw, 1991). First flowering is not until at least the second year, allowing time for a tap root to develop. It is a calcicole: at Chippenham and Snailwell it has been recorded in soils with a pH of 7.0–7.7 and higher mineral content than in the more peaty areas (O'Leary, 1989; Grimshaw, 1991).

Remedies for recovery

At Chippenham, eight Water Buffaloes (*Bubalus bubalis*) had been grazing in Compartment 10 (Central Fen) in the first part of the 2008 summer up until early July. Their trampling had created bare ground between the *Juncus* tussocks, favouring Bog Pimpernel (*Anagallis tenella*) and in time, it is hoped, the regeneration of *Selinum*. On a ridge of slightly higher and better drained ground along the southern margin of this compartment, the grazing had been intense, reducing the sward to less than 7 cm compared with 60–80 cm elsewhere. Here there were hundreds of small plants of *Selinum*, averaging 48 per 2 × 2 m quadrat (n = 8) with a range of 8 to 106. Out of a sample of 385 of these plants 40 (10.4%) were flowering. The flowering plants were 10–30 cm tall, compared with non-flowering ones of 5–10 cm. In the fairly well drained northern part of Compartment 1, where there was a similar short sward created by grazing Red Poll Cattle, 33 non-flowering seedling *Selinum* plants were counted, including 21 in a 2 × 2 m quadrat. Once established, *Selinum* can compete with taller vegetation, as shown by plants growing in an ungrazed and unmown exclosure in Compartment 10, where there were 75 flowering *Selinum* plants with heights of 50–100 cm among vegetation of 60–80 cm. The tallest *Selinum* plants were up to 150 cm in height among uncut and ungrazed vegetation of 100–140 cm in Compartment 11 and up to 130 cm along a fence bordering a ditch on the western margin of Compartment 1. At this latter site, *Selinum* had flourished in the previous two years after ditch-clearing operations. In tall vegetation, however, *Selinum* may gradually die out and fail to be replenished by seedling propagation. Compartment 10 has been subject to a major programme of tree and scrub removal in recent years; this too has probably been beneficial to the shade-intolerant *Selinum*.

Selinum is not a plant of very wet habitat and it can even thrive in hot dry limestone, as recorded in Bosnia and Croatia (M. Southam in Grimshaw, 1991). There is some evidence from Chippenham Fen and Sawston Hall Fen that in waterlogged ground mature plants may die.

Provided that *Selinum* plants are allowed to flower, they freely set seeds and these germinate readily under cultivated conditions and in the wild. The seed has poor powers of dispersal, the majority falling near the parent plant (Grimshaw, 1991). The flowering heads are readily grazed by cattle and Water Buffaloes and by both Roe Deer (*Capreolus capreolus*) and Muntjac (*Muntiacus reevesi*). Annual or biennial summer grazing reduces the longevity of plants; however, this may be compensated by increased recruitment (Grimshaw, 1991).

Grimshaw recommended cutting or grazing on a five-year rotation to provide the conditions necessary for germination and seedling development. *Selinum* flowers in August and may continue into October, so it is best to delay such management until the autumn to allow seeding, but this is not critical in view of the grazing and cutting rotation. Grimshaw also mentioned that molehills (made by Moles (*Talpa europaea*) provide suitable habitat for young plants.

Sawston Hall Fen was formerly grazed by cattle, but by the late 1960s this had become irregular and it ceased by 1980. This resulted in a build-up of litter from clumps of grass and the development of coarse vegetation. A small herd of Highland Cattle has been grazing part of the fen, particularly the drier northern sector, since the autumn of 2005 (Cadbury & Mountford, 2007). The central sector, one of the areas where *Selinum* grew until 2006, was heavily grazed in the summer of 2007, but no *Selinum* was seen there in either 2007 or 2008 when the compartment remained ungrazed. The eastern area was closely grazed in the summer of 2008 and later that summer cattle were allowed into the southern sector, which was the main area for *Selinum* until 2007. Conditions for the plant appear potentially much improved at Sawston, but does a viable seed-bank remain? If the species fails to reappear in the next few years, should a reintroduction using seed from Cambridge University Botanic Garden (Sawston stock) or Chippenham Fen be considered to enhance the survival of a species that may now be raised to Endangered status?

In 1996–97 an attempt was made to create a small fen area at **Kingfishers Bridge**, a wetland created under Andrew Green's initiative from arable farmland on base-rich soil near Wicken Fen, Cambridgeshire. Appropriate fen plants were introduced from Chippenham Fen, including *Selinum* that was sown as seed in trays and grown on in a poly-tunnel before being planted out in the spring (R. Beecroft, pers. comm.). *Selinum* has now survived at Kingfishers Bridge for 11 years at this site, TL 546732. In August 2007 there were 10 plants with a total of 22 flowering shoots. Two mature Water Buffaloes were introduced to the fen area for six weeks that summer and effectively broke up the dense vegetation sward by their grazing and trampling. Not only did four *Selinum* plants set seed but at least eight seedlings appeared in the nearby trampled ground. In July 2008 there were six mature plants at the site with a total of 20 flowering shoots. By late September, after five buffaloes had been fenced on the fen area during August, there were still three mature plants that had flowered but

not set seed owing to the grazing and 47 seedlings in the close vicinity. In future the buffalo will be allowed to graze and trample the fen for a limited summer period before July and not every year, which should enable *Selinum* to flower and set seed.

Acknowledgments

I am most grateful to Adrian Critchley for allowing me to visit Sawston Hall Fen and to Tim Barfield (Natural England) and Andrew Gilbert and Louise Knight for their assistance in the surveys there. Mrs Crawley kindly allowed the Cambridge Flora Group access to Snailwell Meadows. Kevin Warrington was very helpful with the survey of *Selinum carvifolia* at Chippenham Fen and in providing information on the site. Roger Beecroft was instrumental in the introduction of the species to Kingfishers Bridge. I wish to thank Philip Oswald for his helpful comments on a draft of this paper. Lucy Hulmes, of CEH, Wallingford, kindly drew the splendid picture.

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Cambridge Milk-parsley (*Selinum carvifolia*) Drawn by Lucy Hulmes.

Contributions towards a new algal flora of Cambridgeshire (Vice-county 29), IV. Phylum Chlorococcales, second part

Hilary Belcher, Eric George and Erica Swale

This is a continuation of the list of Chlorococcales which appeared in Nature in Cambridgeshire no. 50, 2008, and the initials of the same recorders are given as before, i.e. W.(G.S. West), E.G.P. (E.G.Pringsheim), E.A.G. (Eric George), B. & S. (Hilary Belcher and Erica Swale). When Eric was retiring from the directorship of the Culture Centre of Algae and Protozoa (then in Cambridge, now in Oban) he handed over to us his extensive card index of algal records for the county, but unfortunately there were no supporting illustrations. The present figures are of algae, mostly but not all from Cambridgeshire, collected and drawn in the living state by B. & S. The size indicated is of the individual drawn. Sizes of cells within a species vary widely, and approximate ranges are given in the flora of John et al (2002).

We would like to put in a word here to recommend the microscopical study of freshwater algae and protozoa, about which there is much that can be discovered by amateurs, in contrast to astronomy. This is now a popular pursuit, with many clubs and several magazines devoted to it, the latter having advertisements for retailers of telescopes costing up to £5000 each, yet we were able to demonstrate to a fellow microscopist that he had a new species of freshwater brown alga, a tuft visible to the naked eye, in his fishtank. We would be pleased to assist anyone who felt inclined to start such a study.

Phylum Chlorophyta, Class Chlorococcales, second part:-

Monoraphidium arcuatum (Korshikov) Hindák 1970. B. & S., Vision Park pool, Histon (B. & S., 1999), Wicken Lode, Cambridge Regional College pool. Uncommon. Figure 1C.

M. contortum (Thuret) Komárková-Legnerová 1969. B. & S., Rivers Cam and Ouse (B. & S., 2003), Vision Park pool, Histon, Churchill College lily pond and many other records. Common. Figure 1B.

M. griffithii (Berkeley) Komárková-Legnerová 1969. B. & S., Rivers Cam and Ouse, and many pools and garden ponds. Common. Figure 1A.

M. irregulare (G.M. Smith) Komárková-Legnerová 1969. B. & S., Vision Park pool and other pools and garden ponds. Frequent. Figure 1D.

Muriella magna F.E. Fritsch & R.P. John 1942. M.E. Godward, Wicken Fen 1939, isolated from soil. Figure in D.M. John et al, 2002. We have not seen it.

*Neglectella asterifera (*Skuja) Fott 1976. B. & S., pond at Madingley Hall (B. & S., 1996). Figure 1E.

Nephrochlamys rostrata Nygaard, Komárek, Kristiansen & Skulberg 1986. B. & S., Cam backwater July 1976, Bolton's Pit Sept. 1995; R. Cam backwater July 1976. Figure 1F.

Nephrocytium agardhianum Nägeli 1849. W., Chippenham Fen, Wicken Fen, Roswell Pits, Ely, ponds near March; B. & S., pond at Gretton Court, Girton Aug. 1998. Figure 1G.

Oocystis lacustris Chodat 1897 (including *O. marssonii* Lemmermann 1898, which is very similar and possibly identical (see John et al 2002)). B. & S., Vision Park (B. & S. 1999); Rivers Cam and Ouse (B. & S. 2003), ponds at Churchill College 2.1995, Madingley Hall (5.1995) and others. Figure 1H.

Oocystis parva W. & G.S. West 1898. W., Guyhirn; B. & S., Vision Park pool (B. & S. 1999), Todd's Pit, Milton 7.1995, Churchill College pond 3.2001 and other ponds. Cambridge and Girton. Figure 1I.

Oocystis solitaria Wittrock in Wittrock & Nordstedt 1879. W., Chippenham Fen, Guyhirn, Wicken Fen, Twenty-foot river. We have not seen it.

Palmodictyon varium (Nägeli) Lemmermann 1915. B. & S., Cavendish Lab. Pond , 5. 1987. Figure 1J.

Pediastrum biradiatum Meyen 1829. E.A.G., Madingley Brick Pits, 10. 1962; B. & S., Vision Park pool 9. 2002. Figure 1K.

Pediastrum boryanum (Turpin) Meneghini 1840. W., Dernford Fen, Sheeps' Green, Wicken Fen, and 6 other records; B. & S., Vision Park (B. & S. 1999), Rivers Cam and Ouse (B. & S., 2003); Churchill College pond, various occasions, and other ponds in Cambridge. Figure 1L.

Pediastrum duplex Meyan 1829. W., Wicken Fen; E.G.P., garden pond, Cambridge 1940; E.A.G., Madingley Hall lake 1962; B. & S., rivers Cam and Ouse, Vision Park pool (B. & S. 2003, 1999), ponds at Churchill College (several times), Cambridge Regional College 4.2001, and other ponds in Cambridge. Figure 1M. Var *gracillimum* W. & G.S. West occurred constantly in Vision Park pool, figure 1N.

Pediastrum integrum Nágeli 1849. W., Sutton Fen; B. & S., pond, Churchill College, 1 colony only. Figure 1O.

Pediastrum tetras (Ehrenberg) Ralfs 1844. W., Roswell Pits, Wicken Fen; B. & S., Vision Park, Rivers Cam and Ouse (B. & S., 1999, 2003), Wicken Lode 7. 2006, Churchill College 3. 2001, Pellew's Pond Huntingdon Road, Cambridge, 2. 2002, Cambridge Regional College 4.2001. Figure 1P.

Polyedriopsis spinulosa (Schmidle) Schmidle 1899. B. & S., River Cam, c. 1976. Figure 2A.

Pseudococcomyxa simplex (Mainx) Fott 1981. Oval cells sticky at the narrow end, living in neglected bottles etc. of distilled, deionised or refrigerator de-icing water. (This is not a joke!). B. & S., de-icing water in plastic bottle, 2.1999. Figure 2B.

Quadrigula quaternata (W. & G.S. West) Printz 1915. B. & S., River Ouse, 3. 1993. Figure 2C.

Radiococcus nimbatus (de Wildemann) Schmidle 1902. W., Dernford Fen. No figure. We have not seen this.

Raphidocelis contorta (Schmidle) Marvan et al. 1984. B. & S., pond Cambridge, 2. 1996. Figure 2F.

Raphidocelis rotunda (Korshikov) Marvan et al. 1984. B. & S., Milton 11. 1994. Figure 2D.

Raphidocelis subcapitatus (Korshikov) Nygaard et all. 1986. B. & S., River Great Ouse (B. & S., 1993). Figure 2E.

Scenedesmus abundans (Kirchner) Chodat 1913. B. & S., Cambridge Regional College, 4. 2001. Figure 4A.

Scenedesmus aculeolatus Reinsch 1877. W., Wicken Fen, Roswell Pits, Guyhirne (as *S. denticulatus* var.); B. & S., pond, Cambridge 9. 1995. Figure 4B.

Scenedesmus acuminatus (Lagerheim) Chodat 1902. Its twisted colonies are often confused with the equally common *S. falcatus*, which has flat colonies. E.G.P., Cambridge 1940; B. & S., Vision Park pool 9.02, Wicken Lode 7.06, Churchill College pond 10.02, pond at Madingley Hall 4.2001. Figure 4C.

Scenedesmus acutiformis Schröder 1897. W., Chippenham Fen, Roswell Pits, Ely (with notes). No figure. We have not seen it.

Scenedesmus antennatus Brébisson in Ralfs 1848. Now considered a form of *S. dimorphus*. W., Wicken Fen, abundant, with notes. Churchill College pond and pool at Histon, various dates.

*Scenedesmus armatus (*Chodat) Chodat 1913. W., Wicken Fen; B. & S., Vision Park pool 9.2002, River Cam 10.2202, small pond at Madingley hall 4.2001, Cambridge Regional College 4.2001, Geodesy Dept pond 4.2001. Figure 4D.

Scenedesmus circumfusus Hortobágy: 1960. B. & S., Geodesy Dept. pond 8.2001, Oakington pond 1.1995. Figure 4E.

Scenedesmus communis E.H. Hegewald 1977 (*S. quadricauda*). W., Shelford, Sheeps' Green, Lord's Bridge, Guyhirne, Wicken Fen, Burwell Lode, Roswell Pits. E.A.G., Cam backwater 1955, Madingley Brick pits 1956, Doddington 1960, Wicken Lode 1962, Twenty Pence Pits 1968. B. & S., Cambridge Regional College 4.2001 and many other ponds. A very common species. Figure 4F.

Scenedesmus denticulatus Lagerheim 1882. W., Wicken Fen, Roswell Pits, Guyhirne; B. & S., Wicken Lode 7.2006, Vision Park 9.2002, Science Park 4.2001. Figure 4G.

Scenedesmus dimorphus (Turpin) Kützing 1833. (*S. acutus* Meyen, *S. obliquus* Rabenhorst). W., Dernford Fen, River Cam at Cambridge, Trumpington, Wicken Fen, Burwell Lode, Roswell Pits, Ouse Washes, Sutton Fen; E.A.G., Madingley Hall Lake; B. & S., Vision Park pool 10.2002, pond at Madingley Hall 4.2001, pond at Cambridge Regional College 4.2001, River Cam 10.2002, many garden ponds and cattle troughs. A very common species. It may often break up as single fusiform cells, which have been regarded as a species, *Dactylococcus infusionem* Nägeli. Figure 4H.

Scenedesmus disciformis (Chodat) Fott et Komárek 1960. B. & S., ponds at Milton 7.1995 and Histon 2. 1996. Figure 4I.

Scenedesmus dispar Brébisson. B. & S., Cambridge Botanic Garden lake 9.1995. Figure 4J.

Scenedesmus ellipticus Corda 1835. B. & S., Vision Park pool post 2000. Figure 4K.

Scenedesmus falcatus Chodat 1894. Differs from S. *acuminatus* by the colonies being flat, not twisted. E.G.P. Cambridge 1940. B. & S., Rivers Cam and Ouse, pond at Madingley Hall, 4.01, Vision Park, many times (B. & S., 1999). Figure 4M.

Scenedesmus flavescens Chodat 1913. B. & S., Churchill Pond 5.1996. Figure 4L.

Scenedesmus grahneisii (Heynig) Fott 1973. B. & S., Vision Park pool (B. & S., 1999), ponds in Cambridge 8 & 11.1995, 12.2004, Impington 4.2004, Girton 1.2006. Figure 5A.

Scenedesmus granulatus West & G.S. West 1897. B. & S., pond at Madingley Hall 6.1995. Figure 5B.

Scenedesmus intermedius Chodat 1926. B. & S., River Great Ouse 7.1993, Churchill College pond 12.2001. Figure 5C.

Scenedesmus intermedius var. *balatonicus* Hortobágyi 1943. B. & S., ponds at Comberton 5.1995, Cambridge 2.1995, River Great Ouse (B. & S, 1999). Figure 5D.

Scenedesmus intermedius var. *bicaudatus* Hortobágyi 1943. B. & S., Madingley Hall lakes 6 & 11.1995, Vision Park 9.2002, pond at Girton 2.2001.

Scenedesmus magnus Meyen 1829. B. & S., Vision Park (B. & S., 1999), 2 ponds at Girton 2.1995, 1.2001, and 3 in Cambridge 4.2001. Figure 5E.

Scenedesmus obliquus (Turpin) Kützing 1833. W., Dernford Fen, Hardwick, Wimpole, Wicken Fen, Sutton West Fen, March; E.A.G., Madingley Hall lake 1963. B. & S., small containers of rain water in Girton, various dates, Madingley Hall lakes 7.1996, Science Park lakes 4.2001. Girton, various field animal troughs. Often occurs as single fusiform cells. Very common, and distinguished from *S. dimorphus*, another very common species, by the slightly curved outer cells in colonies of the latter. Figure 5F.

Scenedesmus obtusus Meyen 1829. B. & S., Churchill College, 2.1996. Figure 5G.

Scenedesmus opoliensis P.G. Richter 1897. B. & S., Vision Park, Rivers Cam and Ouse (B. & S., 1999, 2003), Churchill College pond 12.2001, pond at Impington 4.2004. Figure 5H.

Scenedesmus opoliensis var. *bicaudatus* Hortobágyi 1967. B. & S., Vision Park, various dates, River Cam 10.2002, Comberton pond 9.2001.

Scenedesmus opoliensis var. *mononiensis*Chodat 1926. B. & S., Vision Park pool 6.2002, River Cam 10.2002, Comberton village pond 9.2001. Figure 5I.

Scenedesmus planktonicus (Korshikov) Fott 1973. B. & S., Madingley Hall lake 6.1997. Figure 5J.

Scenedesmus serratus (Corda) Bohlin 1902. B. & S., pond at Madingley Hall 6.1995. Figure 5K.

Scenedesmus subspicatus Chodat 1926. W., Sheeps' Green, Lord's Bridge, Wicken Fen, Burwell Lode, Guyhirne. E.A.G., Madingley Brick Pits 5.1962, garden pond Cambridge May 1963. B. & S., Churchill College pond 2.1995, Rivers Cam and Ouse, various times, Wicken Lode 7.2006, Vision Park pool 9.2002, Cambridge Regional College pond 8.2001. Figure 5L.

Schroederia setigera (Schröder) Lemmermann 1898. B. & S., Vision Park pool 11.1998. Figure 2G.

Selenastrum bibraianum Reinsch 1867. E.G.P., Cambridge garden pool 1940. B. & S., Churchill College pond 6.2002, Cambridge Regional College pond 4.2001. Figure 2I.

Selenastrum gracile Reinsch 1867. E.A.G., Shelford garden pond 1948; B. & S., Cambridge Pellew's Pond. Figure 2H.

Siderocelis ornata (Fott) Fott 1934. B. & S., rivers Cam and Ouse, (B. & S. 2003), Churchill College pond, Girton Evergreens pond. Figure 2J.

Siderocystopsis punctifera (Bolonchonzew) E.H. Hegewald et Schnepf 1984. B. & S., Rivers Cam and Ouse 2003. Figure 2K.

Sorastrum americanum (Bohlin) Schmidle 1900. B. & S., pond of The Unicorn at Trumpington 9.1999. Figure 2M.

Sorastrum spinulosum Nägeli 1849. B. & S., pond of The Unicorn 9.1999. Figure 2L. Since both species of *Sorastrum* occurred in the same pond at the same time, with intermediates, yet nowhere else in our Cambridge collections, it is possible that here both the above are stages of the same species.

Sphaerocystis planktonica (Korshikov) Bourrelly 1966. B. & S., River Great Ouse (B. & S. 2003), Vision Park (B. & S. 1999). Figure 3A.

Tetraedron caudatum (Corda) Hansgirg 1888. W., Wimpole Park 1899; B. & S., Vision Park (B. & S. 1999), Rivers Cam and Ouse (B. & S. 2003). Figure 3B.

Tetraedron incus (Teiling) G.M. Smith 1926. W.1899, Dernford Fen, with note; B. & S., Vision Park 1999, Rivers Cam and Ouse 2003. Figure 3C.

Tetraedron minimum (A. Braun) Hansgirg 1888. W., Dernford Fen; E.A.G., Shepreth L-Moor 5.1968; B. & S., Rivers Cam and Ouse, Vision Park pool (B. & S. 2003, 1999), Cambridge Regional College pond 4.2001, Geodesy Dept. pond 9.2001, Cambridge Regional College pond 4.2001, garden ponds in Cambridge 1.2005 and Girton 4.2001. Figure 3D.

Tetraedron triangulare Korshikov 1953. B. & S., Vision Park pool (B. & S. 1999). An unusual species that we have also collected from South Walsham Broad, Norfolk. It is not to be confused with similarly flat and triangular species of the Xanthophyte *Goniochloris*. Figure 3E.

Tetrastrum staurogeniaeforme (Schröder) Lemmermann 1900. B. & S., Rivers Cam and Ouse, Vision Park pool (B. & S. 2003, 1999), lake at Madingley Hall 6.1996. Figure 3F.

Tetrastrum triangulare (Chodat) Komárek 1974 (*T. glabrum* (Y.V. Roll) Ahlstrom et Tiffany). B. & S., Vision Park pool, Rivers Cam and Ouse (B. & S., 1999, 2003). Figure 3G.

Trebouxia arboricola Puymaly 1924. A subaerial species which constitutes much of the green coating on shaded tree trunks, fences, stones etc. B. & S., traffic sign at Girton 2.1996, completely green stones in Cambridge University Library courtyard 6.96. Figure 3H.

Treubaria triappendiculata C. Bernard 1908. B. & S., River Great Ouse (B. & S. 2003). Figure 3I.

Trochiscia hirta (Reinsch) Hansgirg 1888. W., Cambridge, Chippenham Fen.

Trochiscia prescottii Sieminska 1965. B. & S., Vision Park pool (B. & S. 1999), also several times in neighbouring Essex. Figure 3J.

Trochiscia reticularis (Reinsch) Hansgirg 1888. W., Chippenham Fen.

Trochiscia sp. B. & S., pond, Fowlmere 4.1995, abundant. Figure 3K.

Acknowledgments

This section includes the large and difficult genus *Scenedesmus*, and we are indebted to P.M. Tsarenko of Kiev, an authority on the genus, for going through and commenting on our records.

As before, many of the pictures have appeared before in issues of Nature in Cambridgeshire, and in the *Freshwater Algal Flora of the British Isles* (John et al., 2002). We also wish to thank Professor D.M. John for helpful discussions.

Note on the figures. The sizes indicated record those of the individual cells or colonies drawn. Cells of a population vary widely in size, from that of a large mother cell to those of its 4 to 32 or so much smaller daughter cells. Approximate size ranges are given in the algal flora of John et al. (2002)

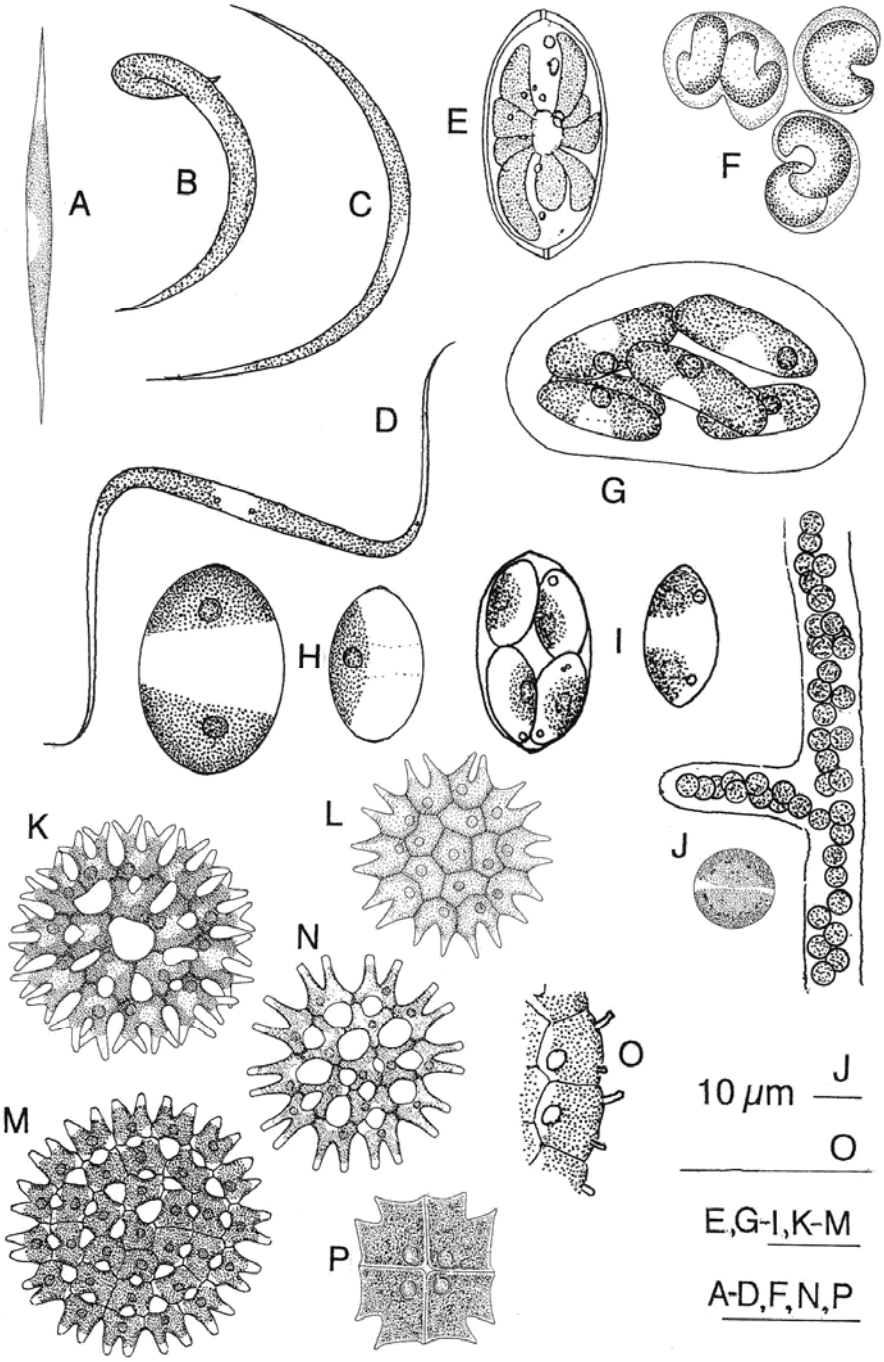

Figure 1. 1A, *Monoraphidium griffithii*, Histon, x c. 1500. 1B, *Monoraphidium contortum,* Histon, x c. 1500. 1C, *Monoraphidium arcuatum,* Histon, x c. 1500. 1D, *Monoraphidium irregulare,* Histon, x 1500. 1E, *Neglectella asterifera,* Madingley, x c. 1000. 1F, *Nephrochlamys rostrata,* Cambridge, x c. 1500. 1G, *Nephrocytium agardhianum,* Girton, x c. 1000. 1H, *Oocystis lacustris,* Histon, x c. 1000. 1I, *Oocystis parva,* Fowlmere, x c. 1000. 1J, *Palmodictyon varium,* Cambridge, x c. 500, with cell x c. 1500. 1K, *Pediastrum biradiatum,* R. Thames, x c. 1000. 1L, *Pediastrum boryanum,* R. Cam, x c. 1000. 1M, *Pediastrum duplex,* R. Thames, x c. 1000. 1N, *Pediastrum duplex* var. *gracillimum,* Histon, x 1500. 1O, *Pediastrum integrum,* 2 cells from colony edge, Cambridge, x c. 2000. 1P, *Pediastrum tetras,* Cambridge, x c. 1500.

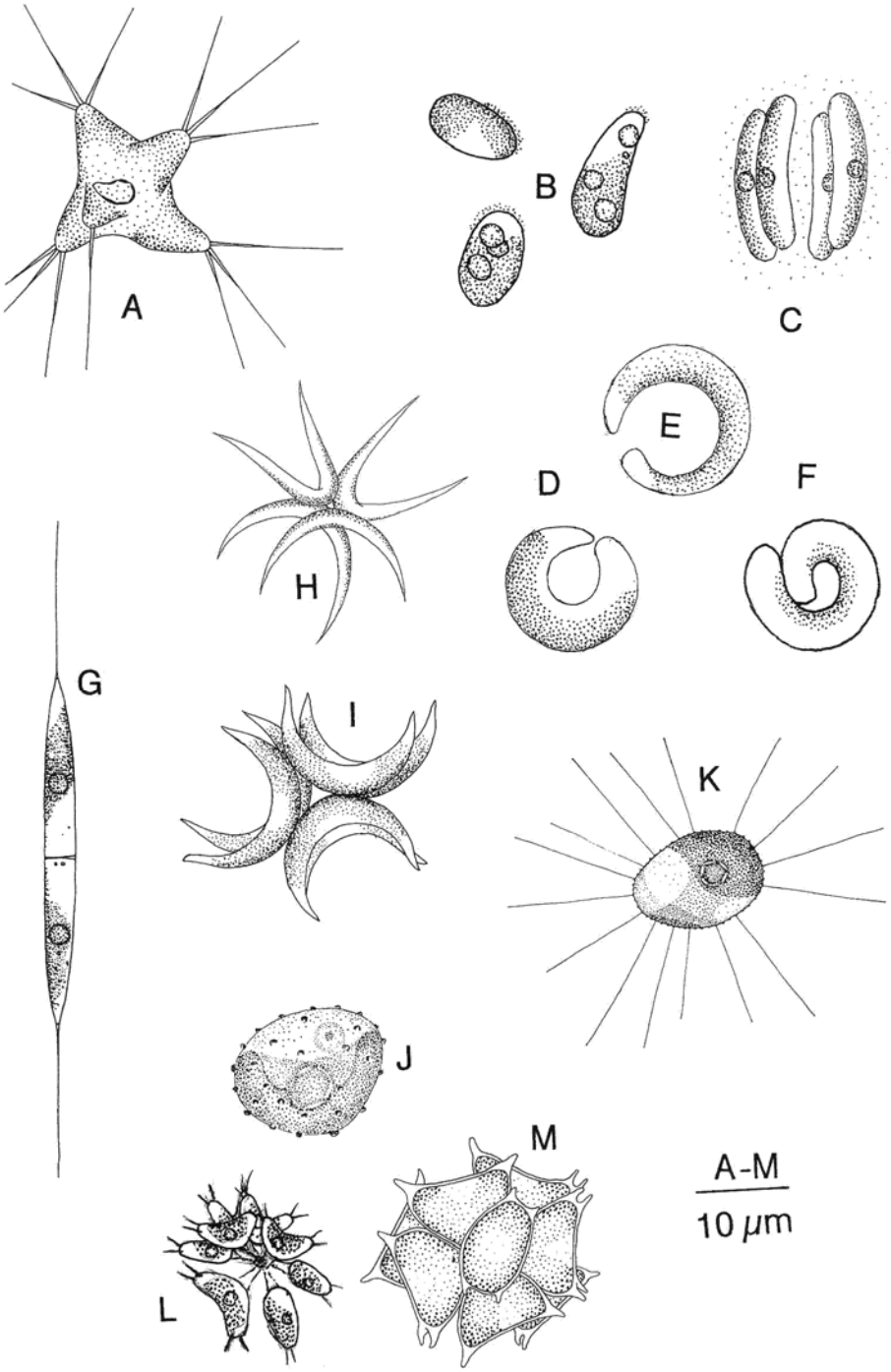

Figure 2. 2A, *Polyedriopsis spinulosa,* R. Lee, Herts., x c. 1000. 2B, *Pseudococcomyxa simplex,* Girton, x c. 1000. 2C, *Quadrigula sabulosa,* R. Gt. Ouse, x c. 1000. 2D, *Raphidocelis contorta,* R. Cam, x c. 1000. 2E, *Raphidocelis subcapitata,* R. Gt. Ouse, x c. 1000. 2F, *Raphidocelis contorta,* Cambridge, x c. 1000. 2G, *Schroederia setigera,* Histon, x c. 1000. 2H, *Selenastrum gracile,* Cambridge, x c. 1000. 2I, *Selenastrum bibraianum,* Cambridge, x c. 1000. 2J, *Siderocelis ornata,* R. Cam, Cambridge. 2K, *Siderocystopsis punctifera,* R. Cam, Cambridge, x c. 1000. 2L, *Sorastrum spinulosum,* Cambridge, x c. 1000. 2M, *Sorastrum americanum,* Cambridge, x c. 1000 (see text).

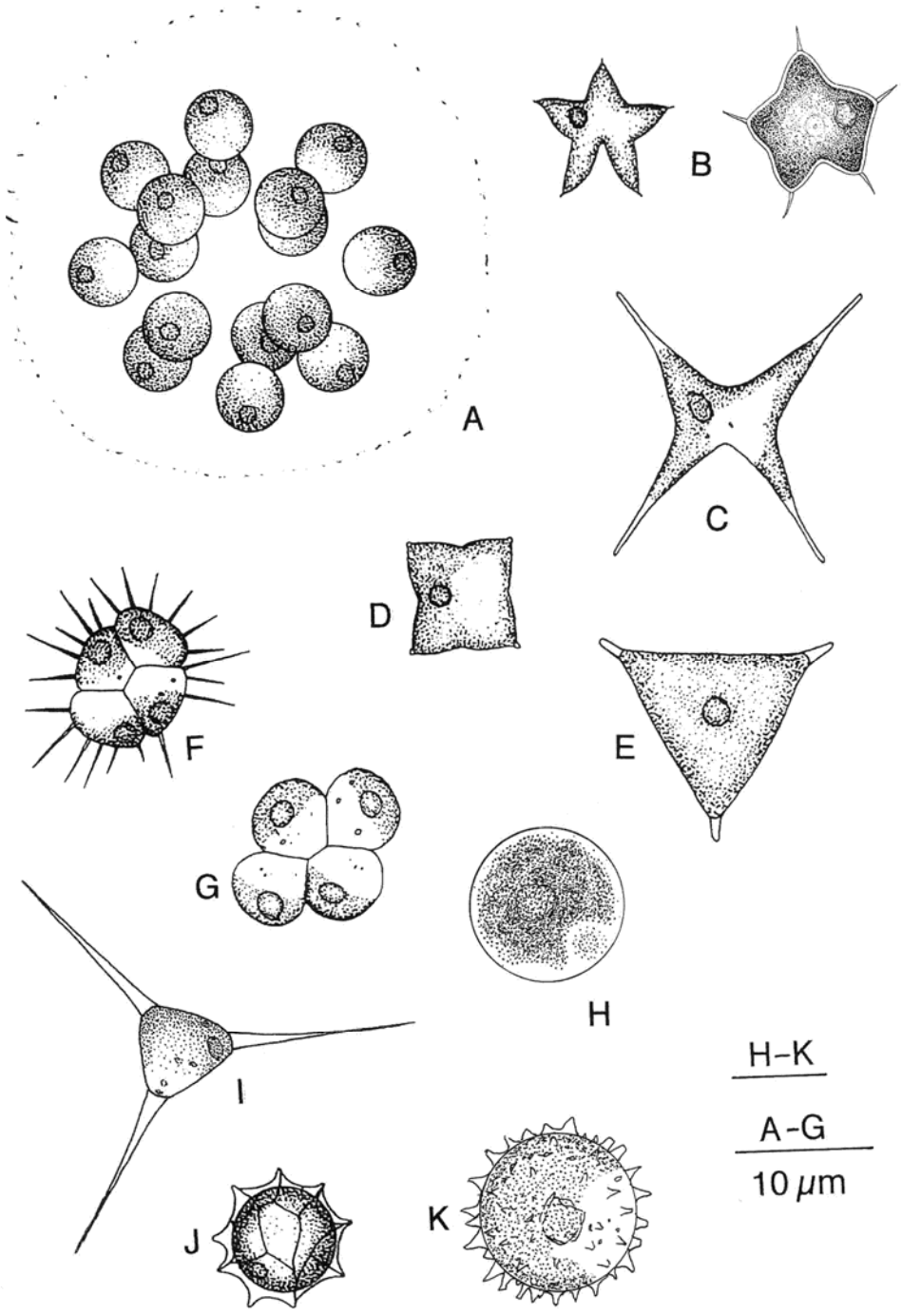

Figure 3. 3A, *Sphaerocystis planktonica*, Histon, x c. 1500. 3B, *Tetraedron caudatum*, Histon, x c. 1500. 3C, *Tetraedron incus*, Histon, x c. 1500. 3D, *Tetraedron minimum*, Histon, x c. 1500. 3E, *Tetraedron triangulare*, Histon, x c. 1500. 3F, *Tetrastrum staurogeniaeforme*, Histon, x c. 1500. 3G, *Tetrastrum triangulare*, x c. 1500. 3H, *Trebouxia arboricola*, Girton, x c. 1000. 3I, *Trebouxia triappendiculata*, River Gt. Ouse, x c. 1000. 3J, *Trochiscia prescottii*, Histon, x c. 1000. 3K, *Trochiscia* sp., Fowlmere, x c. 1000.

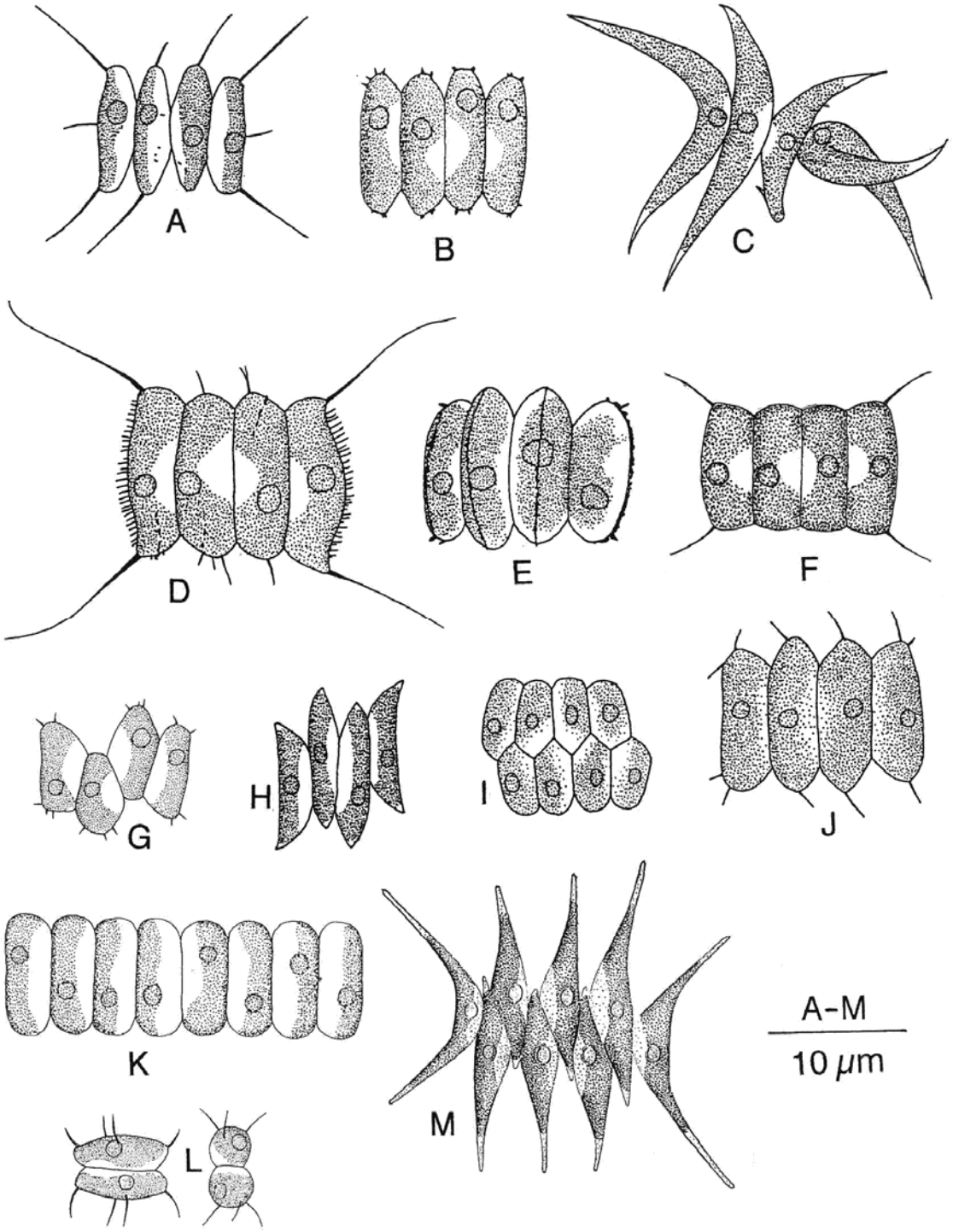

Figure 4. 4A, *Scenedesmus abundans,* Cambridge, x c. 1500. 4B, *Scenedesmus aculeolatus,* Cambridge, x c. 1500. 4C, *Scenedesmus acuminatus,* Histon, x c. 1500. 4D, *Scenedesmus armatus,* Histon, x c. 1500. 4E, *Scenedesmus circumfusus,* Oakington, x c. 1500. 4F, *Scenedesmus communis* (*S. quadricauda*), Histon, x c. 1500. 4G, *Scenedesmus denticulatus,* R. Nene, Lincs., x c. 1500. 4H, *Scenedesmus dimorphus,* Girton, x c. 1500. 4I, *Scenedesmus disciformis,* Cambridge, x c. 1500. 4J, *Scenedesmus dispar,* Cambridge, x c. 1500. 4K, *Scenedesmus ellipticus,* Histon, c. x 1500. 4L, *Scenedesmus flavescens,* Cambridge, x c. 1500. 4M, *Scenedesmus falcatus,* R. Cam, Cambridge, x c. 1500.

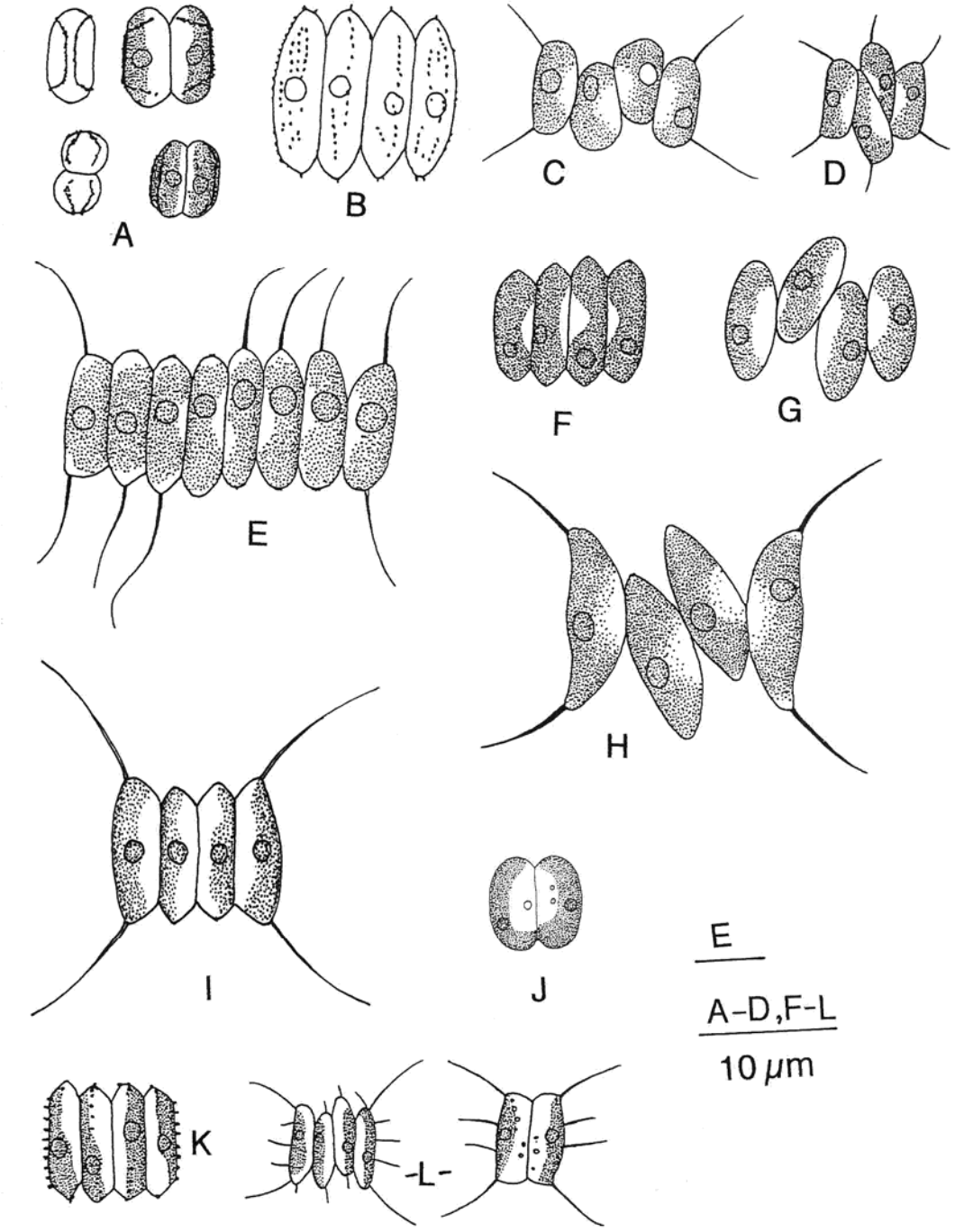

Figure 5. 5A, *Scenedesmus grahneisii*, Girton, x c. 1500. 5B, *Scenedesmus granulatus*, Madingley, x c. 1500. 5C, *Scenedesmus intermedius*, R. Gt. Ouse, x c. 1500. 5D, *Scenedesmus intermedius* var. *balatonicus*, x c. 1500. 5E, *Scenedesmus magnus*, Girton, x c. 750. 5F, *Scenedesmus obliquus*, Girton, x c. 1500. 5G, *Scenedesmus obtusus*, Cambridge, x 1500. 5H, *Scenedesmus opoliensis*, Histon, x c. 1500. 5I, *Scenedesmus opoliensis* var. *mononiensis*, Histon, x c. 1500. 5J, *Scenedesmus planktonicus*, Madingley, x c. 1500. 5K, *Scenedesmus serratus*, Madingley, x c. 1500. 5L, *Scenedesmus subspicatus*, Hatfield Forest, Essex.

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The Great Green Bush-cricket (*Tettigonia viridissima*) in 'old' Cambridgeshire

Rob Partridge

The Great Green Bush-cricket, (*Tettigonia viridissima*), is one of Britain's largest and most spectacular insects. Adult males can measure up to 50mm and the females up to 54 mm; add in the long legs, wings and ovipositors and they can look enormous. They are bright green with some reddish-brown markings, and they are wonderfully camouflaged amongst the tall herbage that they favour; it is quite possible to have one's nose a matter of a few inches from one that is calling at full volume and to still not be able to see it until it moves. The song is most distinctive and far-carrying; it has been compared to all sorts of things but those of you who have ever fixed a card into your cycle wheel for sound effects have some idea of the noise! The ability to hear the song does decline with age. I am in my mid-fifties and could hear it easily last year but friends in their late sixties and seventies could not – fortunately, a bat detector set at about 20 Khz will enable you to hear them at considerable distances.

Like many of our Orthoptera, the Great Green Bush-cricket has a relatively short season as an adult insect. I have recorded them singing between late June and early October, with the peak month usually being August. The nymphs, of course, appear much earlier in the year with April being the usually stated month of emergence, but I have not studied the insect at this stage yet. They enjoy long, warm summers, and numbers would probably increase if we had a succession of these. Similarly, hard winters may reduce the size of a colony, presumably because only the eggs laid in optimum sites are able to survive prolonged low temperatures. As I write, we are in the middle of the coldest winter spell for several years, with lows of -6C in my garden; this may well affect the two colonies that I have been recording for the past few years.

From the above, it will not be surprising to learn that this bush-cricket has always been considered to have a rather southerly distribution within the British Isles. In view of the locations of the two colonies that I know of in 'old' Cambridgeshire, it is worth reviewing what some publications have to say about

the distribution. In 1965 Ragge wrote "this species is most common in coastal districts and especially along the south coast. Warmth and sunshine are of great importance to it." He then mentions particularly the counties of Dorset, Devon and Cornwall. In 1988 Marshall and Haes published *Grasshoppers and Allied Insects of Great Britain and Ireland,* which is, as far as I know, still the most authoritative book available on the British Orthoptera. Their map shows the species to be present in 1961 or later in VCs 29 and 31. These are the two most northerly vice-counties with 1961 or later records apart from East Norfolk, VC 27, but the text then suggests that "it is probably extinct on the Norfolk coast." The writers also add that "it may persist by the main railway line near Huntingdon, but has probably gone from all its other once-numerous fenland sites." One further and for me very interesting comment is this – "Inland it is now a distinctly local species." In 1997, Haes and Harding published the *Atlas of grasshoppers, crickets and allied insects in Britain and Ireland*. This appears to confirm more or less the distribution suggested in the previous text but what is striking is how few colonies, now plotted as 10k squares, actually existed as 1970 onwards records; in the 100k square that includes VC 29, 'old' Cambridgeshire, there are just six 1970 or later dots – two in Essex, one in the Peterborough area, one on the Norfolk/Suffolk border, one close to Huntingdon and one which must represent the colonies with which I an familiar today. It is indeed clear from this map that at the time the records were compiled the Great Green Bush-cricket was predominantly a coastal insect, with extensive areas of some southern counties devoid of records apart from their coastal fringes. Finally, a recent publication, *A Photographic Guide to the Grasshoppers and Crickets of Britain and Ireland* (Evans and Edmondson, 2007) confirms that the species is "quite scarce inland" with colonies "as far north as Westbury-on-Severn in Gloucestershire and inland in Suffolk." Curiously, alongside this text is printed a map which seems to show a widespread distribution across all of southern England, all of East Anglia and even a presence up through the midlands and into the southern edges of Lancashire and Yorkshire.

The historical situation in Cambridgeshire

Marshall and Haes, as already quoted above, suggested that the Great Green Bush-cricket was once numerous in the fens but they give no indication of the data upon which that assertion is made. The Orthoptera have never been as widely or as systematically recorded as some other insect groups, such as the Lepidoptera, and at any one time it seems likely that only a few naturalists would have been interested in making records – in some eras perhaps only a single individual was taking any notice of them. The NBN Gateway offers a fascinating insight into the past history of our fauna – with the proviso, of course, that it only shows which records have been submitted to it; other records may still exist in the notebooks and memories of older naturalists. A recent search of the Gateway turned up 20 records for Cambridgeshire and 17 for Huntingdonshire. The Cambridgeshire records fall approximately into two groups: those made in the 1920s and 1930s, and those made from the 1970s

onwards. Only two records appear for the new century and these relate to the two colonies that I personally know about.

These two colonies are, I believe, responsible for 13 of the 20 Cambridgeshire records on the database. Of the remaining 7 records, only one is in what I would call modern times – near Stapleford in the Gog Magog Hills in August 1989. This is in the far south-east of the county. The other six records are much older; for example, Coveney near Ely in 1924. It would appear from the records held on the database at present that the Great Green Bush-cricket has had a rather limited distribution in Cambridgeshire for a considerable period of time; whilst it may be a difficult insect to locate and to catch, it is by no means difficult to hear for most younger people, and its habit of singing on into darkness on still summer evenings certainly attracts the attention of non-naturalists.

My original assumption was that the agricultural intensification that began in the 1960s was to blame for the species' scarcity but this does not seem to be the case. Based only on the published records, this bush-cricket does not seem to have been widely reported in the county at any time in the twentieth century. If it ever was "numerous", it may only have been so at the time before the drainage of the fens began in the seventeenth century; between then and the twentieth century it may well have been more widespread than now because even after drainage it is likely that plenty of damp, overgrown areas remained where wildlife in general must have flourished. However, it seems that by the beginning of the twentieth century the Great Green Bush-cricket was a very local insect in 'old' Cambridgeshire.

As a check on the above, I then searched the Gateway for records of two species that are common today in Cambridgeshire and which I have no reason to suspect have not always been relatively common; these are the Common Field Grasshopper, (*Chorthippus brunneus*), and the Dark Bush-cricket, (*Pholidoptera griseoaptera*). The former species has only three records pre 1970 and the latter has none at all! This suggests either that the Orthoptera really were all rather scarce in Cambridgeshire in the early twentieth century – and I think that is unlikely – or that very few people were bothering to record them, perhaps because they were so common. It is interesting that records of the Great Green Bush-cricket outnumber those of what were probably more common species; I would put this down to features identified earlier – its large size and its loud, far-carrying song. It is among the most likely of our Orthoptera to be noticed by non-specialist observers, and I still think that the paucity of records indicates that has not been numerous in Cambridgeshire for a long time.

The 1990s

The publication of the *Atlas of Grasshoppers, Crickets and Allied Insects in Britain and Ireland* by Haes and Harding in1997 led to an increase in recording in many areas. In Cambridgeshire the baton was taken up by Adrian Colston who rapidly organised recording within the county as well as making many new contributions himself over the next few years. His results were published in three editions the present journal, and in the first of these, in 1998, Colston

reviews the situation regarding the Great Green Bush-cricket: two post 1980 10-km squares have records; 5 10-km squares have the species not recorded since 1980. I have not seen the data that Colston was using but this fits pretty well with my own rather less professional conclusions based on the NBN Gateway. Colston states "Since 1980 it has been recorded in four separate sites." His map shows these sites; three are clearly related to my own two colonies, and the fourth is in the far south of the county, representing a record with which I am unfamiliar. For the sake of completeness, it is worth pointing out that Colston refers to two authors who also claim that the insect was "very common" – Burr (1904) – or "formerly abundant in VC 29" - Worthington (1938).

The present situation

I first took an active interest in the Great Green Bush-cricket in 2005, partly as a result of Adrian Colston's articles. On the 21st August I visited a site near the village of Aldreth which I knew was one of the last places to have records of *viridissima* in Cambridgeshire. I was not optimistic – I rarely am – but a friend had told me that a man who cuts the grass along some of the riverside paths had reported seeing huge grasshoppers while he worked. It was a hot, humid afternoon with only intermittent sunshine. I began recording at 2.00pm and had soon found plenty of Orthopterans; it may be worth listing them, in fact, as both sites for the Great Green Bush-cricket have a relatively high number of other species: present were Dark Bush-cricket, Roesel's Bush-cricket (*Metrioptera roeselii*), Long-winged Cone-head (*Conocephalus discolor*), Speckled Bush-cricket (*Leptophyes punctatissima*), Field Grasshopper, Meadow Grasshopper (*Chorthippus parallelus*), and Lesser Marsh Grasshopper (*Chorthippus albomarginatus*).

It was not until almost 4 pm that I first heard an unfamiliar song. I see from my field notebook that it took me another ten minutes to locate this first Great Green Bush-cricket, first because it appeared to be something of a ventriloquist, and second because it can be so difficult to see even when you are close by. I was amazed by the size of the beast – in this country we generally seem to deal with rather small insects but this looked at least as long as my forefinger! It was most definitely aware of my presence even when I was several feet away – it would stop singing if I moved carelessly and if I continued to approach, it would move around the stem so that it was more difficult to see. This behaviour I have seen many times in the Short-winged Cone-head (*Conocephalus dorsalis*), but it is also common in the Great Green Bush-cricket. By 4.30pm other males had begun to sing in the area, and that afternoon I located a total of fifteen by song; whilst the Great Green Bush-cricket can be found singing earlier in the day, I have proved several times on the two sites near me that often they will not begin to sing until late afternoon, even when conditions seem ideal. Surveys taking place earlier in the day could miss this species.

I have visited the Aldreth site annually since 2005. The Great Green Bush-cricket seems to be well established over quite a wide area, with at least a mile and a half sometimes recorded between the most distant males. The most that I have found in a single visit is thirty-three singing males – that was on the 28th

July, 2007. The area is predominantly intensively-farmed arable land and the crickets are concentrated along field margins and the sides of tracks. The Old West River runs through the area but the banks are heavily grazed and the short vegetation does not appeal to the crickets – they are invariably found in thicker, taller herbage up to a metre in height, and I suspect that this is a requirement if the males are to establish some kind of territory.

Much encouraged by this early success, I decided to visit the second site at which the species might still be present on 23rd August 2005. As I opened the car door not far from the village of Sutton and close to the banks of the Ouse Washes nature reserve, I could hear the by now familiar song, again from the thicker vegetation that edges most fenland droves. A slow walk of no more than 300 yards located at least 30 singing males. On 3rd September I returned, hoping to discover how far along the wash banks the colony extended. It was a hot afternoon and the insects were in full song; I estimated that there were at least 100 over a three quarter mile stretch. This was most exciting and I think that it was exceptional for an inland colony. I have since monitored this site annually and since 2005 I have not recorded more than 14 singing males on any one visit. The reasons for this 'decline' may include the following: 2005 was a good summer locally for the Orthoptera with the numbers of most species being relatively high; the colony area seems to be smaller than at Aldreth; the area includes some drain-side flood washes which in the past remained relatively dry – they are now more often flooded even in the spring; finally, much of the area occupied by the crickets in 2005 has since been more intensively grazed and the vegetation structure no longer suits them. In 2008 I found several males singing well away from the original point of discovery on field and ditch margins, much as at Aldreth. At my suggestion, the Environment Agency has fenced off a small section to prevent close grazing – they deserve credit for that and I hope it will be of some benefit to the insect.

Over the four years I have seen some fascinating behaviour in the Great Green Bush-cricket but this article is perhaps not the place to discuss that. As regards the present distribution in the parts of Cambridgeshire with which I am familiar, I am left with more questions than answers. Her are some of the questions:

- Are these the last two colonies left in the whole of fenland – the last two of a species that historically was considered by some to have been abundant? Over the last two years I have visited a number of possible sites including some of the old recorded ones but without further success.
- Why have they managed to survive on these two sites? The sites have some similarities in that they are both on the margins of arable land and close to waterways but in all other respects, including their vegetation, they are entirely unremarkable – there are hundreds of acres of apparently identical habitat in the fens.
- The soil types are slightly different, with that near Sutton being more typically the soft black fen soil, but at neither site are there exposed areas

of warm dry soil that some texts suggest they need for successful oviposition.

- In Cambridgeshire, what will be the consequence for the Great Green Bush-cricket of the climatic amelioration that seems to be taking place? Adrian Colston's work in the late 1990s showed that Roesel's Bush-cricket was spreading rapidly across the county, and he also successfully predicted the arrival of the Long-winged Conehead. The latter species has since spread, I believe, at a remarkable rate and occupies suitable sites in huge numbers. The Short-winged Cone-head also seems to have spread further west and north in the county since 2000. Will their much larger cousin respond in the same way?

I rather hope so. If these are the only survivors from the times when the county of Cambridgeshire was a wilderness of wetlands, then it is time that they had some luck, and there would be some sort of irony in it if they were in the end to benefit from our mismanagement of their environment – mismanagement which, some might say, began here with the wholesale drainage of the fens in the first place.

Although I have focused attention on the status of the Great Green Bush-cricket in 'old' Cambridgeshire, I would be most interested to hear of any records, ancient or modern, within the new administrative county area. If any readers would like to share information or thoughts about such abstruse matters as population cycles, colony structures and habitat preferences in other parts of the country, I would be most grateful; it seems that surprisingly little is known about one of our most impressive insects.

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Mistletoe (*Viscum album*) undergoes an explosive increase in Cambridge

C. James Cadbury and Philip H. Oswald

Abstract

An attempt at a comprehensive survey of Mistletoe (*Viscum album*) within the boundary of the city of Cambridge was made in the winters of 2007/08 and 2008/09. In this study it was recorded on 206 trees and shrubs, with over 1500 clumps in all. The four main centres of distribution were the Madingley Road area including Churchill College grounds, Newnham including Barton Road, the University Botanic Garden, and nearby areas including Chaucer and Latham Roads. At least 21 tree or shrub species and seven hybrids are known to have supported Mistletoe in Cambridge in recent years. The most frequent hosts were limes (*Tilia* spp.) and poplars (*Populus* spp.), followed by apples (*Malus* spp.), False Acacia (*Robinia pseudoacacia*) and, especially in the Botanic Garden, hawthorns (*Crataegus* spp.); however, the single tree with the most Mistletoe was a large Sugar Maple (*Acer saccharum*) in Huntingdon Road. Almost all the hosts had been planted; the Mistletoe itself, however, had apparently been dispersed naturally by fruit-eating birds, exceptions being in Milton Country Park and a Glebe Road garden, where it had been planted on apple trees. The highest Mistletoe was growing on poplars and limes 25–30 m above ground, but in the Botanic Garden it was growing as low as one metre from the ground on hawthorn. Though losses of Mistletoe on about 20 host trees were recorded between 1992 and 2009, particularly as a result of ten trees being cut down or dying in the Botanic Garden, it is clearly increasing explosively in Cambridge both in the number of host trees and in the number of clumps on individual trees. This is in line with recent surveys elsewhere in south-east England.

Introduction

Mistletoe is widespread in the southern half of England, but its distribution is patchy, with concentrations in Herefordshire, Gloucestershire, Worcestershire and Somerset, and to a lesser extent in the Home Counties. It is almost absent from the nearly treeless Fens (Briggs, 1995; Rumsey, 2002), but it is frequent in and around Cottenham, particularly in old orchards (Biological Records Centre; Crompton, 2006). In southern Cambridgeshire it has a scattered distribution, with Cambridge itself having most of the major populations.

John Ray (1660) recorded Mistletoe "*upon apple-trees chiefly*" but also "*upon White-thorne*", without localities, but there are only a few old records from Cambridge, dating back to 1863 from three gardens in Chesterton and 1898 from "the backs" (Crompton, 2006). In 1962 Roy Lancaster recorded 15 clumps of Mistletoe in the University Botanic Garden, on *Crataegus orientalis*, *Populus* × *canadensis*, *P. trichocarpa* and *Robinia pseudoacacia* (B.R.C.). There was a record from Chaucer Road (now Mistletoe-rich) in 1965 (B.R.C.: "large plant" "high up in a *Robinia*"). At least ten records in 1970–72 were included in the first national survey of the species, from nine of the 40 1-km

squares wholly or largely within the city boundary (B.R.C.). There was an apparent increase in 1978–82, especially in gardens on Barton Road, recorded principally by C.J.C. (Crompton, 2006). P.H.O. submitted records for a second national survey in 1994–98, particularly from the Botanic Garden. Between the end of December 2007 and early February 2008 and from January till April 2009 the present authors attempted a complete survey of Mistletoe within the city.

Methods

The following information was collected in this winter survey:

- location, including road and house number where applicable;
- host tree or shrub;
- number of clumps, though this was difficult for a densely infested tree;
- number of large clumps (more than *c.* 40 cm in diameter);
- where possible, female clumps bearing many berries;
- in some instances, the height of the clump above the ground;
- for Mistletoe-bearing trees or shrubs in the Botanic Garden, the code letters and numbers traditionally used on maps of the garden.

The term 'plant' has not been used here, because Mistletoe can grow along the branches of its host by a haustorial system under the bark, erupting at intervals to form aerial clumps or bunches (the term used by Vere, 2008). Mistletoe is dioecious, but absence of berries does not necessarily mean that a clump is male.

The Mistletoe sites were divided into ten areas:

A	TL 4357	Newnham, including Barton Road, Gough Way and Downing College sports ground
B	TL 4358, 4458	Queens Road to Wilberforce Road, including the grounds of Trinity and St John's Colleges, Madingley Road (south side) and Cranmer, Adams and Clarkson Roads
C	TL 4359, 4459	Jesus Green and Chesterton Lane to Madingley Road (north side), Storey's Way, the grounds of Lucy Cavendish and Churchill Colleges and New Hall, and to Huntingdon Road, including Sherlock Road and All Souls Lane
D	TL 4456, 4457, 4556, 4557	Fen Causeway, Trumpington Road, Chaucer, Latham and Newton Roads and Brooklands Avenue, Coe Fen (by Trumpington Road), Aberdeen Avenue, Fitzwilliam Road and the footpath between Brooklands Avenue and Long Road (Empty Common)
E	TL 4557	Cambridge University Botanic Garden
F	TL 4655, 4656	Hills Road, including Homerton College grounds, Glebe and Holbrook Roads and Cedar Court, close to Addenbrooke's Hospital
G	TL 4558	Christ's Pieces
H	TL 4561	Tredegar Close, Arbury
I	TL 4759	Barnwell Junction
J	TL 4762	Milton Country Park

All of these ten areas except the last four are situated in the south-west and southern parts of Cambridge.

Results

The numbers of trees parasitised in each of the areas and some details of the clumps of Mistletoe are given in Tables 1 and 2 below. Throughout this account 'Apple', 'Hawthorn' and 'Lime' (with initial capital letters) are used to signify *Malus domestica*, *Crataegus monogyna* and *Tilia* × *europaea* respectively.

Table 1: The numbers of trees and shrubs with Mistletoe in each area and the numbers of clumps on them

Area A	25 trees, particularly Apple, with a total of 248 clumps (39 large); three trees with 40–50 clumps, one with 30 and two with 15–17
Area B	32 trees, particularly poplars, and a *Cotoneaster* hedge, with a total of 263 clumps (24 large); one tree with *c.* 40 clumps and seven with 16–25
Area C	52 trees, mainly Lime, poplars and apples, with a total of 453+ clumps (89+ large); one tree, a Sugar Maple, with 100+ clumps, one with 60, three with 20–27 and four with 15–16
Area D	38 trees, mainly Lime and poplars, with a total of 187 clumps (44 large); one tree with 41 clumps, one with 19, one with 14 and one with 11
Area E	22 trees and a Hawthorn hedge with a total of 280 clumps (56 large); one tree with 48 clumps, one with *c.* 40, four with at least 20 and four with 10–19
Area F	26 trees, particularly Lime, various apples and False Acacia, with a total of 142 clumps (30 large); two trees with 35–40 clumps and two with 12
Area G	Two Lime trees, each with a single clump
Area H	One Sugar Maple with three clumps, including two with basal (fungal?) growths
Area I	One poplar with two large non-fruiting clumps
Area J	Three White Willows and three apples with a total of seven clumps (two large); one Apple with two small clumps, the rest with a single clump each

Table 2: Further quantitative data on the trees and shrubs with Mistletoe in each area

				Trees with 10 or more clumps			Known losses of trees since 1992
Area	Trees	Clumps	Large clumps (40 cm +)	100+	20–60	10–19	Trees
A	25	248	39	–	4	2	–
B	31 + hedge	263	24	–	5	4	–
C	52	453+	89+	1	4	6	–
D	38	187	44	–	1	3	1
E	22 + hedge	280	56	–	6	4	7 (+3 during survey)
F	26	142	30	–	2	2	–
G	2	2	1	–	–	–	–
H	1	3	–	–	–	–	–
I	1	2	2	–	–	–	–
J	6	7	2	–	–	–	–
Total	206	1587+	287+ (18%)	1	22	21	8 (+3)

The densest concentration of Mistletoe was at 111 Barton Road, where there were 12 trees supporting the species and a total of 181 Mistletoe clumps. Another concentration was on the Churchill College playing fields, where there were 12 parasitised trees with a total of 131 clumps. In the vicinity of the junction of Grange and Clarkson Roads about 76 clumps of Mistletoe occurred on eight trees and a hedge, representing five different genera and including several kinds of apples and two different hawthorns. The University Botanic Garden had 22 trees and a Hawthorn hedge with Mistletoe, but it was growing on eight further trees between 1992 and the beginning of the survey in 2007.

Mistletoe hosts

Including known extinctions, at least 21 species of trees and shrubs and seven hybrids (or cultivars of these) have supported Mistletoe in recent years. Among the 215 individual trees and shrubs recorded as bearing Mistletoe since 1992 the most frequent were limes (28.4%, on 61 trees), poplars (20.9%, on 45 trees), apples (17.7%, on 38), False Acacia: 12.6%, on 27) and hawthorns (9.3%, on 20). All the limes seem to have been *Tilia* × *europaea* except one *T. platyphyllos* in the Botanic Garden and two *T. cordata*, one on Barton Road and one at Homerton College. The *Malus* spp. included two ornamental crab-apple trees at 80 Glebe Road – a Purple Crab-apple (*Malus* × *purpurea*) and a *Malus* × *robusta* 'Red Sentinel'. Nine of the 17 hawthorns of various species, hybrids and cultivars were in the Botanic Garden, but there was an old tree of *Crataegus* × *prunifolia* in the front garden of 69 Grange Road with four clumps, one of them huge. There were six fairly recently planted Rowans (*Sorbus aucuparia*) with Mistletoe in Storey's Way. Six White Willows (*Salix alba*), a Weeping Willow (*S.* × *sepulcralis*) and five trees of four species of *Acer* also carried it – an Ashleaf Maple (*Acer negundo*) in Barton Road, a tree of *A. lobelii* in the Botanic Garden, a Norway Maple (*A. platanoides*) on St John's College fields and Sugar Maples in Huntingdon Road and Tredegar Close, Arbury. A *Cotoneaster horizontalis* hedge at the junction of Grange and Clarkson Roads bore two clumps. Unusual host species in the Botanic Garden were Folgner's Whitebeam (*Sorbus folgneri*) from China and two North American trees, a Yellow Buckeye (*Aesculus flava*) and, before the survey, a Black Walnut (*Juglans nigra*).

The trees with most Mistletoe were the Sugar Maple at 152 Huntingdon Road with 100+ clumps, a poplar on Churchill College playing fields with 60, a False Acacia in the Botanic Garden with 48, three Apple trees at 111 Barton Road with 50, 45 and about 40 respectively, and two more Apple trees, one behind 69 Grange Road and the other adjacent to the allotments behind 62 Glebe Road, with about 40. An ornamental crab-apple, *Malus* × *robusta* 'Red Sentinel', in the original Winter Garden at the Botanic Garden (but cut down during the current redevelopment), also had about 40.

Table 3: Genera of host trees and shrubs of Mistletoe in each area of Cambridge
Known losses of host trees since 1992, including four surviving trees now without Mistletoe, are in parentheses; in the Botanic Garden a *Populus*, a *Malus* and an *Acer* were cut down and all the Mistletoe on a *Crataegus* died during the survey.
* Mistletoe deliberately propagated.

	A	B	C	D	E	F	G	H	I	J	Total	%
Tilia	1	5	18	19	3	13	2	–	–	–	61	28.4
Populus	1	13	14	10	2 (+3)	1	–	–	1	–	42 (+3)	20.9
Malus	14	7	6	–	(1)	5+2*	–	–	–	3*	37 (+1)	17.7
Robinia	5	3	3	5	4 (+2)	5	–	–	–	–	25 (+2)	12.6
Crataegus	1	2	1	4	8 (+4)	–	–	–	–	–	16 (+4)	9.3
Sorbus	(1)	–	6	–	1	–	–	–	–	–	7 (+1)	3.7
Salix	(1)	–	3	(1)	–	–	–			3	6 (+2)	3.7
Acer	1	1	1	–	(1)	–	–	1	–	–	4 (+1)	2.3
Cotoneaster	–	1	–	–	–	–	–	–	–	–	1	0.5
Aesculus	–	–	–	–	1	–	–	–	–	–	1	0.5
(*Juglans*)	–	–	–	–	(1)	–	–	–	–	–	(1)	0.5
Total	23 (+2)	32	52	38 (+1)	19 (+12)	26	2	1	1	6	200 (+15)	100

Table 4: Host trees and shrubs of Mistletoe in Cambridge (at least 21 species and 7 hybrids)
Known losses of tree species since 1992 are in parentheses.
* Only in the Botanic Garden.

(*Acer lobelii**)	*Malus* × *robusta* 'Red Sentinel'
Acer negundo	*Malus* (other taxa)
Acer platanoides	*Populus acuminata**
Acer saccharum	(*Populus alba* var. *pyramidalis**)
*Aesculus flava**	*Populus balsamifera*
Cotoneaster horizontalis	*Populus* × *canadensis* 'Eugenii'
Crataegus laevigata 'Paul's Scarlet'*	*Populus* × *canadensis* 'Robusta'
Crataegus laevigata 'Punicea'	*Populus trichocarpa**
Crataegus laevigata 'Rosea Plena'*	*Robinia pseudoacacia* (incl. 'Decaisneana')
Crataegus × *lavallei**	*Salix alba*
Crataegus monogyna	*Salix* × *sepulcralis*
(*Crataegus orientalis**)	*Sorbus aucuparia*
Crataegus × *prunifolia*	*Sorbus folgneri**
(*Juglans nigra**)	*Tilia cordata*
Malus domestica	*Tilia* × *europaea*
Malus × *purpurea*	*Tilia platyphyllos**

Of the 23 trees with 20 or more clumps of Mistletoe 11 were apples, but there were six limes and six poplars among the 21 trees with 10–19 clumps.

In the first national survey of 1969–72 Mistletoe was recorded in 539 hectads (10-km squares) in England and Wales (Perring, 1973). The results were expressed as numbers and percentages of these hectads in which Mistletoe was observed on individual host species – 446 (82.7%) for Apple, 141 (26.1%) for

Lime, 129 (23.9%) for Hawthorn, 97 (15.0%) for Hybrid Black Poplar (*Populus* × *canadensis*) and 53 (9.8%) for False Acacia. In the second survey the results for each host genus (rather than species) were given as a percentage of the total number of all parasitised trees: see Table 5, where the results of the national survey are interim and those of the Cambridge survey are given for comparison.

Table 5: Principal hosts of Mistletoe in England and Wales (Briggs, 1995) and in Cambridge

	National 1994/95	Cambridge 2007–09 (n = 206)
Malus spp. (mainly *M. domestica*)	1st: 39.3%	3rd: 38 (18.4%)
Tilia taxa (mainly *T.* × *europaea*)	2nd: 17.9%	1st: 61 (29.6%)
Crataegus spp. (mainly *C. monogyna*)	3rd: 8.6%	5th: 17 (10.6%)
Populus taxa (mainly *P.* × *canadensis*)	4th: 6.9%	2nd: 43 (20.9%)
Robinia pseudoacacia	9th: 1.3%	4th: 25 (12.1%)

The top five host genera in Cambridge were the same as those in the national survey of 1969–72 (Perring, 1973) and similar to those in 1994/95 (Briggs, 1995), but their order and the proportions of the total differed considerably. Briggs (1999) provided histograms showing final revised percentages of records in 1994–98 on various host trees "across the country" and in four regions: the former histogram differs little from the partial results shown in Table 5, but that for east and south-east England shows a substantially higher proportion of Lime (*c.* 25%) than in the other regions. He commented: "Towns such as Cambridge and Luton boast curious clusters of sightings, but nowhere are there the sorts of concentrations seen in the midlands and central southern areas."

Height above the ground

The highest Mistletoe clumps were in poplars and limes, followed by White Willow and False Acacia. The lowest were in hawthorns, apples, *Sorbus* spp. and *Cotoneaster horizontalis*, followed by a Norway Maple on St John's College playing fields and a sucker on a False Acacia in the Botanic Garden. Also in the Botanic Garden, Mistletoe was growing only one metre from the ground in a Hawthorn hedge and a neighbouring tree of *Crataegus laevigata* 'Rosea Plena'. It was growing at this height too on an Apple in a garden in Barton Road.

Only two clumps, a small diffuse one on the Norway Maple mentioned above and another on an Apple at 66 Glebe Road, were recorded on the trunk of the host tree.

Colonisation

Only in rather few cases is there evidence of when a tree was first colonised or when later clumps appeared. The population of at least 100 clumps of Mistletoe on a large Sugar Maple at 152 Huntingdon Road is known by the owner to have been absent in 1968; it seems to have spread there from an orchard in neighbouring Sherlock Road. Most of this orchard has been destroyed but one Apple with Mistletoe still survives. Gill Bainbridge remembers that

there was no Mistletoe on the *Robinia* at 235 Hills Road in 1977 and only one small clump ten years later; P.H.O. believes that there was still only one clump in 1995, but he recorded two on 10 February 1998; C.J.C. recorded 35 clumps (six of them large) on 16 January 2009. P.H.O. recorded one clump on a poplar by Vicar's Brook at the end of the garden of 20 Chaucer Road in 2000 (Crompton, 2006), but there are now eight clumps (two of them large). However, a poplar on Downing College sports field east of Grantchester Road, often commented on by the late Dr Max Walters (e.g. Walters, 1997), had one huge apparently male clump when photographed by P.H.O. on 9 March 1998 and still has only this one clump, presumably because, as with the two large clumps on a poplar at Barnwell Junction, no berries are produced locally to increase the population. Harder to account for is the fact that the single heavily berried clump on a *Crataegus* × *prunifolia* at the north-east corner of the Systematic Beds in the Botanic Garden, first observed early in 1998 and now huge, did not produce any new clumps on the tree till very recently (three very small ones being observed this year), while, by contrast, two limes and the North American Yellow Buckeye on the western edge of the garden on which Mistletoe was first noticed during the same winter of 1988/89 now bear many clumps. The most heavily parasitised False Acacia (*Robinia pseudoacacia* 'Decaisneana') nearby, now with 48 clumps (18 of them large), seems to have carried only one clump on 21 February 1982 and still had only three by 1995.

Young clumps of Mistletoe with only two or three pairs of branches bearing leaves were observed on a number of trees, but in only some cases were these recorded. In an Apple at 3 Madingley Road there were eight such small clumps out of a total of 19 and the young tree of *Sorbus folgneri* in the Botanic Garden, which already bore one clump of Mistletoe on 4 February 2004, had eight further growths by 2009 including five small sprouts along a low horizontal branch.

Age of clumps

There seems to be little reliable evidence about how long-lived a clump of Mistletoe can be, though Vere (2008) says: "Over a period of twenty years or so bunches can grow to a diameter of up to two metres." In the Botanic Garden one large clump which now hangs down on long bare stems from a branch on the south-east side of a *Robinia pseudoacacia* 'Decaisneana' is known to P.H.O. to have been present as early as 1982 (see above).

Losses

Repeated observations by P.H.O. in the University Botanic Garden provide details of losses of Mistletoe there between 1992 and 2009. In eight instances the host tree was cut down – two *Crataegus* cultivars, a *Robinia pseudoacacia*, a variety of *Populus alba*, a *P. trichocarpa*, a *P. acuminata*, a *Malus* × *robusta* 'Red Sentinel' and an *Acer lobelii* (the last three during the period of the survey). A *Crataegus orientalis* bearing Mistletoe died in 1992 and part of a *C.* × *lavallei* died during the survey causing the death of all its Mistletoe. A heavily parasitised *Robinia* blew down and one of two huge clumps near the top

of a sick-looking Lime by Hobson's Conduit (Crompton, 2006: *c.* 12.11.1997 and 15.1.2003) was blown out of the tree early in 2007. A few years earlier the clump on a Black Walnut was lost when the branch on which it was growing either fell or was removed. A *Crataegus* cultivar and a *Robinia* have become enveloped in Ivy (*Hedera helix*) but without losing all of their Mistletoe, as happened to a large Hawthorn near the Station Gate that was finally felled before 1992. There were three instances in which a tree in the garden lost all its Mistletoe but was later recolonised – a Lime, the Western Balsam Poplar (*Populus trichocarpa*) mentioned above and a Carolina Poplar *P.* × *canadensis* 'Eugenii'.

Elsewhere historical details are too sparse to give a true picture of losses. Photographic evidence shows that one of two clumps on Lime at the west end of Brooklands Avenue was presumably blown down shortly before the survey and that the larger of two clumps at 1 Latham Road, again on Lime, similarly disappeared between April 2007 and April 2009. Earlier a White Willow was felled on the nearby part of Coe Fen; it was perhaps the host tree recorded by D. F. Boyes in 1978 (Crompton, 2006). Hawthorn trees here still bear Mistletoe, though clumps were lost from two of them when branches were cut in February 2008; however an unidentified tree with Mistletoe over the wall to the north of them (perhaps an Apple) can no longer be seen. The pollarding of a White Willow beside Bolton's Pit, Barton Road, in 2007 resulted in the loss of all its Mistletoe. A clump of Mistletoe on a *Crataegus* cultivar on Jesus Green recorded in 1991 (Crompton, 2006) disappeared shortly before Christmas one year (Susan Yates, pers. comm.) and the same thing happened to a clump on Rowan in Gough Way in December 2007; one clump was also removed from a poplar on Churchill College playing fields. On St John's College fields Mistletoe on the trunk of a Norway Maple is often picked and that on a Lime is threatened by enveloping Ivy.

Fruiting

Mistletoe is dioecious, but the occurrence of male and female clumps was not fully investigated in this survey. Unberried Mistletoe may in fact be barren female clumps rather than male and, although the difference between the small female flowers and the larger male ones, with their distinctive anthers which are sessile on the tepals, is quite clear at close quarters (see Plates 3 & 4 inside back cover), it is difficult to detect the sex of the flowers at a distance. The occurrence of berries on a small sample of host trees is shown in Table 7.

Table 7: Occurrence of berried Mistletoe on a few host trees

Site (area)	Host tree(s)	Clumps	Clumps with berries
Storey's Way (C)	*Sorbus aucuparia* (2 trees)	22	22
Churchill College (C)	*Populus* (5 trees)	22	14
New Hall (C)	*Tilia* (3 trees)	14	8
Botanic Garden (E)	*Malus* 'Red Sentinel' (1 tree)	*c.* 40	Probably < half
Botanic Garden (E)	*Robinia pseudoacia* (1 tree)	48	7 large ones + more
Botanic Garden (E)	*Robinia pseudoacia* (1 tree)	5	1
Milton Country Park (J)	*Salix alba* (3 trees)	3	2 (v. few berries)

Dispersal

Mistletoe is well adapted for dispersal by birds. The pulp of the berry is very nutritious, but the single seed is surrounded by a layer of sticky jelly that resists digestion in a bird's gut. When a bird defecates or wipes its bill, this jelly partially sets to form a glue-like slime that enables the seeds to adhere to tree branches (Snow & Snow, 1988; Vere, 2008).

The association between the Mistle Thrush (*Turdus viscivorus***)** and Mistletoe is well known. Other thrushes, Blackcaps (*Sylvia atricapilla*) and Waxwings (*Bombycilla garrulus*) also take the berries, but after an initial period in the autumn they are normally excluded by a single Mistle Thrush or a pair that defend the Mistletoe within their territory (Snow & Snow, 1988). Mistle Thrushes have large territories and are therefore thinly dispersed in Cambridge. During the winter of 2007/08 C.J.C. watched them feeding on Mistletoe berries in an Apple tree in Barton Road, in poplars on Churchill College playing fields and also, just outside Cambridge, on the Barton rifle range. A pair regularly nests in the grounds of Homerton College, where the lime trees carry Mistletoe (Stephen Tomkins, pers. comm.). Between the beginning of December 2008 and early March 2009 P.H.O. frequently saw Mistle Thrushes in the Botanic Garden, several times feeding on Mistletoe berries, and concluded that there were probably two separate pairs, one based among the False Acacias and the second among the lime trees near the western edge of the garden. On 9 December 2008 he watched one successfully defending the heavily parasitised branches of a *Robinia* from a small flock of Redwings (*Turdus iliacus*). In an earlier year he had observed one wiping its bill on a branch of this tree after feeding on Mistletoe berries, and on 10 March 2009 he saw this happen again on Lime.

It may be significant that increasing numbers of Blackcaps are now wintering in the city (Cambridgeshire Bird Reports for 2006 and 2007). On 31 January 1996, as P.H.O. approached the *Malus* 'Red Sentinel' in the former Winter Garden at the Botanic Garden, he saw a male Blackcap feeding, he thought on Mistletoe berries but he could not be certain because the bird took fright at his approach. Nobody that he spoke to at the time had heard of this species feeding on these berries, but it transpires that the habit is well known (e.g. Vere, 2008); indeed Briggs (2008) writes that "they wipe each seed direct from their beak" and that in continental Europe, where they winter in greater numbers, "they are considered the main mistletoe vector". He goes on to describe and illustrate how a single overwintering Blackcap wiped berries onto the branches of the trees and

shrubs in his garden. Interestingly, the 'Red Sentinel' tree, which formerly bore only two large clumps of Mistletoe, one male and the other female, became much more heavily parasitised after 1996, so that by the time it was cut down (see above) it was carrying about 40 clumps, eight of them large ones.

Most of the Mistletoe recorded in this survey was almost certainly derived from natural dispersal by birds, but Malcolm Busby, the Warden at Milton Country Park, has introduced it on three apple trees, though Mistletoe was already present on the White Willows at this site (three clumps in separate trees on 10 February 1998, *teste* P.H.O.). He obtained ripe berries from an orchard between Long Stanton and Willingham in February 2005. These were smeared directly onto the bark (without incisions being cut) and covered with gauze, and three clumps were propagated from 30–40 smears. By smearing berries onto two Apple trees at 66 Glebe Road over several years Eric Bentley has succeeded in propagating 17 clumps. On 28 April 2009 he showed P.H.O. the first tiny pair of leaves of what should become a further clump.

Discussion

The survey of Mistletoe in Cambridge in the winters of 2007/08 and 2008/09 was more comprehensive than any previous one. Despite the more thorough coverage achieved, there is good evidence that this hemiparasite is undergoing both a spread within the city and a population increase on individual trees (i.e. number of clumps). This is in line with an explosive colonisation of new trees and an increase in the number of clumps ("bunches") on trees at two sites in Essex and one in the London Borough of Redbridge between 1998 and 2007 (Vere, 2008) and in the grounds of Hampton Court Palace in the London Borough of Richmond between 1994 and 2008 (Marris, 2008). Rumsey (2002) says that the national survey in 1994–98 provided no evidence for any marked changes in distribution since that in 1969–72, and indeed the latest Botanical Society of the British Isles (2009) distribution maps indicate little alteration from that in *New Atlas of the British & Irish Flora*; however, dot-maps do not necessarily reveal changes in local frequency.

Earlier records suggest that deliberate propagation of Mistletoe has often been practised in the past. This may well have been the original source of the city's Mistletoe, since the plant was grown as a secondary crop in apple orchards and propagated for university teaching purposes in the Botanic Garden.

An important finding of this survey is that the predominant hosts of Mistletoe in Cambridge are limes and poplars, which are considerably more frequent than apple trees, the principal hosts recorded in national surveys. The limes were nearly all *Tilia* × *europaea* and most of the poplars were *Populus* × *canadensis*. With the exception of one tree in the University Botanic Garden (now defunct) no Mistletoe was found on White Poplar (*Populus alba*), nor on Grey Poplar (*P.* × *canescens*), one of the host trees in Vere's (2008) study area at Theydon Bois golf course, Aspen (*P. tremula*) or Lombardy Poplar (*P. nigra* 'Italica').

Why should Mistletoe be thriving in the suburban environment of Cambridge whereas it is generally scarce in more rural parts of the county? Does the slightly warmer climate within the city favour aspects of the plant's ecology and do

more avian dispersal agents winter there? Mistle Thrushes occur at low density, with large territories, over much of Cambridge and winter numbers may be only slightly swollen by immigrants. Numbers of overwintering Blackcaps have certainly increased in recent years: they do not usually feed high up in trees, a frequent location of Mistletoe clumps, but they may well be responsible for increasing the quantity of Mistletoe at lower levels, for example in apple trees.

Acknowledgements

We are glad to thank the following for helpful information: Gill Bainbridge, Eric Bentley, Malcolm Busby, Gill Goodhart, Pauline Melville, Chris Preston, Stephen Tomkins, Susan Yates, a groundsman of St John's College and several unnamed courteous householders.

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Pisidium tenuilineatum Stelfox, a bivalve new to Cambridgeshire

Peter Wilson

Introduction

Pisidium tenuilineatum Stelfox, the Fine-lined Pea Mussel, is one of the smallest and rarest British freshwater bivalves. It can be distinguished from other species of *Pisidium* not only by its small size (>2mm) but also by its numerous (>20 per mm) fine concentric ribs, which are regularly spaced on its whitish shell. Sometimes the shell can be discoloured by encrusting material (Ellis, 1978; Killeen *et al.*, 2004).

Occurrence and distribution

In December 2007 *P. tenuilineatum* was discovered at Sheep's Green, Newnham, constituting a new vice-county record for Cambridgeshire. Elsewhere in the British Isles it has been found mostly in the River Thames catchment area and in the Hampshire basin, in hard-water rivers of all sizes, usually in small numbers. Occasionally it occurs in ponds (Kerney, 1999).

Site description and method of collection

In the southern corner of Sheep's Green on the fen in Cambridge a mill stream leads off the River Cam and runs directly, for about 500m, under Fen Causeway to the mill at Newnham. About 50m from the junction with the Cam (TL447573), the mill stream is approximately 12m wide and 40cm deep. Here there is a build-up of muddy sediment on the bottom, presumably brought there by the River Cam when in spate. Small patches of blanket-weed algae were growing on the bottom. While standing on the concrete bank here, the former site of the girl's swimming pool fifty years ago, a few shells, which turned out to be *Pisidium amnicum* (8-10mm), were noticed on top of the muddy sediment. These were collected in a net together with some sediment from immediately beneath them. Then the net was 'swished' through the water to get rid of excess silt and clay. Numerous empty shells of bivalves and gastropods, shell fragments and pieces of tufa were left in the net together with leaves (mostly Crack Willow), twigs and fine gravel. The small specimens, not recognized in the field, were washed again at home in a kitchen sieve (mesh size approx 1.5mm) and sorted, using a binocular microscope. The fine sediment passing through the sieve was also examined for small molluscs. The bivalves found were then frozen to kill the animals. They were then placed in warm water by a radiator for a fortnight to soften the ligament (Ellis, 1978) and to enable the valves to be separated using fine paint brushes. They were then cleaned, also with fine paint brushes, and dried on tissue paper before being identified using a microscope.

Collecting first took place in 2002 and since then molluscs have been searched for at the same location and recorded in most years. Among those collected on December 11th 2007 were 11 species (and two forms) of the genus *Pisidium* listed in Table 1.

They were presumably living, with a few small gastropods, on the surface of the sediment where there was some blanket-weed for shelter.

Scientific name	Common name	Live (L) or Shells (S)	Frequency
P. amnicum	River or Giant Pea Mussel	*L*	common
P. casertanum	Caserta Pea Mussel	*L*	common
P. casertanum form *ponderosa*		L	common
P. henslowanum	Henslow's Pea Mussel	*L*	common
P. hibernicum	Globular Pea Mussel	S	rare, one valve
P. milium	Quadrangular Pea Mussel	S	rare, two specimens
P. moitessierianum	Pygmy Pea Mussel	L	quite common
P. nitidum	Shining Pea Mussel	*L*	common
P. nitidum form *crassa*		L	common
P. personatum	Red-crusted Pea Mussel	*S*	rare, two valves
P. subtruncatum	Sharp-ended Pea Mussel	*L*	common
P. supinum	Hump-backed Pea Mussel	L	common
*P. tenuilineatum**	Fine-lined Pea Mussel	L	rare, four specimens

Table 1. *Pisidium* species collected on 11th December 2007 at TL447573. *Red Data Book 3 Rare. UK Biodiversity Action Plan priority species. Frequency key: common >40 animals; quite common >20 animals.

Notes about the *Pisidium*

The presence of empty shells of those species not found alive, *P. hibernicum, P. milium* and *P. personatum*, suggests that these bivalves are living further upstream in the Cam catchment area. *P. personatum* is a very common pea mussel inhabiting small ponds, marshes and ditches, including those that dry out in summer. It could easily have been washed into the river from adjoining marshland.

In 2003 and 2005 a few empty shells of the beautiful *P. pulchellum* turned up in sediment from the Sheep's Green site.

Five of the pea mussels recorded in Table 1 as 'common': *P. amnicum, P. casertanum, P. henslowanum, P. nitidum* and *P. subtruncatum*, are generally widespread in small and medium sized rivers in East Anglia.

P. casertanum form *ponderosa, P. moitessierianum, P. nitidum* form *crassa* and *P. supinum* are all bivalves of medium and large rivers (Killeen *et al.*, 2004) like the Cam at Sheep's Green. These four species all have thick shells.

Only four specimens of the elusive *P. tenuilineatum* were found after about six hours of searching under a microscope, (this included looking for small bivalves in sediment and identifying the cleaned shells). Similar searches carried out in the previous five years did not detect this interesting pea mussel.

Additional information

Attached to the outside of a few shells of *P. supinum, P. subtruncatum, P. henslowanum* and *P. tenuilineatum*, were up to twenty stalked epizoites (each

about 0.3mm including stalk). They were invariably positioned on the umbo (the oldest part of the shell) or near the posterior margins of the valves. These sessile animals require a firm base for anchorage and may benefit from the small water currents produced by the siphons of the *Pisidium*. Also, as the *Pisidium* take up a position where there is a suitable flow of water for their own needs, this alignment in a current could be useful for the epizoite as well.

Given the diversity of habitat preferences of the *Pisidium* they cannot have lived together but one can speculate where each species may have come from. In stormy conditions the mussels could have been dislodged from their normal home in the River Cam, carried away in flood water and deposited in the mill stream at Sheep's Green, together with empty shells and sediment picked up by the river in spate. Perhaps some naturally move out of the river and into the mill stream where they settle. The more common pea mussels, e.g. *P. subtruncatum* and *P. nitidum*, are probably established residents of the mill stream.

This pleasant grassy area with trees and bushes, where the mill stream and River Cam diverge, together with the numerous geese and ducks and the recycled water of the Cam, makes the Sheep's Green site unsuitable for public swimming today. It would certainly need to be dredged as the mill stream is shallower now. On the plus side the presence of three of the pea mussels, *P. supinum, P. moitessierianum* and *P. tenuilineatum*, which are indicative of 'good' freshwater habitats i.e. those with a high species diversity (Kerney and Stubbs, 1980), shows that this site by the River Cam is of conchological interest.

Acknowledgments

I would like to thank Geraldine Holyoak of the Conchological Society of Great Britain and Ireland for help with identification of the *Pisidium* species and Martin Willing, also of the Conchological Society, for confirming the identification of *P. tenuilineatum.* Voucher specimens have been deposited in the University Museum of Zoology, Cambridge.

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Scarce and rare Click beetles at Wimpole Estate and south-west Cambridgeshire

Simon Damant

Elater ferrugineus at Wimpole and in south-west Cambridgeshire

The discovery of this beetle was previously described in this journal (Damant, 2006). There was an historical record of *Elater ferrugineus* at Grantchester pre-1950; no other records were known in Cambridgeshire (Mendel & Clarke 1996). There have been a couple of more recent records from Suffolk.

The first modern Cambridgeshire record of *E. ferrugineus* was at Wimpole, bred from larvae collected from a Horse Chestnut tree in Wimpole gardens in 2001. Dr Peter Kirby also caught mature beetles in Wimpole Park during his saproxylic insect survey in 2001 (Kirby 2002). Since this time many trees have had the larvae of this rare beetle found in them; five trees have now been blown down and the rot hole cavities inspected. Trees with cavities used by birds such as Jackdaw, owl species, duck and others were Beech, Apple, Oak, Horse Chestnut and Maple. This beetle would seem to be nocturnal as two have been seen at night when collecting for other species. One was on the trunk of a Lime and the other inside an old Maple trunk. Another was found during daytime but hiding in an old Maple.

Further Cambridgeshire records are as follows:

Stapleford

Winter 2002: while undertaking the removal of an Ash tree, a large rot hole cavity previously occupied by birds was explored and contained a large number of *E. ferrugineus* larvae. Larvae were also found in the galleries of the Lesser Stag Beetle. These were reared out for positive identification.

Croxton

Winter 2002: again while undertaking tree surgery a smaller number of *E. ferrugineus* larvae were found in an old Ash tree with a large bird's nest, these were also bred out for confirmation.

Shepreth

March 2005: while taking down and removing a hollow Horse Chestnut tree in a large garden, some old nesting material was inspected. This revealed at least ten *E. ferrugineus* larvae that were bred out. However a number are still maturing as larvae.

Hardwick Wood

Winter 2005: while on a bryophyte excursion I inspected an Ash tree on the edge of the woods that had had a limb removed many years previously. A bird's nest was found within a large cavity that had formed. One larva was taken for identification and later reared to an adult.

Grantchester

Winter 2006: on 4th February larvae were found in a Horse Chestnut tree that had been felled. Larvae were found underneath a large nest, probably that of an

owl. It had obviously been used as a nesting site for decades and had multiple layers to the nest. There is a strong likelihood that these beetles may have used this tree for decades, as it was an extremely large tree in the advanced stages of becoming totally hollow.

Longstowe

Summer 2006: an adult was brought to me by Leslie Manderson. At first I assumed it belonged to the *Ampedus* group but after enquiring about the find with Dr Peter Kirby and Howard Mendel it was identified as *Elater ferrugineus* var. *occitanicus* (Plate 5, back cover). This is a very rare form with a black head but with red hairs, and the same size as *Elater ferrugineus.* There is an even rarer form that is almost entirely black.

In the last five years at least twenty trees have been found to contain *E. ferrugineus* larvae. However a number of these have since been lost including those at Stapleford, Shepreth, Grantchester and at least five at Wimpole. A full survey at Wimpole would no doubt reveal many other trees with *E. ferrugineus* larvae within small and large cavities used in the most part by birds. All records are from south-west Cambridgeshire in what could be described as an area of mainly arable monocultures interspersed with small villages with large gardens and mature trees. This is very surprising as for the most part the other British records are in areas where ancient trees and wood pasture exist, mainly Windsor Park.

The likelihood is that in south-west Cambridgeshire there may be many more trees where *E. ferrugineus* exists as the tree species and age do not seem to be important. It would seem that any tree that produces a suitable cavity for nesting birds (which probably provide rich nitrogenous material) will provide the perfect breeding and development site for this large, spectacular and very rare beetle. From one of the trees blown down at Wimpole I collected the whole of the nesting material in a large cavity. Many *E. ferrugineus* larvae were present as were other beetle, moth and fly larvae including *Pocota personata,* a RDB2 hoverfly. After the first year almost all other species of larvae except *E. ferrugineus* had gone. The assumption was that *E. ferrugineus* had devoured most of these. Having reared the beetle from larvae for five years it became apparent that the development could take as long as four years and that larvae would eat each other if too many were kept together. When the time came to pupate, larvae formed a cocoon of debris from within the cavity and this was about 25mm in length and up to 10mm wide with a smooth chamber inside. Approximately four weeks was needed for the pupae to develop into beetles and in most cases I released them. However I did keep one alive, with no nectar or other food available, for nearly one month. Recently the larvae found at Grantchester seemed to be eating old Horse Chestnut fruits that had partially gone rotten and I have seen this at Wimpole where squirrels store away the conkers in large tree cavities.

The question is - is this beetle a remnant from the past or a result of a recent expansion of its range? As an invertebrate of some considerable size it is possible that it could travel many miles especially as they would seem to be long

lived as adults. However there are old records for Cambridgeshire and Suffolk and it is possible that the transition from ancient primary woodland to a medieval agricultural landscape that used pollard trees for firewood and building material may have provided the necessary link to the present. Pollarded trees, especially Elm, in Cambridgeshire are long lived and would have supplied the necessary large cavities that birds used for many generations. It is unfortunate that Dutch Elm Disease killed many of these magnificent ancient pollards, although some villages, such as Knapwell and Connington, still have some surviving. It is possible that *E. ferrugineus* could be found in even more rural villages of south-west Cambridgeshire.

Other places with long standing continuity of trees are the old orchards and landscape parks like Croxton and Wimpole with their roots in the medieval past; these may have also provided the necessary sanctuary during the recent arable revolution of the late 20th century.

Current and real threats to this species are still present. Many managers and co-operative bodies would seem no longer to tolerate any form of risk to the public and the easiest management option for old and decaying trees has been to remove the problem altogether which has led to a resultant loss of habitat.

In many cases the designation of risk areas has not taken into account the usage of that particular wood, open countryside or path, and a blanket management decision has been taken to reduce the hazards regardless. This can cost a phenomenal amount and better targeting of resources can be directed to those areas that have a real risk to the public. Those trees alongside very busy A roads and built up urban areas are a higher risk; in bad weather this is where almost all fatalities occur. All effort and resources should be made to reduce the hazards such as broken limbs, large loose deadwood and unhealthy trees. Paths in the open countryside and woodland that have very few people passing per day can be deemed as not requiring a yearly inspection but an informal visit every few years with only the very serious hazards removed i.e. those in imminent danger of falling down. The likelihood of injury or death is extremely low and in actual fact the annual winter storms usually clean out the worst trees when almost no person ventures out.

It is also my opinion that many of the trees that have been removed could have easily been pollarded or re-pollarded to a suitable height and allowed to decay over many years with almost no danger to the public or buildings. This would give back Cambridgeshire its rural landscape that in less than 30 years has diminished quite dramatically. It is also interesting to note that Sycamore is a very good candidate for pollarding and would greatly benefit saproxylic invertebrates; however Ash, Oak, Beech, Field Maple and Hornbeam could be planted on field edges. Existing semi-mature trees could also be treated this way especially those with low side branches. It is best to cut the low limbs, first leaving 6"-12" long stubs then let them re-grow and later reduce the top canopy for best effect.

As a note, the Hardwick Wood tree was on the edge of the woodland and had its large limb over the field lopped off many years previously by the farmer. This was not a tidy job but was very effective at producing a rot hole cavity

suitable for nesting birds. This has also been true of a Horse Chestnut at Wimpole where one of the previous tenant farmers lopped a very large limb that was overhanging his field. This tree is still standing and has *E. ferrugineus* larvae in the rotting stub that contains a big bird's nest.

Other rare click beetles found at Wimpole.

Procraerus tibialis. There are no official records of this beetle in Cambridgeshire (Mendel & Clarke 1996). This beetle was taken as it emerged from a dead Lime tree lying on the ground at Wimpole in the summer of 2002.

Ishnodes sanguinicollis. This is quite common at Wimpole and is best found at night on tree trunks, especially Ash. There is only one official pre-1950 record in Cambridgeshire (Mendel & Clarke 1996). However a number were bred from rot holes in the old south avenue elms at Wimpole by Ivan Perry in 1976, and from the park in 2000 and 2001 and by me in 2002, 2003 and 2004 and by Dr Peter Kirby in 2001 (Kirby 2002). I have also collected it from Croxton Park in 2002.

Athous campyloides. This beetle was recorded by Dr Peter Kirby when undertaking an arable invertebrate survey in 2003 (Kirby 2004) and was caught on a Countryside Stewardship strip next to the Gloucester woodlands. However the larvae of this species feed on plant roots and it is not a saproxylic species. There are records from pre-1950 and 1950-1996. (Mendel & Clarke 1996).

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Analysis of Barn Owl Pellets from a Fen Habitat

John Green and Roger Featherstone

This study was undertaken to provide data for a national survey of Barn Owl diet organised by the Mammal Society. It was also intended to provide records for the Cambridgeshire Mammal Atlas.

Barn Owl pellets were collected at approximately six-weekly intervals over a thirteen month period (November 2004 – December 2005) from a disused stone barn in the fens near Wilburton, south west of Ely. A Barn Owl nest box had been installed in this barn some considerable time prior to this study and an owl was frequently present when collections were made.

The barn is located amongst a group of disused farm buildings and two occupied cottages interspersed with some rough grass – an area of less than one-half hectare in an isolated situation, surrounded on all sides by arable fields cropped with cereals, oilseed rape and sugar beet. Other grassland in the area is restricted to narrow strips along the lanes and fen ditches.

Date of Collection	No of Pellets Analysed	CS	PS	WS	FV	BV	WV (Juv)	WM	HaM	HM	BR (Juv)	Total Prey Items
10/11/2004	30	23	3	1	30	12	-	13	1	4	2	89
21/01/2005	16	14	3	1	22	10	-	12	-	-	-	62
01/03/2005	19	17	2	-	27	19	-	3	1	-	-	69
11/04/2005	22	16	2	-	31	11	-	24	1	1	3	89
02/06/2005	11	4	2	-	13	8	1	3	-	-	-	31
23/07/2005	14	8	5	-	23	4	1	6	4	-	-	51
30/08/2005	7	3	-	-	4	1	-	16	-	-	-	24
04/11/2005	21	1	3	1	32	12	-	23	-	-	-	72
09/12/2005	31	-	2	-	70	15	-	17	-	-	2	106
Total	**171**	**86**	**22**	**3**	**252**	**92**	**2**	**117**	**7**	**5**	**7**	**593**
Percentage of Total Prey		**15%**	**4%**	**0.5%**	**42%**	**16%**	**0.3%**	**20%**	**1%**	**0.8%**	**1%**	

Table 1. Analysis of prey remains in Barn Owl Pellets from an arable farmland location near Ely.
Key: CS – Common Shrew; PS – Pigmy Shrew; WS – Water Shrew; FV – Field Vole; BV – Bank Vole; WV – Water Vole; WM – Wood Mouse; HaM – Harvest Mouse; HM – House Mouse; BR – Brown Rat.

The pellets were collected by RF and analysed by JG. In total, 171 pellets were analysed and remains of 593 different prey items were identified. Apart from the first collection (10/11/2004), virtually all pellets collected on a visit will have been deposited since the last visit. Table 1 shows the analyses of the pellets from each collection and in total.

Ten species of mammal were identified in total. Field Vole (*Microtus agrestis*) was the most common prey numerically (42%), with Wood Mouse (*Apodemus sylvaticus*) (20%), Bank Vole (*Clethrionomys glareolus*) (16%) and Common Shrew (*Sorex araneus*) (15%) also significant prey items. Pygmy Shrew (*Sorex minutus*) (4%), Harvest Mouse (*Micromys minutus*) (1%), juvenile Brown Rat (*Rattus norvegicus*) (1%), House Mouse (*Mus domesticus*) (0.8%), Water Shrew (*Neomys fodiens*) (0.5%) and juvenile Water Vole (*Arvicola terrestris*) (0.3%) occurred less frequently. No significant seasonal variation in prey composition was apparent.

Most studies of Barn Owl diet in Britain show a heavy reliance on and preference for Field Voles. In this arable fenland habitat, although Field Voles are the most common prey, these owls are taking a wide range of small mammal species with several of these species contributing substantially to the owls' diet.

A similar picture was found by Stuart (1992) working in a similar habitat south-east of Ely. In her study, the relative abundance of various small mammal species in Barn Owl pellets reflected that in the whole small mammal population as determined by Longworth live-trapping.

It would be expected that in this arable fenland, small mammal populations would be relatively low. In this situation, it would appear that the barn owls will eat whatever they can catch.

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Black Poplars *(Populus nigra betulifolia)* in Cambridgeshire

A survey co-ordinated by Cambridgeshire & Peterborough Biological Records Centre – 2006

Summarised for Nature in Cambridgeshire by Louise Bacon

The last major survey of Cambridgeshire Black Poplars was about ten years ago as part of a national survey promoted by the Daily Telegraph. It was therefore timely to carry out another county-wide survey to determine which were still standing, and also to find any newly planted trees to add to the records and obtain an accurate picture of the status of Black Poplars in the county. Earlier surveys in "old" Cambridgeshire (vc29) were summarised in Nature in Cambridgeshire (Easy, 1982, 1991). This survey collated existing survey data, checked for the continued existence of those trees, and asked for the public to inform the records centre of Black Poplars known to them. All trees were checked for identity as native Black Poplar (rather than hybrids), for the size of tree and general health condition. Importantly, the survey additionally tried to establish how many trees were females.

Habitat and distribution

The Black Poplar, also known as the Water Poplar, is Britain's rarest native timber species. It is thought that there are only about 7000 of these trees left in England and Wales, and of these only about 600 are female (Cooper, 2006). Their favoured habitat is wetland, and they are more likely to be found along the edge of river banks and in other low-lying, wet areas. They are not found in Scotland or the more northern parts of England, as they prefer the milder climates of southern England and Europe. The strongholds of this species are the Vale of Aylesbury in Buckinghamshire and the Dedham Vale area of Suffolk.

This tree is in decline and nationally rare, which may be attributed to a number of factors:

1) <u>Natural reproduction is very rare</u>

Black Poplars are dioecious, meaning individuals are either male or female. Therefore for reproduction to occur, the two sexes need to be close to one another.

This problem is further exacerbated by the fact that for germination to occur, seeds need very specific conditions, the seeds need to fall on to bare ground that is free from competition but remains wet, (but not flooded) from June-October. If flooding or drought occurs then the seeds will no longer be able to germinate. The seeds are also only viable for a short time.

2) Native Black Poplars are no longer being planted commercially

Hybrid poplars are being planted instead of native Black Poplars as they are faster growing and produce straighter, better quality timber.

3) Only a small proportion of mature trees are female

At the time Black Poplars were being planted commercially, male trees were favoured by landowners because female trees produce large amounts of fluffy seed in June, which made the land look very untidy and also got into crops, making them less saleable at market.

4) Habitat loss

The loss of wetlands, which is the Black Poplar's main habitat, has led to further loss of this tree species. The drainage of winter-flooded meadows has also had an impact, resulting in the loss of suitable habitat for germination.

The survey & previous records

Existing records were collected from three main sources: the Biological Records Centre, Monks Wood, from the vc29 Cambridgeshire flora database on-line (http://www.cambridgeshireflora.com) and the data from the 1994 Daily Telegraph survey, held by Huntingdonshire District Council. Secondly, a public survey was launched, asking the public to inform the CPBRC of any Black Poplars they knew of.

All existing and new records were then visited to ensure all the existing records were still standing and to confirm any new records were native Black Poplars. A standard form was developed for use by everybody checking trees, which asked for a variety of information about the trees.

Data recorded included:

Location of the tree (including grid reference, using a GPS where possible)
Size (height and circumference at 1.3m)
Sex
Form (standard, coppice or pollard)
Health (complete, damaged but alive or dead but still standing)
Age (young, mature or over-mature)

However, not all of the trees were visited at close range, so many were not necessarily measured for girth and height, although an assessment of tree health was often made**.** This influences the number of apparently old trees left when the results are tabulated, although it is likely that several of the trees whose height was determined at 25-30m are likely to be of a reasonable girth.

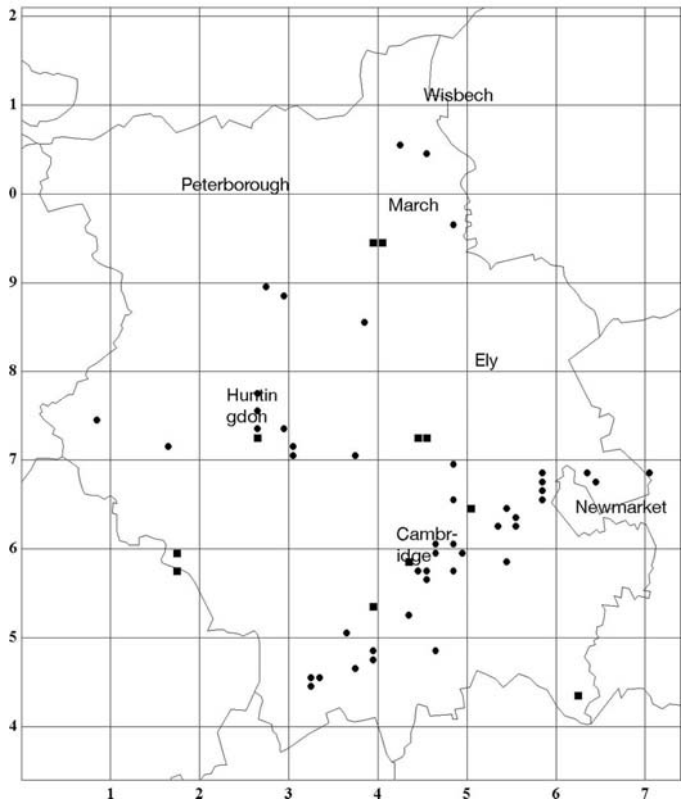
Public survey

The public survey and appeal for people to send in their records was extremely successful, especially after local radio and television stations promoted the survey. Many of the trees notified by the public were confirmed as native Black Poplars, the vast majority of which had been planted in the last ten years, which was extremely encouraging. A big thank you must go to everyone who took the time to contact us about their Black Poplars. Engaging the help of volunteers and the wider community had the additional benefit of promoting Black Poplars and their decline to a wider audience.

Results summary

The dataset before the 2006 survey held records of trees in 110 locations throughout the county; our 2006 survey found that there are now records of trees in 102 locations. Trees at 16 points across the county have been lost, including trees at Chippenham, Girton and Woodhurst. However it is not all bad news as there are new records of trees at eight locations, including St. Neots, Haddenham, and March. Whilst most of the trees newly-discovered in this 2006 survey were young trees, planted within the past twenty years, two were much older – notably, one of 8m girth, surprisingly appears to have gone unnoticed in previous surveys despite being not far from other existing or lost trees.

The map below shows the distribution of Black Poplar after our survey. Squares denote young trees, circles represent mature trees, all plotted at 1km resolution so each dot may represent more than one tree or cluster of trees



The results from the 2006 survey show that the majority of the young trees have been planted within the last ten years and it is promising to see that over a quarter of the trees surveyed were young trees, showing a healthy young population. It is possibly worth noting that the provenance of the seed or donor trees was not sought in the survey, and this may have significance on the genetic diversity of the county's Black Poplars in the future.

Of the trees surveyed only 4% were known to be female, however the sex of more than 30% were unknown due to their age or time of year they were surveyed, so there may be more females than it currently appears. However, there are still significantly more male Black-poplar trees than females.

The results on tree health are much more positive. Nearly three quarters of the trees surveyed are complete, i.e. no damage, and in good health. This combined with a good percentage of young trees (more than 25%) and about 50% of the population being mature trees suggests the Black Poplar trees in Cambridgeshire are in good health and have a good age structure. Again there were a number of unspecified trees in terms of age and health because they were viewed from a distance and it was difficult to determine their health and age.

Concluding remarks

In summary, this survey suggests that the Cambridgeshire Black Poplar population is fairly healthy with a good age range of trees, including a good young population of trees. In comparison to some other eastern counties, Cambridgeshire cannot compete with Suffolk and Buckinghamshire who have a national stronghold of Black Poplars in the Dedham Valley and Vale of Aylesbury respectively.

The sex imbalance is still great, and this is a problem with the Black Poplar population as a whole, including in Suffolk and Buckinghamshire. However it will take time to address this and as already discussed, there are factors other than just the sex imbalance preventing the Black Poplar from reproducing naturally. It is highly likely that planting and awareness raising, which hopefully this survey has helped to do and will always be important for the Black Poplar's survival.

Relation to the 1982 / 1991 surveys:

Out of 113 trees known to Graham Easy in old Cambs and the Newmarket area of Suffolk by 1982, 72 had a girth over 12ft; by 1991, out of a total known of 203, 41 trees had been lost, 19 with a girth over 15ft. In 1982, trees were recorded from 22 parishes in Old Cambridgeshire, 20 with big trees as defined below. In the CPBRC 2006 survey, there were trees recorded from 33 parishes across the whole county, 26 in "old" Cambridgeshire, but only 10 with definite large trees – however, note the comment in the survey section above, as not all trees had girth measured in 2006, so there are still a significant number of parishes with large trees, although there may have been a decline.

Easy's 1991 paper illustrates and details 31 trees, several of greater than 15ft girth (450cm girth) which had disappeared between his two survey dates, and the reasons for their loss: although many had succumbed to severe weather it is

startling how many had been cut down. Intriguingly, eight of these locations were surveyed in 2006, oddly enough they still did not have a tree.

It is heartening that at least some of the destruction of Black Poplar for apparently frivolous reasons seems to have lessened.

Whilst this survey shows there are still some of these trees existing, there has been significant loss of the larger trees. Let's hope that sensitive tree-surgery can prolong the life of some of these giants of the waterside, and that a more enlightened approach to land management may enable some of the middle-aged and young trees to reach these dimensions in the centuries to come.

Cottenham Boundaries Survey

Peter Pilbeam

Background:

A survey of the field boundaries in Cottenham was undertaken as part of an environmental audit of the parish with a number of aims including the production of:

- supplementary local planning guidelines for the landscape of the parish;
- a detailed report of the findings of the boundaries survey;
- a map and leaflet highlighting locally significant landscape characteristics and features for free distribution (throughout the village);
- additional information for the village website;
- recommendations for future practical measures to enhance the local landscape.

From the spring of 2002 to the summer of 2004 volunteers from the Cottenham Environment Audit Group (CEAG) surveyed 219 field boundaries within the parish of Cottenham (outside the built environment). The survey was undertaken to record the make-up and condition of the hedgerows, trees, ditches, lodes and other features forming the boundaries.

Methodology:

The methodology used was based on that used by the Suffolk Hedgerow Survey in 1998 modified to suit the Group's requirements. After piloting a set of instructions and a record form with a few volunteers, further modifications and training days took place and about 20 volunteer surveyors covered all the accessible field boundaries (219 of a total of about 535) in the forty-three 1 km squares involved.

The basic parameters recorded were the trees and shrubs present, the nature of the boundary if not a hedge, the hedge structure if a hedge,

adjacent land use, and nearby features. Provision was made for general comments and for comments on future planting possibilities, and surveyors also recorded various facts relating to the location of the boundary and the time taken to survey each boundary (for 'match funding' purposes).

Data from survey forms was entered into a custom-built Access database and extracted into Excel spreadsheets for analyses.

Results and conclusions:

Of the nine categories of boundaries used just over 40% were hedges, and of those some 31% were 'remnant'. This reflects the predominantly arable land use – less need for stock-proof hedging and therefore less attention paid to hedges.

Only about 24% of hedges were being 'maintained' (i.e. being looked after, not being maintained for wildlife or aesthetic reasons), and around 30% of hedges were considered to be good wildlife corridors.

A fairly wide variety of tree species was found (reasonably typical of lowland Britain) and quite a wide variety of shrub species. However, in the shrub-containing boundaries, most species were less frequent in the parish than in the lowlands of southern and eastern England. The generally low numbers of species per hedge is an indicator of the relatively young age of the majority of the hedges in the parish – in the late 19th century pastoral farming declined following the enclosures and its place was largely taken by extensive orchards and soft fruit and flower growing.

Note: The full survey report can be seen on the web at:
http://www.cvdg.org/ceag/

Acknowledgments:

The CEAG was a joint initiative of the Cottenham Design Group, the Cottenham Wildlife Group and the Cottenham Footpath Group – it gratefully acknowledges financial, logistical and personal support from the Local Heritage Initiative (Heritage Lottery Fund; Nationwide Building Society; The Countryside Agency), The Wildlife Trust for Bedfordshire, Cambridgeshire, Northamptonshire and Peterborough, the Fen Edge Community Association, and in total about 100 local residents, landowners, surveyors, fundraisers and general supporters.

Ditton Meadows Survey

A report on the CNHS Survey project for 2008

Jonathan Shanklin and Steve Hartley

The Cambridge Natural History Society project for 2008 was a survey of the flora of the meadows from Stourbridge Common to Fen Ditton. We logged over 370 plant species, roughly 70% more than previously recorded, and also recorded some other phyla. Stourbridge Common and Ditton Meadows were logged separately across the divide of the railway line, on a tetrad basis. Individual record sheets for each area are available. Although many species were refound from previous surveys, our conclusion is that the area is slowly degrading.

Over the past few years the Cambridge Natural History Society (CNHS) has selected a different area of the city each year and made regular survey visits to it over the course of the year. Primarily these surveys have concentrated on the vascular plants, however other phyla have been recorded on a casual basis. This year's survey covered the meadows and adjacent "green" areas between Stourbridge Common and Fen Ditton. Large parts of this area are City Wildlife Sites (CWSs), and are surveyed by the Wildlife Trust from time to time, primarily for indicator species. These surveys are usually carried out over one or two days every seven years by one or two people and do not provide a comprehensive list of what grows on the site. Information from these surveys and the Cambridgeshire flora was incorporated into our list of species to look for, although we failed to find roughly 17% of them (38 species). The following site descriptions are taken, with some alterations, from the Wildlife Trust's 2005 survey reports.

Ditton Meadows consists of four flood meadows on the south side of the River Cam, with drains, some hedges, and areas of adjacent scrub woodland, the whole covering approximately 15ha. The grasslands remain substantially improved. The southern and eastern fields are divided only partially by a damp ditch. The drains have a wide range of wetland plants. The whole site is cattle-grazed as one block over the summer. The far south-western corner of the site has grown up and largely lost its previously recorded drier grassland area to scrub. Similar flood meadows and ditches continue to the east beyond the city boundary, as well as a young woodland plantation, and Stourbridge Common CWS lies across the railway to the west. A cycle path was constructed across the meadows in 2004.

The grassland is very similar across the four fields, consisting mostly of an improved sward dominated throughout by grasses, such as Perennial Rye-grass (*Lolium perenne*), Creeping Bent (*Agrostis stolonifera*),Cock's-foot (*Dactylis glomerata*), and in places by Creeping Thistle (*Cirsium arvense)*. The forb

species are uninteresting. The only indicator species found was Hairy Sedge (*Carex hirta*), which grows mainly in the wetter, lower, areas. These lie throughout much of the western field and around the boundary between the northern and southern/eastern fields. At times the western field has small areas of standing water. Other species in the wetter areas include Tufted Hair-grass (*Deschampsia cespitosa*), Greater Pond-sedge (*Carex riparia*), and Hard Rush (*Juncus inflexus*).

The central and eastern ditch system has more interest. The ditches are 2-4m wide and total approximately 1000m in length. The water depth ranges from puddled mud to over 50cm. Grazing cattle have moderately poached their banks. They are largely unshaded. A broken hedge, 2-4m tall, runs along the western edge of the southern/eastern field, which becomes taller and denser at its western end where it runs beside the disused railway. Here the ditch dries out. Despite this shade, the section of ditch beside the lower portion of the hedge appeared to be the most diverse on the site at the time of the 2005 survey. In two 20m transects, 10 and 11 species of submerged, floating, emergent and wetbank vegetation were recorded. Sampling of the submerged and floating plants was not comprehensive so these figures are likely to be underestimates. The rest of the ditch system is filled in large part by Reed Sweet-grass (*Glyceria maxima*) and Greater Pond-sedge (*Carex riparia*), with frequent Hard Rush on the wet banks and other plants such as Lesser Water-parsnip (*Berula erecta*) being locally frequent. Towards the eastern end there is an area where the water is more open. Here Spiked Water-milfoil (*Myriophyllum spicatum*) was abundant and stoneworts were found at the water's-edge in 2005. The ditch at the extreme east of the site is lined at its southern and eastern end, where it eventually dries out, by increasing scrub and mature trees, including several large Ash (*Fraxinus excelsior*).

Coldham's Brook is mostly heavily shaded where it runs across the site, and channel vegetation is infrequent. A couple of the more exposed sections do have Horned Pondweed (*Zanichellia palustris*). The overflow ditch which runs along the western margin of the site, from Coldham's Brook to the Cam, is inaccessible and was surveyed from beyond a high fence. Nevertheless a diverse wetland flora was apparent, especially at the north end where the ditch has standing water.

The southern boundary of the southern/eastern field is a largely defunct hedge. At the western end it is tall and has thickened to a small area of dense scrub in the field's west corner. As the hedge runs east it thins and reduces in height, until at the eastern end it is thin and very widely scattered line of bushes. Much of the adjacent disused railway has been added to adjoining gardens. There has been surprisingly little spread of aliens from the gardens to the meadows.

The south-eastern corner of the site was largely inaccessible, and was mostly recorded from the footbridge over the railway. This area now has rank vegetation in the northern corner, dominated by Common Nettles (*Urtica dioica)* and Hedge Bindweed (*Calystegia sepium*), merging into dense scrub of Hawthorn (*Crataegus monogyna*) and a suckering Elm (*Ulmus sp.*) in the central

strip, and mature trees, including Ash, bordering the disused railway. This area was included in our 2008 survey, with several interesting species being recorded from the railway track, including Meadow Saxifrage (*Saxifraga granulata*), Bloody Cranesbill (*Geranium sanguineum*) and Marjoram (*Origanum vulgare*).

A further meadow, which shows relict topography from the site of Ditton Hall, is on private land at the eastern end of the site. It is not part of the CWS, but is grazed with it. The hedge at the eastern margin is the boundary of the old track to Fen Ditton (Mentioned by Ray, although we only found three of the species he mentions for the lanes near Ditton). Several small copses have been planted in recent years, however the grassland is all improved. A few casual species appear to have been introduced in the north-eastern corner.

The Meadows are much used for exercising dogs, and there is occasional disturbance from scrambler bikes. The cyclepath, which was built after the 1998 survey and runs from Stourbridge Common along the river via a parapet under the railway, has increased the numbers of walkers and cyclists across the site. Despite this use the central part of the site is reasonably undisturbed – a Snipe (*Gallinago gallinago*) was flushed from the ditch between the northern and southern/eastern fields during the 2005 survey, and Grey Heron (*Ardea cinerea)* also regularly hunt along there.

Stourbridge Common is an area of cattle- and horse-grazed common land of approximately 16.3ha, with planted trees, mostly scattered but also in blocks on the south side. There is a playground at the western end. In 2008 the bulk of the Common was left ungrazed, and was mechanically cut at the end of September.

The main body of the sward still consists of a wide variety of grasses, with very few forbs other than weed species. The only frequent grassland indicator is Meadow Barley (*Hordeum secalinum*) with Strawberry Clover (*Trifolium fragiferum*) locally frequent. A small, slightly better drained area near Garlic Row has Fiddle Dock (*Rumex pulcher*). The sward has recently deteriorated over large sections of this large site. Heavy poaching due to grazing in the exceptionally dry periods of 2003 and 2004 permitted Creeping Thistle (*Cirsium arvense*), Common Nettle and other ruderal plants to become abundant over large areas of the site, before it was topped in the spring. Ground disturbance over much of the west end, due to electric cable laying in winter 2004, exacerbated the problem. Pernicious weeds remain a severe problem and will need treating for several years.

Several small, low-lying and wet, areas are apparent within the grassland, especially close to the track leading to the railway bridge; some have standing water. They have an inundation or wet grassland community, with frequent Hairy Sedge (*Carex hirta*) and rare Round-fruited Rush (*Juncus compressus*). Although hybrid Sweet-grass (*Glyceria x pedicellata*) is frequent in these areas, Plicate Sweet-grass (*G. notata*) is not, and its other parent, Floating Sweet-grass (*G. fluitans*), was not found on this side of the railway. A larger area, on the south side of the site, has ankle-deep water and is mostly surrounded by broadleaved trees. This set of wetter areas includes some not found in the 1998

survey, and not all those found in that survey were apparent at the time of the 2005 survey.

The site is a good bat feeding area, especially around the trees where Pipistrelles (*Pipistrellus sp.*) are regularly seen. The site is used by numerous birds, wintering and breeding. Occasional Snipe visit, especially in spring and autumn; the secluded southern wet area is a potential feeding ground. A flock of 33 Meadow Pipit (*Anthus pratensis*) was seen in winter 2004/5, and eight males held territories in spring 2005; some were singing during the survey.

The river Cam runs along the northern margin of the area. It and its banks host many aquatic species.

The Commons through 2008

January 1 was a mild day with Alan, Jonathan, Monica and Steve making the observations to celebrate the New Year. This preliminary survey found nearly 160 species, including over 40 new to the area. Most interesting of the additions were Marjoram, Shining Cranesbill (*Geranium lucidum*) and Bloody Cranesbill (*G. sanguineum*). Marjoram has not been reported in this part of TL45 before, although Alan Leslie reported it from Chesterton sidings in 2001. Shining Cranesbill was last reported near the area in the 19th century. Bloody Cranesbill is rare for Cambridgeshire as a native, with Chesterton churchyard the nearest other non-native location. Round-fruited Rush was one of the scarcer re-found species. A couple of further visits over the following weekend were made to gain permission to access two of the private fields. A few additional species were noted, pushing up the total to nearly 170.

Although the weather forecast in the days leading up to the first formal survey on **March 30** had been threatening showers, we enjoyed one of the best days of the spring so far. The morning group met at the east end of Ditton Meadows for a look round the Ditton Hall field, where we found several garden escapes along the old hedge. On the way back Jonathan found Creeping Jenny (*Lysimachia nummularia*) under a damp hedge, a species last reported here in 1860. In the afternoon a dozen or so people met at Riverside, and started with a walk round the children's playground. Mostly we found common species, but there were still quite a lot of additions to the species list. Numbers had dropped a little by the time we crossed back into Ditton Meadows, but here we saw meadow pipits displaying, and at the Fen Ditton end saw a water vole in the lode. Just across the lode, an ancient Black Poplar was in flower. We added 36 plant species to the list, of which 18 were new to the area. There were many butterflies on the wing, and queen bumblebees were out looking for nest sites.

April 27 day dawned mild and sunny, and it was still bright when the botanical group met at 11am. It didn't last, and soon after the group (Alan, Dave, Jonathan, Lizzie, Monica) left the playground, showers started and continued until after lunch, which no doubt put many off. The most exciting find of the morning was Meadow Saxifrage, growing along the old railway track, and some Perfoliate Honeysuckle (*Lonicera caprifolium*) by the track edge. Meadow

Saxifrage was reported from the meadow by Barnwell pits in 1940, so perhaps this was the source. The group just managed to get to the 2pm starting point in time, and the slightly larger group continued towards Fen Ditton. One common species, last noted in 1860, was Black Medick (*Medicago lupulina*). Several more escapes surfaced in the Ditton Hall meadow and we also found an Adonis Ladybird as well as a Harlequin. Having only found a small clump of Lady's Smock (*Cardamine pratensis*) by the old boat shed, we were delighted to find a large display in the dampest part of the Ditton Meadows. As we crossed the new bridge into Stourbridge Common an odd tree with long catkins caught our eyes. As Alan had left it required some thumbing through books to decide that it was Western Balsam Poplar (*Populus trichocarpa*). We added 45 plant species to the list, of which 31 were new to the area.

May 29 On a very wet evening the only two participants were Jonathan and Monica. Having made a start we continued round the ditch system as planned, steadily getting wetter, as despite noting the presence of brighter skies from time to time, the rain continued to fall, even though the 4pm forecast predicted dry conditions for Cambridge. We did make a few new finds, notably Curled Pondweed (*Potamogeton crispus*), Toad Rush (*Juncus bufonius*) and Narrow-fruited Watercress (*Rorippa microphylla*), and re-found the Water Violet (*Hottonia palustris*), last seen in 1998. Not surprisingly little in the way of animal life was around, and we made no other records. Jonathan had made a couple of visits earlier in the week, covering the parts of the area that we weren't likely to have time for, and in total around 40 species were added to the list, just under half of which were new records.

June 26 Around a dozen people gathered at the riverside entrance on a pleasant summer evening, though Jonathan predicted that he would be surprised if it wasn't raining by 8pm. He wasn't! We began by looking at the river in the corner of the Common, and found several water weeds, with grasses on the bank, and discussed identification features. An unusual duck was spotted on the river, an immigrant from America, the Wood Duck (*Aix sponsa*). The party slowly moved up the riverbank, splitting into two groups, with one focusing on the flora, and the other the fauna. The fauna group had brought a stick and umbrella, beating trees and catching insects in the umbrella, which also proved useful later in the evening! By the time we reached the first bridge, rain drops were falling, and the majority of the party called it a day, however five stalwarts continued round the circuit. In a muddy area Alan Leslie found the two Watercresses (*Rorippa nasturtium-aquaticum* and *R. microphylla*) growing side-by-side. Generally however broad-leaved plants were few and far between on the bulk of the Common, suggesting use of chemicals at some time in the recent past. A final significant find was an unusual bramble that Alan hadn't seen before, which had pink flowers and hairy stems, and seemed to be a cross between Himalayan Giant (*Rubus armeniacus*) and something else. Altogether we added or refound around half a dozen species during the visit, and Jonathan had added a dozen more on a visit to Ditton Meadows earlier in the week, which brought the total species to over 300.

July 31 Nine people gathered at the central entrance to Ditton Meadows on a rather grey evening, with rain once again in the air. An item in the Cambridge Evening News had brought along two visitors to Cambridge who thought it sounded an interesting event. We proceeded clockwise round the Meadows to the central ditch system, remaining on the south side. As we were concentrating on the ditch vegetation, Jonathan tried dipping for pond weeds using a walking stick brought along for the purpose. This was successful in bring up bits of Water Violet roots, and also a new addition of Canadian Pondweed (*Elodea Canadensis*). David Barden showed us the sole plant of Square-stemmed St John's Wort (*Hypericum tetrapterum*) at one end of the ditch system. Although biting insects were plentiful, not much else was on the wing given the weather, although Black Slugs (*Arion ater*) were frequent. As it grew dimmer, the rain increased and only David Seilly was prepared to try detecting bats. Jonathan had visited Stourbridge Common earlier in the week, he and David also had a look along the river bank the previous day, in rather nicer weather and Jonathan paid another visit, again rain affected, on Friday evening. All told these visits brought the total floral species to over 350.

August 31 Despite the threat of heavy thunderstorms, the weather remained largely dry, albeit sultry thoughout the day. The morning botanical group had a look round Stourbridge Common, finding several new species, including Trifid Bur-marigold (*Bidens tripartite*), last reported here in 1860, a couple of bird seed aliens, the hybrid between Curled and Broad-leafed Dock (*Rumex x pratensis*), and that between Raspberry and Dewberry (*Rubus x pseudoidaeus*). A party of six gathered at the Fen Ditton end of Ditton Meadows for a broader look at the wildlife. We introduced the beginners to the variety of Dandelion like flowers, which were in fact all different species (Smooth Hawksbeard (*Crepis capillaries*), Autumn Hawkbit (*Leontodon autumnalis*), Dandelion (*Taraxacum officinale agg*) and Corn Sow thistle (*Sonchus arvensis*)). Several species of butterflies and dragonflies were on the wing and towards the end of the excursion we found an Ivy bush (*Hedera helix*) in flower, covered with hoverflies and wasps, making the most of the nectar source. A rumble of thunder suggested it was time to go home, but a closer inspection of a gravelled plot, passed over by Alan and Jonathan in the morning, threw up several new species, with Hawkweed Ox-tongue (*Picris hieracioides*) growing alongside the much more common but confusingly similar Bristly Ox-tongue (*P. echiodes*). The rain then began to fall and the party dispersed rapidly!

September 28 Summer finally arrived in late September, and the weather was warm and sunny, at least till thicker cloud came in late in the day. The morning group took a leisurely view of the north-east corner of Stourbridge Common and the south-west corner of Ditton Meadows, but didn't find anything new. Numbers at the meeting point by the children's playground in Stourbridge Common slowly increased and we ended up with around ten participants for the final exploration. New plant species were few, but while explaining that perching birds often introduced species such as Gooseberry (*Ribes uva-crispa*) and Cotoneaster inside some of the tree guards by the river, Jonathan spotted Pellitory of the Wall (*Parietaria judaica*) adjacent to a Cotoneaster. With

several of the ARU students having an interest in invertebrates we did rather better at finding new species, with a selection of galls, spiders and ladybirds. The stridulation of Roesel's Bush-cricket (*Metrioptera roeselii*) was much in evidence, and the cyclists tried to encourage them to louder efforts! (They sound a bit like a cycle free-wheeling). As we returned across Ditton Meadows we met up with three young lads on their mountain bikes (one looking very much the worse for wear, having come off the BMX track the day before), who asked us what we were doing. They volunteered that they had found some orange mushrooms, and led us to them. They turned out to be Golden Scalycap (*Pholiota aurivella*), growing on Ash. Heading back to our starting point, we kept looking for further species, but with the sun rapidly setting found nothing more.

Our expectation that these flood meadows were unlikely to prove as diverse as Coldham's Common, and that we should find some interesting water plants in the extensive ditch system of Ditton Meadows proved correct. It was disappointing how poor the majority of the grassland area was, and it is clear that they had suffered considerably from "improvement". One particularly unwelcome alien invader, found both in Coldham's Brook and the River, was Floating Pennywort (*Hydrocotyle ranunculoides*). Although steps are being taken to control it, it seems likely to spread.

Many people came out on the monthly excursions, with the principal contributors being David Barden, Monica Frisch, Steve Hartley, Alan Leslie, David Seilly and Jonathan Shanklin. With nearly 380 vascular plant species or sub-species being recorded we greatly increased the number of species known from the Common. It is however unlikely that the list is complete, as even after the formal close of the survey in September an additional species was found during conservation work.

The 2009 survey is covering Cherry Hinton brook, Cherry Hinton Hall grounds and the Cherry Hinton chalk pits. The Wildlife Trust has just acquired the East Pit, and will have carried out extensive works over the 2008/9 winter, so it will be interesting to see what has changed since our occasional visits of recent years. With a wider variety of habitats than the Cambridge commons surveyed last year, we should find more species. Although the present group tends to concentrate on plants, we make records of other organisms too and would welcome beginners and experts with other interests. Do come and join in. Dates for the monthly surveys, and flora lists for many of the wildlife sites near Cambridge are on the Society web page at http://www.cnhs.org.uk

Parish Surveys 2007

Jonathan Shanklin

I responded to Nick Millar's challenge in the Nature in Cambridgeshire (Millar & Leslie 2006) to survey a parish and initially took on Waterbeach in May 2006. In the autumn I had a few free weekends and asked Nick to suggest some others requiring attention. He suggested Childerley, Croxton, and Newton. I didn't at first appreciate that the Newton he meant was the other end of Cambridgeshire but Childerley and Croxton are in easier reach of Cambridge. This note gives a brief description of each parish and highlights some of the better locations and interesting species.

Childerley

Childerley is an ancient parish and lies entirely within the Childerley Estate. This made requesting access fairly simple, and Mr Jenkins kindly gave me permission to cover the entire area. Construction of the new A428, which used to define the south edge of the parish, was in progress when I started the survey, and was completed within the year. The roadworks produced new habitat and consequently a number of casuals. At the centre of the estate is Childerley Hall and the abandoned medieval village of Great Childerley. The majority of fields now have three metre headlands all round them and the estate has a number of paths through it, in addition to the public footpaths. Unlike many farms, wildflower mix has not been introduced on the headlands, so that any plants found on them have made their own way there.

The most striking find in the parish was on the embankment of the minor road over the new A428, where a patch around 20m across had over a dozen plants of the blue form of Scarlet Pimpernel (*Anagallis arvensis* subsp. *arvensis*). Also here were scattered plants of Broad-leaved Spurge (*Euphorbia platyphyllos*), which was also scattered elsewhere in the arable fields, with occasional Dwarf Spurge (*Euphorbia exigua*). The best public access area is probably the section of the Pathfinder long distance walk running from Dry Drayton towards Black Park, which has a varied flora including Slender Tare (*Vicia parviflora*), which somewhat surprisingly also grew on the new road embankment.

Croxton

Croxton is another ancient parish, but is not confined to one estate. Much of it is included in Croxton Park and I was given permission to explore this by Mrs Bowkett and thanks are also due to Mr Topham for permission to explore north of the A428. There is a good variety of habitats, with arable land, brooks, ponds, woods, meadows, roads, the village and small brownfield sites. The roads and a few footpaths give some public access, but most of the more interesting areas are on the private land.

Although the wide variety of habitats allowed me to find over 400 species, in general they were mostly relatively common. North of the A428, North Lodge plantation has some damp, shady tracks, and here I found Mountain Currant (*Ribes alpinum*) and Lesser Centaury (*Centaurium pulchellum*) along with many other more common woodland plants. The grasslands of Croxton Park show evidence of ridge and furrow and combined with the ponds show a good variety of plants. Quite a few aliens were encountered, particularly on a brownfield site on Abbotsley Road, but the most unusual was a Feather Grass (*Stipa tenuissima*), found on the site of a cattle feeding station in Croxton Park, which is a new record for the county.

Newton

Lying north of Wisbech, this Newton is a long way from Cambridge! Part of the parish is even in the neighbouring VC28 (Norfolk), a fact that I didn't note until some time after I started the survey. It also lies near the border with Lincolnshire, and family history aficionados often have to consult three different county records offices. Today's parish is bounded to the east by the River Nene, but this is the Pauper's Cut, and the old river meandered around a kilometre further west. The Romans started the process of draining the land with Roman Bank, an old sea wall, and there are many other banks and drains marking the fight to produce arable land. Unlike much of Cambridgeshire, it is not all given over to wheat, and there are varied arable fields, including some for horticulture and also some orchards.

Unfortunately the most interesting area is the one in VC28, with the Nene bank and the track of a dismantled railway providing good hunting. The river bank has many estuarine plants that are generally rare in Cambridgeshire, including Sea Milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*) and Annual Seablite (*Suaeda maritima*). Another interesting area straddles the boundary with Leverington and adjoins Leverington Gull, a County Wildlife Site. Here a local farmer has created a new copse, with a pond in the middle, and many aquatics have reappeared from the seed bank including Lesser Reedmace (*Typha angustifolia*) and Tubular Water Dropwort (*Oenanthe fistulosa*) and somewhat surprisingly a single plant of Sea Aster (*Aster tripolium*).

Waterbeach

Waterbeach is a large fen edge parish, covering four ten-kilometre squares and it was never possible to cover all of it in a single day. It is bounded in the east by the River Cam, where there are some flood washes and the west by the A10. The Cambridge to Ely railway runs through it. To the north there is mostly arable farmland, and the drains are either heavily managed or largely overgrown. The village and army barracks and airfield are at the southern end. Historic features include Denny Abbey, a Franciscan nunnery, and Car Dyke, a Roman canal. The main churchyard is well kept; however the old cemetery is more given over to wildlife and the large new cemetery has a good variety of plants.

The highlight of the parish is the airfield, which is one of the largest areas of unimproved land in the county, and certainly deserving of County Wildlife Site status. It is under army control and access is by permit; however the Station Staff Officer is very keen to promote its wildlife and willingly gave me access. It has a wide range of habitat with areas of open grassland, relict arable land, brownfield, lakes, scrub and a golf-course and is used for training the Royal Engineers. Here I found two new species for the county – Narrow Leaved Ragwort (*Senecio inaequidens*) and Corky-fruited Water-dropwort (*Oenanthe pimpinelloides*) and Alan Leslie found Slender Rush (*Juncus tenuis*).

Elsewhere there are mostly small areas of natural diversity, such as Denny Abbey, which hosts quite a range of wall plants, particularly on the boundary walls. Car Dyke has suffered from a lack of management, but on the 2006 May visit of the CFG had a mass of Water Crowfoot (*Ranunculus aquatilis*) in one of the open water sections. The river, drains and washes are clearly not what they were a hundred years ago, but still support many aquatics.

Species lists for all these parishes are kept on the Cambridge Natural History Society web pages and the more detailed records have been lodged with the county recorders and the CPBRC.

Reference

Millar, N. & Leslie, A. (2006). A New Flora of Cambridgeshire. *Nature in Cambridgeshire* **48,** 86 - 87

Vascular Plant Records

Alan Leslie

The records listed below demonstrate what is becoming a familiar pattern: one potential new native plant (*Ranunculus peltatus*), fifteen aliens that have never been recorded in the county before, four new hybrids, a host of new records for rare and local plants, with some significant refinds in old localities and a few new variants. Only the lack of many new records for apomictic taxa breaks with the pattern of recent years. Cambridgeshire may be comparatively well-known botanically, but plants come and go, and sometime return again; ranges expand and contract; critical plants, aliens, variants and hybrids are often ignored or overlooked. There is always something to find, at any time of the year (check the recording dates on the records below), always a good reason to go out and look. One does not have to return with a long list: sometimes just refinding one plant not recorded for many years in a particular site will be reward enough – and it does not have to be a rarity. Establishing that continuity with the historical record and making yourself part of that history can be immensely satisfying.

Although the majority of the new records noted here are from 10 km square TL45 (which contains Cambridge) it is pleasing to see that recorders have covered the county pretty well, as overall the records come from the following

squares: 25, 26, 29, 34, 35, 36, 39, 44, 45, 46, 47, 48, 49, 54, 55, 57, 65, 66. Only the far north of the county is a complete blank: this is challenging ground but worth a look. I would also draw attention to records from two areas where interesting native plants are returning naturally to former agricultural land (on Magog Down and at Kingfisher's Bridge) and to the fact that we have first records for a number of self- or bird-sown aliens that are more familiar as naturalised plants from further south and west in the British Isles, more evidence perhaps that our flora is changing as the climate warms.

The Cambridgeshire Flora Group has had some productive and popular outings. Not least at Dernford Fen, in June, where we refound *Anagallis tenella* and showed that *Cladium* persists on both sides of the railway. Nearby waste ground also provided some highlights including Motherwort (*Leonurus cardiaca*) and a splendid display of Annual Beard Grass (*Polypogon monspeliensis*). In July on Newmarket Heath and the Devils' Ditch we had our highest attendance for some years, but despite this could not refind any *Potentilla neumanniana*, which may perhaps have now gone from the county. By way of compensation we did refind a very small quantity of *Viola canina* on the Heath and a number of recorders were able to make their first acquaintance with at least the leaves of *Veronica spicata*. On the Ditch the star of the day for most people was *Carex ericetorum,* although sadly it is now apparently reduced to a single flowering patch. However, it was the quantity of *Tephroseris integrifolia,* both in mown turf to the south-west of the July race course stands and in lush grassland on the north-east face of the Ditch (the ditch not the vallum), which was perhaps the greatest surprise to us all.

At Fordham Woods later in the year we added three good ferns to the site list: *Polypodium vulgare* (*sensu stricto*) growing epiphytically on a fallen willow, *Dryopteris carthusiana* and *D. affinis*. The last species continues to crop up in more and more sites across the south of a county: in 2008 Stephen Hartley reported four plants from Gamlingay Wood (all but one in the v.c 29 part of the wood!) and other records have come from woodland near the Trust meadow at Gamlingay, as well as Great Chitlings Wood and Basefield Wood on the south-eastern boulder clay. Those records that have been looked at critically seem to be subsp. *borreri,* but this will need expert confirmation. There were no Cambridgeshire records of this fern at the time of the 1964 Flora.

Fern records in general have received a major boost this last couple of years through the enthusiasm generated by David Barden for this group of plants. A review of all Cambridgeshire polypody records, which he has conducted with Chris Preston, is published elsewhere in this issue and is remarkable for having revealed four more sites for *Polypodium vulgare, sensu stricto,* in the county, including one on St Johns College Chapel in Cambridge, found by Laura Spence. Such an intensive study of all the records for selected taxa can be very rewarding, as well as providing much of lasting value to future generations of recorders, not to mention Flora writers!

Indeed steady progress with the new Flora has been achieved over the last year with nearly 200 accounts now written. I keep repeating this, but I think it

really is true that there isn't a dull species in our flora; every one has an interesting story to tell if one can but find it and put it into words.

In the following accounts 'recent' means from 1987 onwards and reference to the date of the last record means the last date that the county recorders have on record for that plant in that site. If you have other evidence that has not yet come our way to provide a later date in any case please let us know. It is all too easy to assume the recorders 'must know about it' but in some cases we would need to be clairvoyant to do so! As always our thanks go to those of you who have put so much time and effort into doing a lot of recording and sending us the results and also to the experts who have helped verify our finds.

Adiantum capillus-veneris (a) one small clump on the side of a wall dividing 61 & 63 Glisson Road, Cambridge, TL45915776, A.C. Leslie, 18 June 2008, **CGE**, subsequently destroyed by building work; (b) one large and one small clump on wall of window light well, in the alleyway beside 5 Glisson Road (now The Jill Sturdy Centre), Cambridge, TL457573, A.C. Leslie, 18 June 2009. Maidenhair Fern has now been lost from all other recorded sites in the county: it had for instance been known below an old railway platform near Longstowe for at least 66 years, so has the potential to persist for long periods in a sheltered position.

Amaranthus powellii Frequent as a weed in an asparagus field, Hauxton, TL435522, J.D. Shanklin, September 2008, **CGE**, conf. E.J. Clement. First v.c. record for a close relative of *A. hybridus*, which could be overlooked elsewhere although its longer, stiffer bracts give the inflorescence a distinctive spikier look and a more prickly feel.

Anagallis tenella Several patches on bare, damp ground around shallow depressions, where scrub has been cleared, Dernford Fen, TL47235030, Cambridge Flora Group excursion, 21 June 2008. The first record here for Bog Pimpernel since 1978. C.J. Cadbury has also reported refinding this species in 2008 on Sawston Fen, where it had not been seen since 1977.

Bergenia x *schmidtii* (*B. crassifolia* x *B. ciliata*) Several plants established on garden refuse site, Stetchworth, TL64225846, A.C. Leslie, 22 February 2008, **CGE**. First v.c. record for a familiar garden plant.

Calamagrostis canescens Two colonies in the reedbeds at Kingfisher's Bridge, Wicken, TL54377319, C.J. Cadbury, 2008, 'not introduced'. A new site for a rare plant of a few fens and boulder clay woods in Cambridgeshire. The nearest locality is at Wicken Fen just a couple of miles away.

Campanula glomerata f. *albiflora* One plant with pure white flowers, south-west face of Fleam Dyke (near the old railway), TL544545, M. Frisch, 27 September 2008. First v.c. record for a white-flowered Clustered Bellflower: white variants are known in various guises in cultivation, but this plant gave every evidence of being spontaneous in this long-recorded population.

Carduus tenuiflorus (a) many plants at edge of a cornfield, Graveley, TL25966481, J.D. Shanklin, 8 June 2008, **CGE;** (b) a few plants in a grazed meadow, Papworth St Agnes, TL26806596, J.D. Shanklin, 8 June 2008. Two more records for Seaside Thistle which is turning up in a variety of situations across the county. P.D. Sell also reports it from a field margin at Bassingbourn (2007) where he believes it was introduced with wild flower seed.

Carex pilulifera At least five clumps in grassland just to the west of the main hollow on Gamlingay Cinques, TL 22635292, D.J. Barden, A.C. Leslie & C. Turner, 20 July 2008. First record since 1956 for Pill Sedge: formerly known in a number of sites around Gamlingay. Its

reappearance at the Cinques follows clearance of bramble and scrub. Charles Turner indicated that he had noted its reappearance 'a year or two ago'.

Cephalanthera damasonium Two plants in different parts of Memorial Wood, Magog Down, south-east of Cambridge, TL4953, N. Jarvis & L. Evans, 28 May 2008. This has presumably spread on to this ex-arable field site from either the well-known large population in the Wort's Causeway beechwood or the smaller one on Fox Hill just to the south-west. A very local plant in the county.

Cerinthe major Two plants on imported soil on a recently reconstructed railway bridge bank, west of Toft, TL35105576, A.C. Leslie, 16 May 2008, **CGE**. First v.c. record for a self-sowing Boraginaceous annual from the Mediterranean, which became all the horticultural rage a few years ago, especially in the form involved here with conspicuously purple-tinged bracts (the cultivar 'Purpurascens').

Chaenorhinum origanifolium One plant flowering in gutter in front of 3 Sleaford Street, Cambridge, TL464583, A.C. Leslie, 15 June 2008, **CGE**, with two more non-flowering plants in pavement cracks a few yards away in York Terrace. First v.c. record for a little blue-flowered toadflax for which there was no immediately apparent source: perhaps used in a window box nearby in the preceding year. A native of south-west Europe, long naturalised at West Malling in Kent.

Cirsium dissectum Eighteen flowering plants, ancient hay meadow, just south of Popley's Gull, Nene Washes, Whittlesey, TL30079961, C. Kitchin, J.J. Graham & J.O. Mountford, 2008. This site had not been reported before and is a new locality for a plant always scarce in v.c 29 and now only known from two other places (Wicken and Chippenham Fens). The current recorders indicate that it has been known there to local recorders for several years (perhaps even since 1983) but that it has decreased in quantity recently.

Cladium mariscus Dernford Fen: still quite a large colony under wet scrub just to the east of the railway, but now rather depauperate and non-flowering as it is too shaded, TL47205025, Cambridge Flora Group excursion, 21 June 2008; rediscovered later the same day to the west of the railway by M. Frisch and J.D. Shanklin, where there are five separate sites, in the largest of which flowering plants were recorded. These latter sites were last noted by G. Crompton in 1960, although the record was not included in the Flora Catalogue.

Cotoneaster bacillaris cf. *Nature in Cambridgeshire* **47**:88 (2005). The BSBI referee Jeanette Fryer has now determined material from the site by St John's College playing fields as *C. obtusus*, so *C. bacillaris* must removed from the county list. *C. obtusus* is now an established part of the Cambridge scene having been recorded naturalised now at this site, as well as near the railway station, on Castle Hill and around Alexandra Gardens.

Cotoneaster fangianus One birdsown in hedge by 21 Wisbech Road, March, TL41039719, A.C. Leslie, 1 September 2007, **CGE**, det. J. Fryer. First v.c. record for a deciduous Chinese species: not located in neighbouring gardens.

Cotoneaster vestitus (*Cotoneaster glaucophyllus* var. *vestitus*) One large plant, bird-sown on the top of a tall, brick garden wall, Dullingham House, Dullingham, TL627580, A.C. Leslie, 22 May 2008. Determined by Jeanette Fryer from a specimen collected in October off the large parent shrub growing elsewhere in the garden, **CGE**). First v.c. record for this semi-evergreen, Chinese species.

Cymbalaria muralis 'Pallidior' (*Linaria cymbalaria* subvar. *pallidior*) Growing with the typical mauvish violet-flowered plant on a wall in the churchyard, Bartlow, TL586452, M. Frisch, 26 May 2008. First v.c. record for this white-flowered variant of Ivy-leaved Toadflax; such plants are well-known in cultivation, but it appears to have occurred spontaneously at this locality.

Danthonia decumbens A few plants on a sinuous bank running through a meadow, Snailwell, TL6367, A.C. Leslie (Cambridge Flora Group excursion), 18 August 2008. A new locality for an increasing local grass, only reported recently from the Soham meadows, Quy Fen, Newmarket Heath and Long Hill, Newmarket. Formerly more widespread.

Dipsacus pilosus Several hundred old flowering stems in damp scrub/open woodland on the south side of the R. Granta, north of Little Linton Farm, Linton, TL55454762-55524760, A.C. Leslie, 9 February 2008. This area has been known for Small Teasel since the 18th century, but there has apparently been no report of it since W.H. Mills in 1955: it is clearly still one of our best places for this very local plant.

Epilobium obscurum x *E. parviflorum* (*E.* x *dacicum*) On an area of waste land, High Fields, Bassingbourn, TL333422, P.D. Sell (no.04/42), 21 August 2004, **CGE**, det. G.D. Kitchener. First v.c. record. Whilst *E. parviflorum* is common and widespread in Cambridgeshire, *E. obscurum* is decidedly local and has not yet been recorded from Bassingbourn.

Epilobium parviflorum x *E. montanum* (*E.* x *limosum*) One plant on roadverge, Milton Road, Cambridge, TL458600, M. Wilcox & B.A. Tregale, 14 September 2008, **CGE**, conf. G.D. Kitchener. First recent record: previously recorded at Gamlingay in 1913 and Eversden Wood in 1911.

Erigeron glaucus Self-sown and naturalised around graves in Cambridge City cemetery, Newmarket Road, Cambridge, TL48215941, J.D. Shanklin, 24 August 2008, **CGE**. First v.c. record for the Seaside Daisy, a North American perennial, which as its common name suggests, is more frequently seen naturalised on rocks and walls along the south coast.

Eruca vesicaria subsp. *sativa* One large plant at the base of fencing bordering the railway, beside the Beehive Centre superstores, off Coldham's Lane, Cambridge, TL46695849, A.C. Leslie, 18 May 2008, **CGE**. Third v.c. record for the salad constituent Rocket, previously noted from Cambridge Station by H. Gilbert-Carter in 1921 and on Coldham's Lane tip by G.M.S. Easy in 1988.

Euonymus japonicus One bird-sown plant (c.20cm tall), at base of railings, St John's College playing fields, Madingley Road, Cambridge, TL443589, A.C. Leslie, 16 March 2008. First v.c. record for a bird-sown plant of a familiar planted evergreen shrub, a Japanese species, more usually seen regenerating in southern coastal localities.

Fatsia japonica One bird-sown plant at base of wall, Brandon Court, Cambridge, TL45755841, A.C. Leslie, 25 September 2008. First v.c. record for a familiar evergreen garden shrub, a native of Japan, which tends to flower very late in the year here, when the inflorescences may get frosted and thus no seed is set. Warmer winters may be increasing the chance this plant has to set seed and become naturalised.

Juncus acutiflorus x *J. articulatus* (*J.* x *surrejanus*) Scattered patches over a large area in a meadow just to the east of the R. Snail, Snailwell, TL6368-6568, Cambridge Flora Group excursion, 18 August 2008, conf. T.A. Cope. Apparently without either parent: our first certain recent record for this hybrid rush, which has been recorded from a few localities across the county, mostly in wet meadows and fens.

Leonurus cardiaca At least five plants on waste ground beside the railway, just west of Sawston, TL 47564945, A.C. Leslie, 22 June 2008, **CGE**. Motherwort is a rare Cambridgeshire alien, but one which was known to Ray and for which there are a number of 18th and 19th century records. Our only other recent record is from Haddenham in 1994-1997.

Linaria aeruginea (a) self-sowing on waste ground (now built over) at the junction of Union Lane and Scotland Road, Cambridge, TL462599, A.C. Leslie, 16 August 2003, det. E.J.

Clement; (b) abundantly naturalised along the railway tracks behind the Beehive Centre superstores, off Coldham's Lane, Cambridge, TL467585, A.C. Leslie, 2005, still there 2008, **CGE**. First and second v.c. records for a decumbent toadflax with flowers in a great range and combination of colours, from shades of purple and brown to yellow, white and orange.

Melica altissima Several plants on waste ground in front of old Unwins site, Impington Lane, Histon, TL44306344, J.D. Shanklin, 15 November 2008, **CGE**. These plants were the variant of this cultivated ornamental grass with reddish brown spikelets, grown in gardens as the cultivar 'Atropurpurea'. First v.c. record and perhaps the first British record for self-sown plants.

Mentha x *smithiana* (*M. arvensis* x *M. aquatica* x *M. spicata*) (a) scattered along ditch which forms an extension of Upper Mill Drain towards Denny, Waterbeach, TL49896963, J.D. Shanklin, 16 August 2006, **CGE**, conf. ACL; (b) several patches by small pond, south-east of Manor House Farm, Boxworth, TL352644, D.J. Barden, 23 August 2008, **CGE**, conf. ACL. Two new records for a very scarce triple hybrid mint, only known to be persisting elsewhere in the county at Bourn.

Nicotiana glauca One self-sown, flowering plant on a tall brick wall, Wordsworth Grove, Cambridge, TL44295771, A.C. Leslie, 16 November 2008. First v.c. record for a shrubby relative of the more familiar herbaceous tobacco plants; a most surprising alien in Cambridge, but well-known to be naturalised around the Mediterranean; native of Argentina and Bolivia.

Ornithopus perpusillus (a) Frequent in mown turf of playing field, behind Gamlingay Community Centre, Stocks Lane, Gamlingay, TL24075185, A.C. Leslie, 4 July 2008; (b) scattered in thin, open vegetation at the north-west end of scrap yard, north-west of Potton Road, Gamlingay, TL233509, A.C. Leslie, 18 July 2008. These additional finds confirm the Gamlingay greensand as the headquarters for Birdsfoot in the county. In both cases it was accompanied by *Trifolium striatum*.

Oryzopsis miliacea Several small plants self-sown on and below a low brick wall, junction of Topcliffe Way and Almoner's Avenue, Cambridge, TL47475546, A.C. Leslie, 2 November 2008. Second v.c. record for a tufted ornamental grass from southern Europe (Smilo Grass), which has been naturalised in Jersey since 1931. The probable parent is cultivated in an adjacent garden.

Polypodium vulgare sensu stricto (a) two clumps growing out of crevice between the wall and the roof, St John's College chapel, Cambridge, TL447587, L.A. Spence, 2008 (specimen collected by LAS 17 December 2008, det. C.D. Preston); (b) one large clump on coping at east end of main part of roof on north side, a few plants on roof nearby and scattered small plants on roof of adjoining small building, north side of All Saints church, Longstanton, TL399664, D.J. Barden, 13 July 2008 (specimen collected 6 December 2008, det. C.D. Preston); (c) four plants on wall, Holly House Farm, Horseway, TL427872, D.J. Barden (Cambridge Flora Group excursion), 21 July 2007, det. C.D. Preston; (d) one clump of fronds on the mossy horizontal trunk of a fallen *Salix fragilis*, Fordham Woods, Fordham, TL63137005, A.C. Leslie (Cambridge Flora Group excursion), 18 August 2008, det C.D. Preston (from a specimen collected 31 January 2009). It is remarkable to have four new records for this supposedly more calcifuge segregate, for which we have only ever had three other records (in Cambridge, March and Tydd St Giles). Most of our polypodies that have been checked microscopically have proved to be *P. interjectum*.

Polystichum aculeatum Two plants on a steep, shaded drain bank, east end of Coldham's Common, Cambridge, TL477582, D.J. Barden & A.C. Leslie, 16 September 2008, **CGE**. Growing here with many plants of *Polystichum setiferum* and *Phyllitis scolopendrium* (including unusual variants of both these species). Apart from 18th century records at Gamlingay (and possibly one near Cambridge) our only other record for Hard Shield Fern

was under a grating in Wisbech (1966, R.C. Clarke). Whether the spores blew to Coldham's Common from a native population elsewhere or from a garden it is impossible to tell. *P. aculeatum* is much less commonly cultivated than *P. setiferum*.

Potamogeton coloratus Locally frequent in shallow water in reedbed, Kingfisher's Bridge, Wicken, TL544734, C.J. Cadbury, 2008. A new locality for a local pondweed which has presumably spread naturally to this site that 20 years ago was an arable field. The nearest recorded locality is on Wicken Fen just a couple of miles away.

Potamogeton gramineus One patch along about two metres of the base of an almost empty drain, just to the north of the track to Ashlings Farm, Underwoods Grounds, Whittlesey, TL27169465, Cambridge Flora Group excursion, 15 September 2007, **CGE**, conf. C.D. Preston. At one time Various-leaved Pondweed was quite widespread in the Cambridgeshire Fens, but now it is very local and had not been reported from the Whittlesey area since 1957.

Pseudotsuga menziesii Two self-sown plants on edge of ride, Ditton Park Wood, TL66425713, D.J. Barden & A.C. Leslie, 5 May 2008. First v.c. record for self-sown Douglas Fir. Formerly widely planted in the wood, but now largely removed.

Ranunculus ficaria subsp. *ficariiformis* Abundant garden weed, 51 Long Road, Cambridge, TL45975562, A.C. Leslie, 12 April 2008, **CGE**. An introduced, large-flowered form of Lesser Celandine (here with flowers up to 40mm wide), with long floppy stems and some axillary bulbils. Long known on the drive to Leckhampton House in Cambridge and as a weed in the University Botanic Garden.

Ranunculus parviflorus Thousands of small plants on gravelly waste ground, beside Chesterton Hospital, Union Lane, Cambridge, TL46045997, A.C. Leslie, 25 May 2008, **CGE**. First record since 1928 for Small-flowered Buttercup, which was formerly well-known in and around a number of villages to the south and west of Cambridge.

Ranunculus peltatus Ditch, Chear Fen Engine Drain, Cottenham, TL46607103, N.P. Millar, 25 June 2008, **BM**, conf. R.V. Lansdown. Pond Water Crowfoot has until now remained a puzzling absentee from the Cambridgeshire flora; it has been claimed in the past but never substantiated. Richard Lansdown, whilst passing the specimen from Cottenham as this species, commented that the abortion of many carpels as well as the occurrence of lamina leaf shape instability suggest a degree of hybridisation may be involved.

Rubus boraeanus Large linear colony along hedge/ditchbank, Byall Fen Drove, north-east of Horseway, Chatteris, TL43738770, A.C. Leslie, 2 August 2008, **CGE**. This must be the site of Alan Newton's original record in 1986, located only to 'Horseway' and for which the Flora Group searched for in vain in 2007. Now also known at Soham and Ely: very common in north-east Norfolk.

Rubus eboracensis (a) bank of stream at the east edge of the newly planted Toft Wood, Toft, TL357563, A.C. Leslie, 19 July 2008, **CGE**, conf. A.L. Bull and continuing in various places up the stream valley; (b) trackside, north of Green End, Comberton, TL386572, A.C. Leslie, 19 July 2008. The first records to be found away from Gamlingay, where it was first recorded in 2002.

Rumex hydrolapathum x *R. obtusifolius* (*R.* x *lingulatus*) One vigorous clump on the north bank of the R. Nene, just west of the bypass bridge, March, TL40279707, A.C. Leslie, 7 August 2008, **CGE**. First v.c. record for a scarce dock hybrid, growing here with several *R. hydolapathum* plants and noticeable for its more slender, elongated inflorescence branches, general sterility and the few small teeth on the occasional perianth segments that do mature.

Rumex obtusifolius x *R. pulcher* (*R.* x *ogulinensis*) One plant with both parents in a dry sandy field, just north-west of Mount Pleasant Farm, Gamlingay, TL22905175, A.C. Leslie, 18 July 2008. Second v.c. record.

Senecio inaequidens One vigorous clump on disused railway siding, on south side of railway, north of Stanground Wash Nature Reserve, east of Peterborough, TL20769768, J.J. Graham & C.D Preston, 9 September 2008. Third record for this alien ragwort which is perhaps on the point of spreading more widely here as it has done in parts of south-east England.

Setaria adhaerens One plant at base of railings in front of 10 Fitzwilliam Street, Cambridge, TL4557, A.C. Leslie, 17 October 2008, **CGE**. First v.c. record. Confirmed by BSBI alien grass referee Bruno Ryves, who comments that this taxon is perhaps better treated as part of the variation within *S. verticillata* from which it differs in its smaller spikelets and hairless leaf sheaths.

Stellaria palustris Three populations in two adjacent hay meadows, just south of Popley's Gull, Nene Washes, Whittlesey: TL30059961 (40 plants), C. Kitchin, J.J. Graham & J.O. Mountford, 23 June 2008; TL30139932 (20 plants) and TL3000.9950 (1 plant), J.J. Graham, July 2008. At least in part an extension of R.M. Payne's record in this area and especially welcome since Payne's other record a little further to the west along the Washes could not be relocated. Otherwise only seen recently in several places along the Ouse Washes, at Bassenhally and Swavesey.

Stipa tenuissima One self-sown vegetative plant at junction of pavement and the front wall of 15 Union Street, Cambridge, TL457585, J.D. Shanklin, 2007 (conf. when in flower April 2008, ACL). Second v.c. record.

Tragopogon porrifolius x *T. pratensis* (*T.* x *mirabilis*) One plant with both parents (indeed with a great deal of *T. porrifolius*), on roadside just north-west of the M11 bridge, Grantchester, TL41715716, J.D. Shanklin, 4 June 2008. Second recent locality for an uncommon hybrid which usually has startling brownish orange flowers. There has been a considerable increase in records for *T. porrifolius* throughout the county over the last few years.

Trifolium subterraneum About a dozen flowering plants on the steep, grassy bank of an old sand pit, just to the north-west of Mount Pleasant Farm, Gamlingay, TL22905175, A.C. Leslie, 18 July 2008, with one on flat ground in the same field just a little to the west. Not reported from this site since 1980 and now apparently lost from our only other site in West Road, Gamlingay.

Tsuga heterophylla Scattered self-sown saplings (c.0.5m tall), in open grassy areas near the north side of Little Widgham Wood, TL663500, British Bryology Society, Cambridgeshire Group excursion, 10 February 2008, det. M.O. Hill & S. Damant. First v.c. record for self-sown plants of Western Hemlock, which is planted in the wood.

Vicia lathyroides A few plants scattered along the base of a west-facing bank by "Wildtracks" karting area in the old Chippenham sandpits, west of the A11, Kennett, TL68456882, A.C. Leslie, 27 May 2008. Although a much larger population now exists on the Cambridge Science Park, these are the first native plants recorded in the county for many years. Most, if not all the previous records from the Kennett area were from east of the R. Kennett and therefore in a bit of Cambridgeshire that is in v.c. 26, West Suffolk: the last such record was in 1982. *Medicago minima*, recorded at this site in 2004 has now increased considerably in the same area that now also holds the *Vicia*.

Bryophyte records

C.D. Preston and M.O. Hill

For the last three years our records have been dominated by epiphytic species. We list below further records of epiphytes, many of them found by Robin Stevenson (C.R.S.) in his continuing studies of orchards, but this year species of other habitats are equally prominent. Two plants are new to the county, the aquatic moss *Octodiceras fontanum* and the terrestrial liverwort *Plagiochila porelloides*, and another liverwort, *Cephaloziella divaricata*, has been seen for the first time for over 50 years.

Figure 1 shows the number of species recorded in the 5-km squares of Cambridgeshire during fieldwork for the proposed new bryophyte flora. We now have records from 132 of the 134 squares in the vice-county. Fieldwork for the flora is due to finish on 31 December 2009.

Mosses

Bryum pallens Occasional scattered shoots and small, dense patches, some with immature fruit, in area grazed and trampled by water buffalo, Compartment 9, Chippenham Fen, TL64906928 & 64896930, R.J. Fisk *et al.*, 18.4.2009. The second recent record of this species in the county. Last year we found it at Wicken Fen in an area cleared of scrub then grazed by ponies. As at Wicken, there is no previous record from the site.

Ephemerum recurvifolium With *Microbryum davallianum* on soil between graves, probably treated with herbicide, Westry church, March, TL399983, C.D.P., 11.1.2009. This is the first Fenland record of a species hitherto recorded from soils over chalk and calcareous boulder clay in the southern half of the county.

Hypnum jutlandicum On branches of pear trees in commercial orchards, Guyhirn, TF391042, C.R.S., 24.3.2009, Popple Drove, Leverington, TF410092, 9.3.2009, C.R.S., conf. M.O.H. and Oak Tree Farm, Gorefield, TF417109, C.R.S., 28.3.2006. In our area *H. jutlandicum* is a very uncommon plant of rotten wood and of acidic ground, occasionally extending onto tree bases. These are the first records from our area of it as an epiphyte growing well above ground level. It was found on a single tree in each orchard. The species fruits fairly freely in Norfolk and may therefore have spread by spores.

Octodiceras fontanum On concrete side of canalised river, N. side of R. Nene under A1139 flyover, Peterborough, TL19859794, and with *Cinclidotus fontinaloides* on underside of wooden plank attached as a fender on the riverside east of flyover, TL20049789, in both sites below normal water level, J.J. Graham & C.D.P., 8.9.2008, BBSUK, conf. G.P. Rothero. This is the first site in the county for this nationally scarce aquatic, which was discovered further upstream by the Nene in Northamptonshire in 2007 (Carter & James 2007). The Cambs material had small, easily detached branchlets 1.5-4 mm long, a means of vegetative reproduction known from mainland Europe but not hitherto recorded in Britain.

Orthotrichum striatum On poplar, Pleasure Grounds, Wimpole Hall, TL3351, S. Damant, 3.2009. On ash, TL6557, and coppiced field maple, TL65025691, Basefield Wood, Stetchworth, M.O.H., 21.3.2009. On two willows, Compartment 2, Chippenham Fen, TL64566978, C.D.P. & C.R.S., 18.4.2009. On Conference pear in orchard, Guyhirn, TF391042, C.R.S., 24.3.2009. On two Discovery apple trees, Garner's Orchard, The Broad,

North Brink, Wisbech, TL415064, C.R.S., 29.2.2009. *O. striatum* appears to have colonised the county more slowly than some other *Orthotrichum* species. It had been found before this season in only three sites, but these records suggest a remarkable recent increase in frequency.

Plagiomnium cuspidatum Several clumps, some fruiting, on ground in beech wood, with *Ctenidium molluscum*, Beechwood Nature Reserve, Wort's Causeway, Cambridge, TL484545 & 485545, C.D.P., 9.4.2009. This species has been recorded only twice in the last 40 years, at Great Abingdon in 1974 and at Fowlmere RSPB reserve in 1993.

Pylaisia polyantha Fruiting plants on apple trees in orchards, Ashley Farm Orchard, Rampton, TL426685, C.R.S., 18.2.2009, Mandalay, Station Road, Wisbech St Mary, TF421086, C.R.S., 12.2.2009 and Garner's Orchard, The Broad, North Brink, Wisbech, TF415064, C.R.S., 29.2.2009. There are two earlier records of this species in the county, made by C.R.S. in 2004 and 2007 in orchards near Wisbech. This moss of "hedgerows and open woodland" (Hill *et al*. 2004) clearly finds suitable conditions in modern orchards.

Seligeria calcarea Patch of c. 50 cm^2 on hard shaded stone below ground level at base of steps by crypt, Westry church, March, TL399983, C.D.P., 11.1.2009. This is the first Fenland record of any of the three *Seligeria* species in the county, and the first from a churchyard (but see *S. donniana* below).

Seligeria donniana Felt-like patches with *Fissidens gracilifolius* and *Tortula muralis* on vertical N. side of tomb on N. side of Stetchworth church, TL642590, N. Jardine, 21.3.2009, det. S.D.S. Bosanquet. The only earlier record of this species in the county is Richard Fisk's record of a plant on a chalk pebble in a rabbit hole on the Devil's Ditch in 2005.

Zygodon rupestris Apple trees, Ashley Farm Orchard, Rampton, TL426685, C.R.S., 18.2.2009. This species was discovered at the southern edge of the county in 2005 and last year we reported two records from orchards near Wisbech. C.R.S. also found it in four more orchards in the Wisbech area in February & March 2009.

Liverworts

Cololejeunea minutissima On hawthorn, New Wood, Boxworth, TL340612, M. Ghullam, 24.1.2009. Sloping trunk of willow by pond S.E. of Childerley Hall, TL35696256, C.R.S., 24.1.2009. Apple trunk in orchard, 9 Redmoor Lane, Wisbech, TF451072, C.R.S., 3.3.2009. Further records of a liverwort that we classified as Hyperoceanic in 1998 but which has spread so remarkably in Europe that we would now call it Mediterranean-Atlantic. It was first recorded in Cambs in 2007 and is spreading rapidly northwards and eastwards in Britain.

Cephaloziella divaricata Four patches, the largest 13.5 x 9.5 cm, in open turf on ballast in old railway siding, with *Brachythecium albicans, Bryum* sp., *Ceratodon purpureus* and *Dicranum scoparium*, Stanground Wash Nature Reserve, TL20809767, J.J. Graham & C.D.P., 8.9.2008, BBSUK, det. D.G. Long. The collected material was female. The only previous records in the county of this tiny, calcifuge liverwort were from Gamlingay in 1934 and 1957.

Lejeunea cavifolia With *Homalia trichomanoides* at base of ancient ash coppice stool, on one of a circle of more or less independent trees, Basefield Wood, Stetchworth, TL64875689, C.D.P., 21.3.2009. This common western liverwort is very rare in Cambs and confined to old coppice stools in ancient woodland. This is the first new site to be discovered since 1952; since 2000 it has only been refound in one of its former sites, Hayley Wood.

Nowellia curvifolia Patch c. 20 cm wide with *Lophocolea heterophylla* on decorticated horizontal trunk of sycamore, Decoy Pond, Arrington, TL31795230, M.O.H., 21.2.2009. The third site for another western liverwort, which has survived for decades in Hayley Wood and Chippenham Fen.

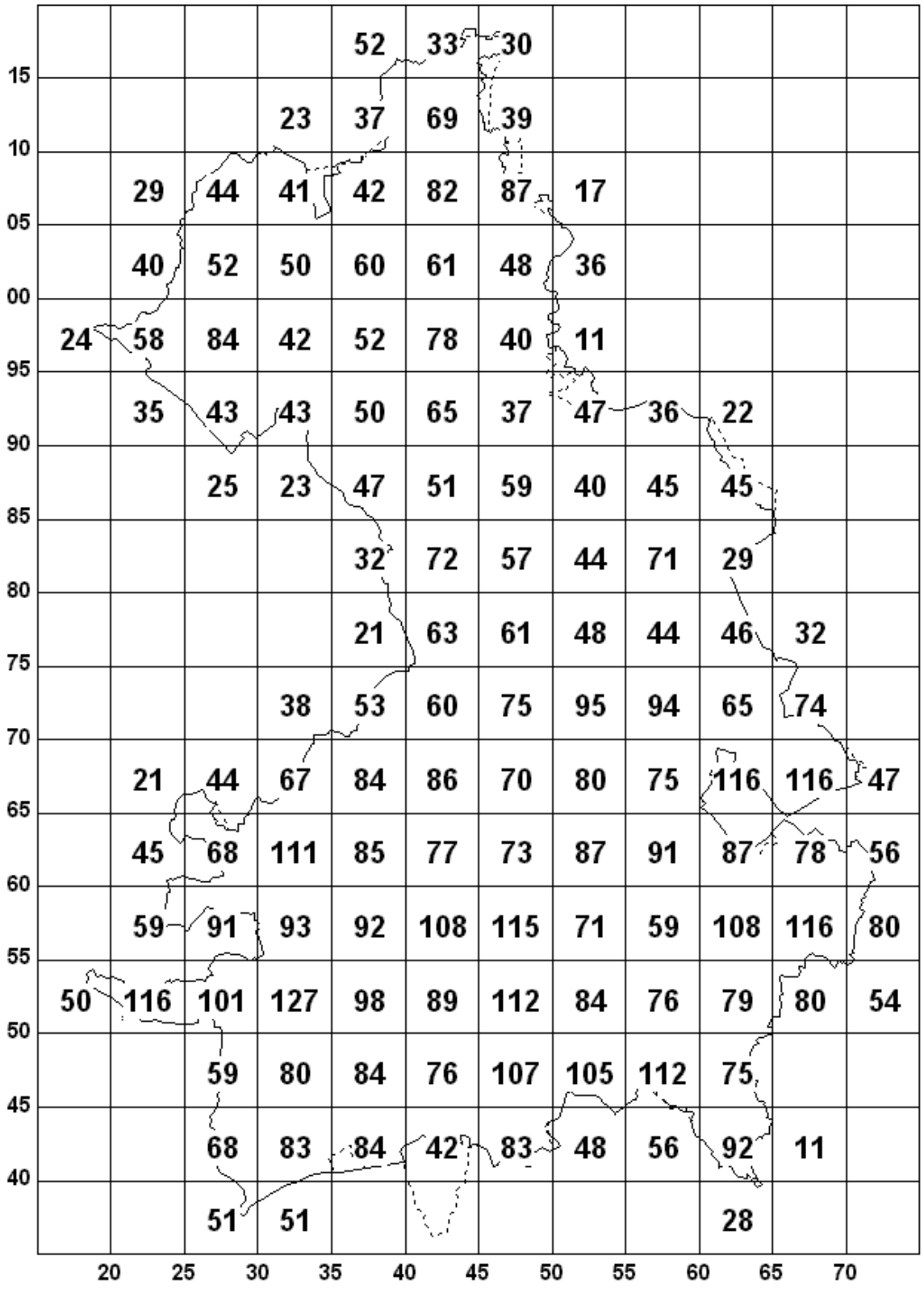


Figure 1.
Number of bryophyte species recorded in each 5 x 5 square, 1 January 2000 – 19 April 2009.

Plagiochila porelloides 10-20 patches on humic soil at foot of beech trunk, with *Ctenidium molluscum, Homalothecium lutescens* and *Hypnum cupressiforme*, Beechwood Nature Reserve, Wort's Causeway, Cambridge, TL48495437, J.D. Shanklin, 2.2009 & seen *in situ* by C.D.P., 9.4.2009, BBSUK, conf. S.D.S. Bosanquet. The first vice-county record of a liverwort which is frequent in most parts of the British Isles but not previously recorded from East Anglia. S.D.S.B. detected the epiphyllous ascomycete *Epibryon plagiochilae* on the leaves, a fungus which has only recently been reported in Britain (Bosanquet 2007).

Riccia subbifurca In small quantity on winter-flooded areas in arable field, with numerous associates including *Juncus bufonius, Persicaria maculosa, Pulicaria dysenterica, Aphanorhegma patens* and *Riccia glauca*, N. side of Dernford Fen S. of America Farm, TL47235063-47265060, C.D.P., 17.8.2008. *R. subbifurca* was collected by Jeff Duckett in wet hollows in an arable field at Dernford Fen in August 1967; the only other sites in the county are the *Lythrum hyssopifolia* hollows just to the south, in TL44.

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Invertebrate records

Louise Bacon

This report continues to focus on records of invertebrates that have never been recorded in vc29, rarely recorded, or showing unusual occurrence patterns from normal.

Contributions have come from various sources, mostly county recorders or other keen amateur naturalists, and have been compiled by Louise Bacon. Especial thanks are due to Nick Millar and Stuart Warrington for their contributions. Records of significant invertebrates can be sent to the data officer at Cambridgeshire Biological Records Centre, Manor House, Broad Street Cambourne (email via data@cpbrc.org.uk) and will be passed to county or national scheme recorders for verification

Na and Nb are measurements of National scarcity based on 10km square distribution.

Coleoptera (Beetles)

Carabidae (Ground beetles)

Ophonus ardosiacus (Nb), TL35, Cambourne, 2005-08. This species was first recorded in Cambourne by Nick Millar and Brian Eversham in 2005; it turned up as singletons in a few locations around the new settlement including the foyer of the Wildlife Trust's offices. In autumn 2007 Brian noted that it could be found in substantial numbers in the developing fruiting heads of Wild Carrot (*Daucus carota*) at a site in Swavesey village (TL36).

Subsequent investigation that autumn by Nick of locations around Cambourne where Wild Carrot was frequent showed that this beetle was also frequent here; counts of ten or more individuals being reached quite readily. Though the carrot was often in quite dense and rank grassland there were always areas of bare clay soil not too far way, generally on ditch banks. The habitat of this beetle is usually described as open ground on chalk, limestone and sometimes clay soils.

Platyderus depressus (Nb), TL226529, Gamlingay Cinques Nature Reserve, 8 June 2008, Nick Millar. Also found on 30 May 2008 by the same recorder at TL314394 close to the railway line at Morden Grange Farm.

Chrysomelidae (Leaf beetles)
Macroplea appendiculata (RDB3), TL271939, moderate-sized fen drain, Underwood's Grounds south of Whittlesey, 24 May 2008, Nick Millar. Two individuals on the pondweed *Potamogeton x zizii*.

This species and its single British congener are unusual amongst reed-beetles in that even the adult stays submerged rather than emerging to feed on the aerial parts of water plants. It is easily overlooked and was detected only when one crawled out of the pondweed specimen as it was being laid out on paper at home ready for pressing. It is probably under-recorded by coleopterists and disregarded if seen by botanists. The method of discovery suggested that this species may get pressed inadvertently in pondweed herbarium specimens but Chris Preston, who must have looked closely at many hundreds of such sheets, cannot recall having seen any.

There are recent nearby records for Marsh Lane Gravel Pits, Hemingford Grey, TL3036 (1993) and Cross Drain, South Lincs, TF1810 (1994). This latter record may be a similar habitat to the Whittlesey one. Previous records in vc29 are as follows: River Cam, Bottisham Locks, TL5065, 1918; Bottisham, TL5460, 1918. The national atlas (Cox, 2007) shows a total of only eight 10km squares post 1980, though these span the length of the country.

Cerambicidae (Longhorn Beetles).
Arhopalus rusticus. TL399549. One came to mercury vapour light in a moth trap in a Barton garden, 10 September 2008. This species appears to be coming more widely reported, and there are several records from Huntingdonshire in the last few years, but this is the first one that the National Recorder is aware of for vc29. It is species that feeds on dead pine as a larva, but can be quite dispersive as an adult. There are dead pines about 1.5 km away from the location of this moth trap.

Meloeidae (Oil Beetles)
Meloe rugosus (RDB3) (Rough Oil Beetle) Orwell Clunch Pit, 24/02/2008. An adult beetle was found during a Butterfly Conservation work party at this small SSSI in south Cambridgeshire. The adults of this very distinctive group of beetles overwinter, and reproduce by parasitising solitary wasps in the spring. This is possibly the first record of this species for Cambridgeshire, although there are fairly recent records of *Meloe* sp from Wandlebury. All members of the group are scarce to rare, and are found in chalk grassland. They are distinctive with their shortened elytra. There was an excellent article and key to the British species published in British Wildlife (Ramsay, 2002).

Hymenoptera: Formicidae (Ants)
Lasius brunneus (Na), TL244536, Gamlingay Wood, vc29, 14 May 2008, Nick Millar. Several individuals beaten from a small hawthorn in a fairly open and sunny coppice plot in the eastern part of the wood. TL260550 Waresley - Gransden Woods, vc31 28 May 2008, Louise Bacon. Two found in frass at the base of a dead elm. The national distribution of this species is southerly and strongly clumped; a large area from south Essex through Middlesex

to Surrey and another along the Vale of Gloucester and further north. It has been recorded from Monks Wood also vc31) and there are recent vc29 records from Wimpole Park and a site in TL45; the six-figure grid reference provided by the NBN Gateway puts this record in the middle of an arable field but this may be an error for Wandlebury. This species is likely to be under-recorded: it nests in trees and there is often very little outward sign of occupancy, the workers look superficially like other small dark Lasius species and they are very timid and retiring in nature.

Formica cunicularia TL555485 Hildersham Furze Hills, 10 October 2008, P.J. Attewell. On central hill only; workers foraging over gravelly south-facing slope with some bracken, below scrub oak and gorse. Probably only a single nest at the second-only Cambs site (the other site, Over disused railway, is now part of the guided busway route and therefore may have been lost if not on the upper half of the cutting sides).

Lepidoptera
Hyles livornica (Striped Hawkmoth), TL438600, north-west Cambridge, 10 September 2008. Sarah Rodgers found a specimen of this migrant hawkmoth on her door frame on the morning of 10th September. Being interested in wildlife in general, a photograph was taken on a mobile phone and brought into the office of the wildlife trust a couple of days later. At this point, an identification as the second ever for vc29 was confirmed, but unfortunately the moth had obviously departed.

Arachnida
Argiope bruennichi (Wasp Spider), TL315597, Cambourne, 19 October 2008
During a Wldlife Trust training workshop on invertebrate techniques at Cambourne, this very pretty yellow, white and black spider was found in the grass by Catharina Karlsson and identified by Brian Eversham (Plate 6, back cover). Further searching in the area led to the discovery of egg-cases, implying a breeding female spider. The presence of this species which is spreading in lowland England with our warming climate, at a new settlement site, in the grasslands of the nature reserve areas, shows the potential for this species to become eventually a familiar sight across the county. One was recorded in Peterborough a couple of years ago, but we can find no other records for vc29, although this has not yet been checked with the British Arachnological Society.

Wicken Fen Vision Invertebrates. (Contributed by Stuart Warrington and various original recorders)

Recent survey work at The National Trust's Wicken Fen has focused on the invertebrates found on the habitat creation areas of the Vision land. Over 260 species of beetle have been found since 2006 in these areas and this number is certain to increase as the habitats develop. The ditch network is proving to be of particular value, with a number of scarce species being found by Tony Drane, such as the specialist reed carabids *Demetrias imperialis* (Nb), *D. monostigma* (Nb), *Paradromius longiceps* (Na) and the wetland species *Odacantha melanura* (Nb). Also on the reeds were *Cerapheles terminatus* (Na)(Melyridae), *Crudosilis ruficollis* (Nb)(Cantharidae) and *Donacia marginata* (Nb) (Chrysomelidae), the latter species the first record at Wicken for over 50 years. These ditches and shallow, flooded areas have also been found to support scarce water beetle species such as *Enochrus nigritus* (RDB2), *Hydrochus elongatus* (RDB3), *Enochrus quadripunctatus* (Nb), *Limnebius papposus* (Nb), *Berosus affinis* (Nb), *Berosus luridus* (RDB3) and *Cercyon tristis* (Nb). So far, the grassy areas of the habitat creation sites of Baker's, Guinea Hall and Burwell Fen seem

to support a more ubiquitous and common Coleoptera fauna. The total list of Coleoptera for Wicken Fen land now totals 1515 species. A number of these species have not been recorded for some decades, but they may still be present, for example 14 rove beetle (Staphylinidae) species that had not been noted since before 1929 were found by experts at Wicken Sedge Fen in 2007.

Of the Hemiptera (true bugs), the Water Cricket (*Velia caprai*) (Veliidae) has been found in several of the flowing ditches on the new land since 2005, a new species for Wicken. Also new was the tiny and scarce *Microvelia pygmaea* (Nb) (Veliidae) which was found in 2007 in a pond on the newly acquired Hurdle Hall Farm. *Stictopleurus punctatonervosus* was once extinct in Britain, but it has been recolonising from the south in recent years and recently turned up by a footpath on Guinea Hall. The local Water Stick-insect (*Ranatra linearis*) has turned up in several of the deeper ponds and ditches on the Vision land. This is not so surprising as this strange insect is quite capable of crawling up a reed stem out of the water and taking flight on a warm day.

BDS National Dragonfly Atlas project; a request for volunteers by Val Perrin.

The last dragonfly atlas for Britain and Ireland (Merritt et al, 1996) was published some 13 years ago and since that time much has happened to the dragonfly fauna in this country, with many species undergoing range expansions, some more specialised species having range contractions, while other new species (e.g. Small Red-eyed Damselfly) have newly colonised this country from the continent. It is therefore timely that a new atlas of the distribution and status of the British Isles' Odonata be undertaken.

With this in mind, the British Dragonfly Society last year launched a new atlas scheme to cover both Britain and Ireland, which will run until 2013. The aim will be to gain as even coverage of the country as possible in order to determine the current species' distribution. Cambridgeshire is playing its part in this and a small band of dragonfly recorders has already begun work in the modern county. However, there is plenty of scope to expand this network. Anyone with good dragonfly / damselfly identification skills interested in helping with recording is asked to please contact Dr Val Perrin, county dragonfly recorder for the BDS (email: valperrin@aol.com. Tel 01954 780467) who would be pleased to provide further details and recording forms. Recorders may wish to adopt one or more 10 km squares to concentrate their recording efforts and avoid duplication of effort, although records will be welcome from anywhere.

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OBITUARIES

Professor Michael Eugene Nicolas Majerus (1954–2009)

It is with the deepest sadness that we report the death of an inspirational natural historian and evolutionary ecologist, Professor Michael Majerus. Mike worked in the Department of Genetics, University of Cambridge, for almost thirty years, first as a postdoctoral research associate but ultimately as Professor of Evolution. He was also a Fellow of Clare College. He talked affectionately of his pastoral role within the college. He was not only highly respected and much loved by his students, collaborators and colleagues but also an inspiration to many of them. In December 2008 Mike was diagnosed with an aggressive form of cancer. He died just two months later.

Mike was a staunch defender of Darwinian evolution and his recent presentation to the European Society for Evolutionary Biology (2007) summarised eloquently the foundations of his thinking:

"When I was at school in the late 1960s, I was taught about the physics, chemistry and geography of 'the greenhouse effect' as fact. According to the scientific laws of these subjects, global warming could not NOT happen. It has taken nearly 40 years for scientists to accumulate the empirical evidence of proof, so that even those with strong vested interests in denying global warming have had to concede that climate change is now a fact of life. Similarly, Darwinian evolution is logical fact, and had to be even in 1859. Consider Darwin's four observations and three deductions, upon which selection theory is based.

1. Organisms produce far more offspring than give rise to mature individuals.
2. Yet, population sizes remain more or less constant. Therefore, there must be a high rate of mortality.
3. The individuals in a species show variation. Therefore, some variants will succeed better than others, and those with beneficial characteristics will be naturally selected to produce the next generation.
4. There is a hereditary resemblance between parents and offspring. Therefore, beneficial traits will be passed to future generations.

Given these four observed facts and three simple, logical deductions, selection cannot NOT happen. And there are a tremendous number of examples of Darwinian selection in action, whether these be due to natural, sexual or artificial selection."

Mike worked extensively on the Peppered Moth (*Biston betularia*), conducting experiments in his much loved back garden in Coton to fulfil two aims: to address a major gap in knowledge of the natural history of the Peppered Moth (where they rest in the day) and to assess whether various criticisms of

Kettlewell's experimental protocols could have altered the validity of his conclusions. Mike concluded that the rise and fall of the Peppered Moth is an excellent example of Darwinian evolution in action.

Lepidoptera were Mike's passion from an early age. He caught his first butterfly at the age of four and this marked the advent of his entomological career. He was quoted as saying that the first four years of his life were wasted! Enthusiasm, passion and determination are qualities that describe Mike and he employed these to great effect from a young age. When Mike was a young teenager the Amateur Entomological Society (AES) removed the over-eighteen age restriction on membership and immediately Mike joined. His association with the AES remained strong throughout his career and he took every opportunity to promote the society, ultimately becoming President. Indeed, he requests donations to the AES in his memory.

Mike was well known internationally for his research on Lepidoptera but he is perhaps even better known for his work on Coccinellidae. In the 1980s he published two papers in *Nature* demonstrating that, for the polymorphic ladybird *Adalia bipunctata*, non-assortative female preference for melanic males is genetically determined (Majerus *et al*., 1982, 1986). This provided critical experimental evidence that behavioural strategies could be genetically determined. Mike continued to publish widely on the behaviour, ecology and genetics of ladybirds and there can be no doubt that he has been the most influential scientist in coccinellid biology. In 1994 he published the New Naturalist book *Ladybirds* (Majerus, 1994), a synthesis which demonstrated his depth of understanding and passion for these charismatic animals. I read this book avidly, as a Ph.D. student in 1994, and it enthralled and inspired me.

A few weeks into my Ph.D. studies I wrote to Mike asking for advice on breeding Seven-spot Ladybirds (*Coccinella septempunctata*), a notoriously problematic laboratory species. I expected him to forward me some references to relevant papers but instead he invited me to the Cambridge University Genetics Field Station (a magical establishment). So, on a cold autumn day in 1994, I spent some cherished hours with Mike instructing me on the subtleties of *Coccinella septempunctata* mating and so began the start of a wonderful collaboration. I relished Mike's enthusiasm, his encouraging words and his excitement. I also know that Mike offered his time and knowledge in this generous way to many, many scientists and enthusiasts around the world. He was an outstanding mentor.

Much of Mike's research was centred on meticulous laboratory research but he was also an exceptional field biologist. Indeed he was happiest when he was trekking through rainforests or climbing up mountains in pursuit of an insect, usually a lepidopteran. He would return from these trips full of excitement and anticipation for his next voyage. He particularly relished the opportunity to contribute to the Tropical Biological Association and taught on a number of field courses across the world. He met many people through his travels and embraced the opportunity to support their studies. Mike's protégés span the globe. His enthusiasm for the natural world was boundless, his knowledge was vast, and he captivated those who had the privilege of being in his company. He

had a desire to see others succeed and would offer every opportunity within his authority to ensure this.

In the world of biological recording he will be remembered for his leadership of the Biological Records Centre Coccinellidae Recording Scheme (later the UK Ladybird Survey and Harlequin Survey) for almost three decades. In 1989 he published the Naturalists' Handbook *Ladybirds* (Majerus & Kearns, 1989). This book is still an essential reference for anyone wishing to study ladybirds. It is written in Mike's characteristic, charismatic style and is much more than a functional guide. From 1984 to 1994 Mike ran the Cambridge Ladybird Survey; a public outreach project on an enormous scale. The data collected from this extensive survey form a major component of the Coccinellidae Recording Scheme. Mike embraced the volunteer recording community on a national scale and was aided by television and radio appearances, including the BBC programme Blue Peter.

In the late summer of 2004, Mike, in his role as recording scheme organiser, received a specimen of a new arrival to the British Isles, *Harmonia axyridis*. I was on sabbatical in Mike's laboratory at the time and the sorrow that Mike felt at the arrival of this invasive alien species in the British Isles was evident. He had written in 1994:

"I have an unnerving nagging at the back of my mind that faunal and floral homogenisation is among the most detrimental of the ways in which humanity is affecting the Earth" (Majerus, 1994).

Years of detailed research into fundamental aspects of the biology (particularly natural history) of coccinellids provided Mike with the foresight to act quickly. He issued a press release entitled "The Ladybird has Landed" and began working on a strategy to ensure that this species was tracked from the onset of invasion. Mike and I (with invaluable guidance from Trevor James representing the NBN Trust) secured funding through a Defra contract to design and launch two on-line recording surveys: www.harlequin-survey.org and www.ladybird-survey.org. Over the following four years, Mike worked tirelessly to promote and develop these surveys. His extensive list of publications and press articles on the Harlequin Ladybird is testament to the success of this activity (including Roy *et al.*, 2006; Majerus *et al.*, 2006; Brown *et al.*, 2007, 2008; Koyama & Majerus, 2008; Ware & Majerus, 2008). The Ladybird Surveys have been selected for the 2009 Royal Society Summer Exhibition, a further accolade to Mike's exceptional leadership.

Throughout all his work Mike ensured that integrated and collaborative research was coordinated through lively and dynamic meetings, involving many scientists from Britain and beyond. It was not unusual for Mike to be hosting the visit of a scientist from far-flung lands. He generally marked these occasions with a party at his house, which provided opportunities for enthusiastic discussions, considerable consumption of alcohol and frivolity that echoed with Mike's laughter and good humour. His wife, Tina, was instrumental to the success of these events. Her ability to look after the needs of all the diverse guests, coupled with her enthusiasm for the natural world, ensured that visits to their home were always memorable occasions.

Mike has left a lasting impression and a rich legacy to many biologists through his friendship, teaching, and writing. He wrote prolifically, coupling originality with rigour. I had the honour of being co-author with Mike on a number of publications and I learnt so much from his expertise as a writer. He was as committed to writing short entomology notes as he was to producing high-impact science papers and books. He saw the importance of communication and was fantastically effective at conveying ideas, thoughts and facts to all audiences. He was simply a brilliant speaker. I will remember him for his intelligence, insight, knowledge, understanding, laughter, enthusiasm, passion and much more.

I have so many vivid recollections of this incredible scientist. One of my many favourites is of Mike in King's Forest (Thetford) with the Living World (Radio 4) crew on a frosty February morning (Plate 2, inside front cover). We had a few hours in which to record a thirty minute programme about ladybirds waking up from winter. As we walked through the frozen forest it seemed unlikely that we would find anything very much awake but Mike strolled nonchalantly up to a gorse bush, spread out his beating tray and hit the branches with his favourite beating stick. Out tumbled hundreds of Sixteen-spots (*Tytthaspis sedecimpunctata*), and tens of Seven-spots (*C. septempunctata*). I think the crew were persuaded that in nature anything is possible – especially when in the company of Mike Majerus.

To finish with Mike's own words "And it has been a great life".

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Helen Roy with Peter Brown and Remy Ware

Monica Joan Stokes (1923 – 2008)

Monica Stokes was known to many local *Nature in Cambridgeshire* followers in recent decades as an active member of the Cambridge Natural History Society, Cambridgeshire Flora Group, U3A Botany group, Cambridge Antiquarian Society and many other groups connected with local and natural history. She was often accompanied by her elder sister Edna Norman, who died few years ago.

The sisters, daughters of a Gloucestershire farmer, both followed botanical careers. Monica read Horticulture at Reading and after graduating worked near Cambridge at the NIAB (National Institute for Agricultural Botany) on the relationship between clover and bumblebees. Then she worked for some years for Suttons Seeds, in Wiltshire; looked after her father after her mother died; and eventually returned to Cambridgeshire, settling in Cottenham. She acquired a market garden plot and grew fruit and vegetable crops, willow for basket making, Christmas trees, flowers and grasses for drying and kept bees and Jacobs sheep. Soft fruit, particularly raspberries, was her main cash crop; the sheep were the least profitable, but she enjoyed spinning their wool for rug making and other projects. She was pretty much self-sufficient but would also take part-time agricultural work locally if necessary. She was very hardworking and fiercely independent and thought nothing of tackling any job that needed doing, including building fences. After she had to give up the market garden, she soon set about digging up the back garden of her sheltered bungalow for vegetables and raspberry canes.

She was never the sort of person who would be short of something to do. Outside work, often still out of doors, she had many interests and her mind was always hungry for new things to learn. She was a member of the RSPB and the local rambling group, and travelled abroad to watch birds in ‘interesting’ places such as Madagascar. She enrolled on a variety of courses, from painting to archaeology, at local adult education centres, and joined the University of the Third Age in Cambridge.

As a member of CAMBIENT (later, the Wildlife Trust), Monica frequently attended meetings and field trips. She and Edna were enthusiastic members of the Cambridgeshire Flora Group for many years, where their identification skills – often involving intensive debates between them – were of great value in

recording many sites in v.c.29. Monica's battered copy of Keble Martin's *Flora* was always brought on such trips, and frequently consulted despite increased handling difficulties, and her knowledge of grasses remained impressive and instructive.

Monica was a great character. She had a fiercely independent nature and was not afraid to live life on her own terms. Some may have considered her to be a bit wacky and chaotic, but she made many friends through her varied interests and was well known for her good humour. Her last two years were spent in residential care in Cottenham, where flashes of her old self would still shine through until the end.

Jane Bulleid

A. E. Vine (1929-2008)

Tony Vine had so many interests that it is difficult to summarize his legacy to us in this short account.

Natural history became a major factor in his life during his RAF days, when his bicycle coverage of Breckland in the late 1940s bird watching resulted in some significant surveys. These were the most detailed for that period and have been used in recent articles to show how Breckland bird populations have changed, usually for the worse, since that time. By 1947 Tony had become a member of the Cambridge Bird Club and soon joined undergraduates from the University to visit the South Wash. By the early 1950s his regular coverage consolidated his knowledge of that area. In 1950 he had begun his census work on the heronries of Cambridgeshire; - the Brecks and Fenland which he continued annually until illness made this impossible just before his death.

He was the first Town member to become Editor of the *Cambridge Bird Report* in recognition of his data gathering and considerable knowledge of the area covered by the Club. In his Reports he produced summaries on roosting Starlings and Rooks/Jackdaws and their daily flight paths across the county and provided an in depth study of Pinkfeet on the Wash. Bird conservation and the threats to many Cambridgeshire sites concerned him at this time; he was close friend of Philip North and Eric Cottier who were trying to protect Black-tailed Godwits on the Ouse Washes.

Tony often mentioned that his association with Dr Max Walters, when the two shared their anxieties about these threatened local places, actually spawned the idea of setting up a Protection Trust, which Max soon steered into the formation of CAMBIENT, the forerunner of our Wildlife Trust of today and which produced *Nature in Cambridgeshire* as its mouthpiece in association with the Cambridge Natural History Society. Tony contributed several articles in the early issues but it was the eighth edition where his accounts of mammals and birds of Hayley Wood and Badgers in Cambridgeshire that was indicative of a major change in Tony's attitude to wildlife. Conservation came to the fore with his work in Hayley Wood, and his information-gathering on East Anglian Badgers was initiated by a call for a Nationwide Survey by the Mammal

Society. The Badger involvement became a lifelong project in which he personally visited all setts for which he received information and in many cases he worked to protect and maintain colonies.

Membership of the Mammal Society led him to associate with Maurice Webber in a bat survey of the Area. Once again Tony became completely engrossed in this investigation; the two constructed and erected bat boxes all across East Anglia and made secure many sites for these threatened mammals at considerable personal expense and effort. Tony became further involved with the Nature Conservancy and English Nature, being called out wherever bats were at risk when houses, barns or churches were being demolished or repaired. This often meant endangering his person climbing about in lofts, belfries and underground icehouses and the like to make sure sites were habited or bat-free. His unique knowledge of Badger setts meant he was also called upon to make sure that the species was not endangered by the construction of new roads or where housing development threatened rural areas.

Work on these two projects alone would have kept most mortals fully occupied; however, Tony had other major interests of which industrial archaeology, along with his time-consuming research of Dummy Airfields (used in the Second World War to confuse German bombers) and his bird census work on Ministry of Defence sites across East Anglia were the most significant. In fact when I joined him in recent years on Airfield Surveys he took a keen interest in my botanical coverage of these sites and found the work on plotting rare Breckland plants on RAF Lakenheath one of the most satisfying of all projects undertaken.

Tony was known to many since he sat on a large number of conservation and management committees – Wicken Fen, RAF Lakenheath, Mildenhall, Honnington, Stanta to name a few. He attended a remarkable tally of Society Meetings across the region and led many field meetings where his knowledge on a wide range of subjects was invaluable. His East Anglian wide surveys required a network of friends and informants including observant gamekeepers, farmworkers, farmers and landowners. He had a great capacity to remember names and family details of all such acquaintances. He had a real influence on many people's attitude to the countryside and set many a young person upon a life of Natural History involvement. He will be sadly missed.

Graham Easy

Terry Wells (1935-2008)

Terence Charles Ernest Wells, known to most simply as Terry, or as 'Dry' Wells to distinguish him from his colleague Derek 'Wet' Wells who worked on wet grasslands, died on 4 September 2008. He had been suffering from Parkinson's disease, and more recently from cancer.

Terry will be best known to readers as the Botanical Society of the British Isles' vice-county recorder for Huntingdonshire (v.c. 31), a position he held from 1967 to 2007 when he stepped down due to ill-health. During this period

he wrote *The Flora of Huntingdonshire and the Soke of Peterborough*. Huntingdonshire was the last English county to be covered by a book-length Flora and it therefore fell to Terry to complete the sequence begun by John Ray with his Cambridge *Catalogus* in 1660. Terry was also a pivotal member of the Huntingdonshire Fauna and Flora Society for which he performed many duties including botanical recorder and president.

Terry's childhood interest in botany was awakened by his history teacher at Luton Grammar School and long-time mentor, John Dony. John was then a leading light in the BSBI and his meticulous 'scientific' approach to recording was to have a major influence on Terry's later work. Terry was very much a botanist in the John Dony mould, keen on detailed recording in relation to conservation, less keen on recording introduced species, apomictic groups, infraspecific taxa and hybrids. Indeed it was John who persuaded Terry to record on a tetrad basis and to extend the boundary of his flora to include the whole of the new (and in the event short-lived) administrative county of Huntingdon and Peterborough. This added much to distract Terry, including areas of limestone grassland and ancient woods, such as Bedford Purlieus, where he spent many happy hours recording fungi with his wife Sheila. Nevertheless, Terry completed the field work for the Flora by the early 1980s but he was unable to find time to write the text until after his retirement. It was finally published, despite Terry's ill-health, in 2003 with much help from Sheila and "largely though her insistence".

Yet Terry's most enduring contributions to plant ecology are less well known. After a brief spell working as an agricultural scientist in Jamaica Terry returned to England (in 1963) to join the Nature Conservancy (NC) at the newly formed Experimental Station at Monks Wood. He remained at Monks Wood for the rest of his career undertaking pioneering work on the ecology of chalk grassland communities and rare species, most notably Pasque Flower (*Pulsatilla vulgaris*) and Spotted Cat's-ear (*Hypochaeris maculata*) for which he published Biological Floras in the *Journal of Ecology*. In later years Terry talked fondly of his summers surveying sites for the *Nature Conservation Review* (NCR). This brought together a 'crack' team of NC botanists who would set off in a draughty Land Rover each Monday morning to find and survey the 'best' grassland sites Britain had to offer. The team did much work in Wiltshire, where they were helped by friendly regional NC staff, much less in Kent where they were made to feel much less welcome! The results were published as the NCR, arguably one of the most influential modern works in British conservation. Terry was also very proud that his quadrat data was used to derive many of the grassland communities in the *National Vegetation Classification*.

1963 marked the start of another life-long obsession – orchid demography – when Terry took over the monitoring of Autumn Lady's-tresses (*Spiranthes spiralis*) at Knocking Hoe in Bedfordshire. This recording continues to this day and, thanks to Terry, provides one of the longest running demographic studies in the world. He became increasingly interested in the complex, but fascinating lives of orchids for which he was a recognized world expert. Painstaking studies were carried out on Green-winged Orchid (*Orchis morio*), Bee Orchid (*Ophrys*

apifera) and Musk Orchid (*Herminium monorchis*)**.** His 'triangulation method' for locating individual plants was characteristic of his merits as a practical field ecologist and led to scores of similar studies worldwide. His work on two species in particular capture the essence of Terry's approach to scientific study. Terry was instrumental in notifying Upwood Meadows as a National Nature Reserve mainly for its population of Green-winged Orchid. He was very proud of this site, which was only a short walk from his house, and visited it annually from 1976 to count the numbers of spikes and cattle. Although Terry was unable to join in the 'walk' in 2008, he still got involved, writing down the numbers from his deckchair as the recorders shouted them to him! His work on Autumn Ladies-tresses at Knocking Hoe also deserves much wider recognition. This followed the fate of over 1000 individuals and by meticulous recording of the positions and performance of individuals, combined with information on management and climate, has provided us with arguably the finest long-term study of an individual species in the British flora. It is testament to Terry's dedication and stamina that he recorded the plots for the 45th and last time in September 2006. He was a dedicated and conscientious field-worker, and a passionate advocate of the need to use information wisely for conservation. Nothing annoyed him more than when decisions were made about a site or species he knew without any apparent justification or scientific rationale.

Terry was also fascinated by the way land-use influenced local floras, not least in the fens close to his home in Upwood. This led him to study the 'lost flora' of Britain's last great wetland – Whittlesey Mere – as well as fenland rarities such Ribbon-leaved Water Plantain (*Alisma gramineum*), Deptford Pink (*Dianthus armeria*), Fen Ragwort (*Senecio paludosus*) and Fen Violet (*Viola persicifolia*). A central theme was always to understand their ecological requirements better and then apply this knowledge when introducing them back in to former haunts such as Woodwalton and Wicken Fens. His lovely garden was littered with the remains of this work and on visits you would be taken on an obligatory tour to see how Fen Ragwort was faring in its rather small pond or how rampant *Dianthus armeria* had become in his vegetable patch that year.

Towards the end of his career Terry became involved in grassland re-creation, pioneering the use of wildflower mixtures and agricultural methods to create "attractive grasslands". This was more controversial than any of his earlier work, as many traditionalists (including John Dony) regarded such schemes as distorting distributions patterns and even (it was sometimes claimed) making future plant recording pointless. Terry faced even the most far-fetched criticism with characteristic calm and good humour. His studies have led directly to some of the options now promoted through agri-environment schemes. In his retirement Terry's passion switched to fungi, a love he shared with his wife Sheila, an expert in the field and constant companion on both botanical and mycological forays.

Terry was an inspirational scientist dedicated to observational study at a time when plant ecology was becoming increasingly laboratory and office based. He was also a renowned botanist and conservationist who contributed much to our

understanding of the British flora (for which he received an OBE in 1997). He was a larger than life figure but always modest and unassuming - his knowledge, kindness and warm good humour will be missed by all who knew him or had the good fortune to spend time with him in the field.

Kevin Walker & Chris D. Preston

Monks Wood (1960-2009)

Monks Wood had a worldwide reputation as an ecological research station, yet was sadly taken away from us on 30 January 2009.

The Nature Conservancy was responsible for the birth of Monks Wood; Max Nicholson wanted ‘a new and adequately staffed centre for the effective experimental study, testing, demonstration and dissemination of applied knowledge in animal and plant ecology, and the factors underlying successful management of the fauna and flora’. Eventually a site was chosen immediately to the south of Monks Wood NNR. Some land (appallingly heavy arable land which later defied both drainage and irrigation) was purchased and experiments got underway from 1961. The Nature Conservancy pulled in some of its key staff to work at the new showplace research station. Buildings took a little longer, and early staff were housed in a variety of temporary accommodation and labs between Cambridge and Monks Wood (including Norman Moore’s spare bedroom).

In best government accounting practice it was decided to split building costs between two financial years; consequently building work ran into the winter of 1962/3, the coldest since 1739/40, which delayed completion. Further squeezes on funding meant that whilst the conservation research, toxic chemicals and wildlife, and woodlands research units were established the planned vertebrate ecology unit never was.

For nearly 50 years visitors have marvelled at the ugliness of the “tower” and wondered how it ever got planning permission. The tower’s main purpose was to house a water tank at the top with student bedrooms on the four floors underneath to service the practical conservation courses that took place at Monks Wood. Planning permission was not necessary; this was crown property. The official opening took place on 28 October 1963 when the station was opened by the Minister for Science, Lord Hailsham.

By the time the site was relabelled as The Institute of Terrestrial Ecology in 1973, the research had already gained international reputation; in particular work on pesticide poisoning effects on wildlife, on the value of rapidly disappearing hedgerows, and the establishment of a national Biological Records Centre. Various funding changes led to expansion and contraction over the years, and a refocusing from curiosity-led conservation research to contract-led surveys and experiments. Later merging of research institutes led to a second name change to the Centre for Ecology and Hydrology. A new director gave the impression of a dislike of Monks Wood and its work.

Monks Wood was predeceased by its sibling ecology sites in Dorset and Banchory. The death of Monks Wood was long and protracted and in those last three years it is a credit to staff that they maintained a sense of humour and continued with the research that was their passion.

Will we ever know exactly why a site with such a good reputation, high research outputs, low running costs, experimental facilities, long-term experiments (some of them over 40 years old), room for expansion and relatively low housing costs was closed? Some 20-30% of staff transferred to other CEH sites; the rest dispersed to the wind. It is unlikely that such a vibrant mix of gifted staff will ever exist again. For those of us that worked there it was a privilege.

Tim Sparks

BOOK REVIEWS

A Year in the lives of British Ladybirds. Michael Majerus, Remy Ware & Christina Majerus. Published by the Amateur Entomologist's Society (AES Publications), price £7.50. ISBN 0-900054-73-5

Despite being 'for younger readers', this excellent small publication contains a wealth of information on ladybirds for naturalists of all ages. Based on six articles originally published in the AES Bug Club magazine for junior AES members, it has been expanded with a very useful reference section into a life history of ladybirds with pointers to finding them in the wild at different times of year.

The text takes us through the calendar year, starting off with hibernating clusters of 2-spot, Harlequin, etc, through the adults awakening in spring, the pressures of finding food as a larva, late summer swarms (the last significant one being in 1976) and returning to the autumn. One of the amazing facts which stood out for me is the apparent innate knowledge of the Orange Ladybird of how harsh the forthcoming winter will be, which governs its choice of hibernating site - under bark on branches if it is to be mild, or in the leaf litter just at or below ground level if it is to be a hard winter.

Searching techniques relevant to the season feature – it is very much a book inspiring you to go out and look. I never knew that the Water Ladybird which has a standard red and black colouration in summer, hibernates in reed stems near the ground and consequently changes colour to beige/black to keep itself inconspicuous. Any equipment featured is cheap and easy to come by, and methods such as sweep-netting are clearly described.

One of the other sections focuses on parasitism; the various flies and wasps that use adult ladybirds as a food source for their larvae. A particularly nasty parasitoid wasp reproduces by laying a single egg inside a ladybird, the larva develops, feeding on the fat reserves and non-vital organs, keeping the ladybird alive but paralysed, to take advantage of its colouration and foul taste whilst the wasp is maturing.

Unsurprisingly, the Harlequin ladybird features throughout and the interaction of this recent invader with our native species is covered in all of the different seasons. One hopeful observation with respect to this species is that there are two forms and we have the Japanese form which breeds at the equinoxes. This means that whilst the spring generation has no trouble finding food in the UK, the autumn generation faces a much tougher challenge and has not yet shown as much adaptation to the British climate.

As an amateur entomologist and naturalist, I found this book inspiring – I have already been checking domestic windowsills for hibernating 2-spots. It is well written and has excellent colour plates of all species as well as figures in the text of other important interactions with parasites or of techniques. The reference section has habitats and over-wintering sites for species, line drawings for beetle anatomy and life cycle, and a section of notes for tricky species pairs/groups, especially those species which exhibit large variability in appearance.

An excellent buy at £7.50, this book is available from the Amateur Entomologist's Society, via their website or the following address: AES Publications, 1 Tower Hill, Brentwood, Essex, CM14 4TAA, or email: aespublications@btconnect.com.

Louise Bacon

Cambridgeshire and Peterborough Pond Survey Report 2008. Cambridgeshire and Peterborough Biological Records Centre. 2009.

This booklet is a mixture of general statements about the nature of ponds and summaries of what was discovered in the 2008 survey. The general statements are helpful. However, I am not happy about the use of the phrase "natural pond" for ponds that are not garden ponds. It is misleading because in the county virtually all are man-made, having been dug originally by farmers at some time in the past.

The summaries of the percentages of the flora, amphibia, grass snakes and fish recorded in the ponds in the survey are valuable and interesting. Their value would be increased if the geographical distribution of the sites in the survey was shown. Unfortunately the total number of sites in the survey is not mentioned. For this reader mixing the general statements with the summaries of the survey did not help.

There is an appendix listing plant species recorded in the 2008 survey. As well as recording native and invasive and garden aquatic plants it includes numerous wild species such as Bluebell, Campion and Lesser Celandine and garden species such as Lilac, Japonica and Pampas Grass which are not aquatic

plants and just happened to grow near the ponds surveyed: the purpose of this appendix is not clear.

The survey of the Cambridgeshire ponds is an admirable one, but this report does not seem to do justice to its 2008 results.

Norman W. Moore

Review of the 2008 weather in The Botanic Garden

John Kapor

January was unsettled and saw some very mild temperatures with 14.8˚C reached on the 20th, and only a touch of air frost on one day. However, during a dry February the more typical seasonal weather returned with frosts occurring and on the 17th the air minimum dropped to -7.2˚C and as low as -11.2˚C on the ground. February was the driest month of 2008 with only 14.9mm of rainfall.

March was a wet month and on Easter Sunday the first snowfall of the season fell when 3cm of snow blanketed the Garden. Because the temperature was close to freezing the snow clung to the plants and the *Forsythias* that were in full flower, looked particularly spectacular. However, the icy conditions did do some damage to the blooms of the magnolia collection that had been early into flower.

April saw the last of the air frosts on the 9th when the temperature dropped to -1.6˚C. In the first 3 weeks only 13.8mm of rain fell but April showers turned to downpours in the last week when 29.0mm of rain fell, the wettest day being the 29th with 12.2mm.

May repeated April's pattern with a wetter end to the month. Average rainfall for May is around 50mm but 49.5mm fell in just five days (25-29 May). The total May rainfall of 64.1mm created good growing conditions and consequently the Garden did look green and lush.

Drier conditions were evident in June but nevertheless a useful amount of rain fell preventing the lawns turning brown. July saw the warmest day of the year when 29.2˚C was reached on the 28th. July had an average rainfall with three days experiencing thunderstorms, the most intense of which produced 17.6mm on the 7th. The majority of these downpours occurred in the first 11 days with only 4.8mm during the rest of the month.

August was the wettest month of the year with 84.8mm, and the 7th was also the wettest 24 hours of 2008, with 23.1mm falling in quite a short space of time.

September continued the wetter theme where greater than average rainfall fell, but with most of the rain falling in the first week, and only 5.5mm falling after the 9th.

By the end of October we experienced our first three air frosts of the season. On the 29th October the air temperature dropped to -3.0˚C which may have helped trigger some of the autumn colours that we enjoyed during November.

The *Tilias* (lime), *Fagus* (beech) and the ever reliable *Liquidambars* coloured beautifully, as did some of the trees in the *Legume* section of the Garden.

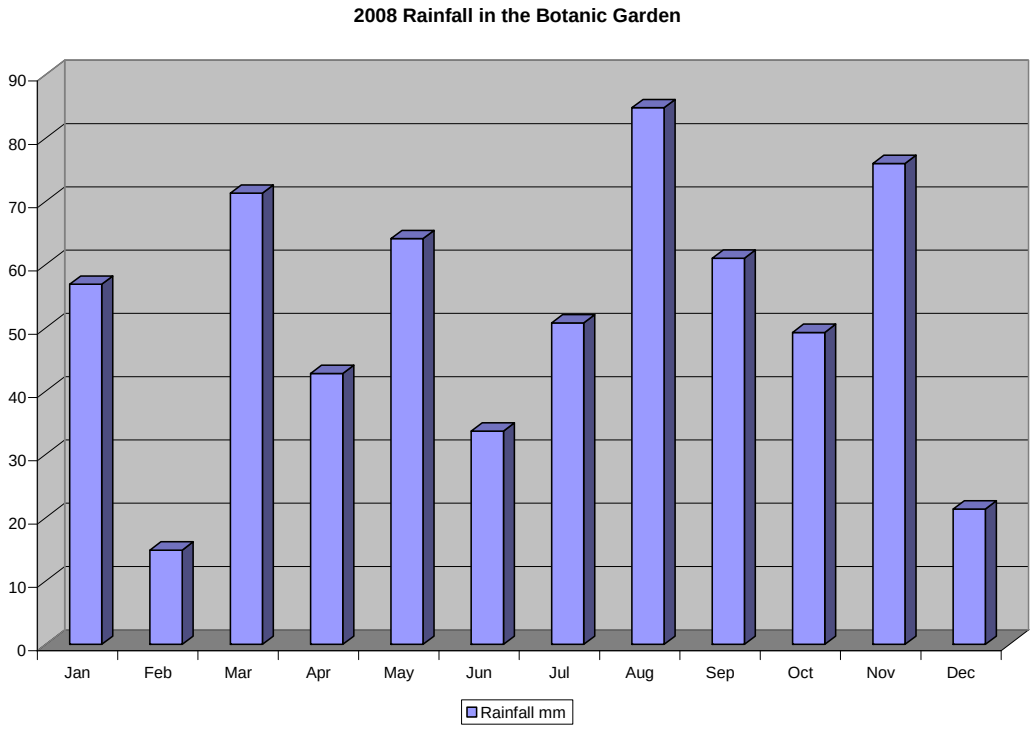
Autumn colour extended throughout November with individual plants continuing to provide us with a rich combination of browns, yellows, oranges and reds that brightened up the sometimes dull and grey autumn days. November was another wet month and there were several days with hail falling. There was also a brief spell of snow on the 23rd before it gradually turned milder.

December was on the cold side, however there was a milder spell between the 17th and the 24th. Rainfall wise it was also on the dry side with only 21.4mm. After the 12.6mm that fell on the 13th there was only 0.1mm for the remainder of the month.

For up-to-date weather in the garden visit www.botanic.cam.ac.uk/weather.htm

Table of rainfall in mm.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
56.9	14.9	71.3	42.8	64.1	33.7	50.8	84.8	61.0	49.3	76.0	21.4	627.0



Maximum and Minimum Temperatures (˚C)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	14.8	14.6	15.0	22.6	27.4	25.8	29.2	25.6	21.9	22.5	15.1	12.9
Min	-0.2	-7.2	-3.0	-1.6	1.9	5.7	7.8	7.3	4.0	-3.0	-3.2	-3.7

Plate 3. Mistletoe with female flowers and a ripe berry in Cambridge University Botanic Garden, 6 April 2009 (Photograph by Philip H. Oswald) (See article on page 50)

Plate 4. Mistletoe with male flowers in Cambridge University Botanic Garden, 6 April 2009 (Photograph by Philip H. Oswald) (See article on page 50)

Plate 5. *Elater ferrugineus* var. *occitanicus* from Longstowe. Photograph by Simon Damant. (See article on page 64)

Plate 6. Wasp Spider (Argiope bruennichi) from Cambourne. Photograph by Catharina Karlsson. (See article on page 95)