

S 296



TRANSACTIONS
of the
NORFOLK & NORWICH
NATURALISTS' SOCIETY

Volume 47 Part 1 2014 &
Volume 48 Part 1 2015 combined



NATURAL HISTORY
MUSEUM LONDON
16 MAY 2016



TRANSACTIONS OF THE NORFOLK & NORWICH NATURALISTS' SOCIETY

Volume 47 Part 1 2014 & Volume 48 Part 1 2015 (published April 2016)

Editor: **AR Leech** Assistant Editors: **S Harrap & NW Owens**

Published by the Norfolk & Norwich Naturalists' Society www.nnns.org.uk

Contributions for Volume 49 (2016) should be sent to the Editor, Nick Owens, 22 Springfield Close, Weybourne, Holt, Norfolk NR25 7TB owensnw7@gmail.com, from whom notes for contributors can be obtained.

The Norfolk & Norwich Naturalists' Society has as a principal aim the investigation and recording of Norfolk's wildlife and to this end it publishes:

- An annual volume of *Transactions*, consisting of papers and notes on wildlife in the county.
- The *Norfolk Bird and Mammal Report* which contains systematic lists of observations on the county's birds and mammals, as well as relevant articles.
- *The Norfolk Natterjack*, a quarterly illustrated newsletter.

All of these publications are free to members, as are *Occasional Publications* on specific topics.

The Society also arranges lectures and field meetings which are planned to appeal to anyone interested in natural history. More specialist groups cover many aspects of the county's flora and fauna.

The subscription rate is £20 per year, which includes all members of a family living at the same address.

Membership enquiries should be made to: David Richmond, 42 Richmond Rise, Reepham, Norfolk, NR10 4LS, All other enquiries should be directed to the Secretary, Nick Owens, 22 Springfield Close, Weybourne, Holt, Norfolk NR25 7TB. Tel: 01263 588410.

The Society gratefully acknowledges the support of the Sarnia Trust in the production of this publication.

ISSN 0375 7226

© Norfolk & Norwich Naturalists' Society 2014 Charity No. 291604

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electrical, mechanical, photocopying, recording or otherwise, without permission, except in accordance with the provisions of the Copyright Design and Patents Act 1988. Applications for permission should be addressed to the Secretary (see address see website: www.nnns.org.uk).

Printed by Barnwell Print Ltd, Aylsham, Norfolk NR11 6SU. Tel: 01263 732767

TRANSACTIONS
of the
NORFOLK & NORWICH
NATURALISTS' SOCIETY

Volume 48 Part 1 2015

The moths of the Dersingham area

R E Jones

Introduction

The parish of Dersingham is long and narrow and the whole area is less than about fifty metres above sea level. It stretches from the Peddars Way on the high chalkland in the east, down through the heath and woodlands below the low scarp, and over the flat, reclaimed saltmarsh around the Wash, almost to the sea. Many of the habitats of the Norfolk countryside occur within the parish, from the acid soils of the Dersingham Fen to the, regrettably scarce, patches of chalk grassland that still occur here and there, usually along roadside verges. The name Dersingham Fen is being gradually supplanted by the more correct term, at least biologically and ecologically, Dersingham Bog.

I decided to list the moths found currently within the parish because, although there are maps of the distribution of Norfolk moths shown on line (www.NorfolkMoths.co.uk), the data is not fully reliable. The identification of some species, particularly the microlepidoptera (micros), may be in error if not based on genital dissection. This paper follows a similar publication on the moths and butterflies of Hickling Broad by T. N. D. Peet (Peet 1992).

Dersingham has a rich and varied moth fauna which is representative of Norfolk species at the moment and will provide a baseline against which future studies can be compared. I have been moth trapping, on and off, for 35 years and for the last 5 years or so I have trapped almost continually, even in the winter months, and except for holidays, I have an almost continuous annual record for my garden which is near the centre of the village. I have not included any micros that I have not confirmed by dissection, apart from obvious common

species. I have also dissected several of the macrolepidoptera (macros), particularly the aggregate species, which are difficult to separate. Other records are as correct as I can ascertain and where possible I have asked the recorder to verify them.

Because of the way records are collected it is often difficult to know exactly where in Dersingham a species has occurred and some Dersingham records are probably from outside the parish boundary. I have therefore included any records from the tetrads TF62U, TF62Z, TF63K, TF63Q, TF63V, TF72E, TF73A, TF73F and TF73K.

The habitats

The chalky soil extends from the Peddars Way to the outskirts of the village. It is now used completely for arable farming and little of the original vegetation remains except along hedges and roadside verges. Species such as Oxeye Daisy *Leucanthemum vulgare* and Common Knapweed *Centaurea nigra* grow along the roadside. Some of the best chalkland vegetation can be found on the roadside along the Sherborne Road, although the best bits are just outside of the parish proper. There is a disused chalk pit, rather overgrown with *Salix* species, along the same road. Woodland here is sparse and mainly confined to planted strips for game cover.

The village is fairly large, more than 5,000 souls, providing King's Lynn with a dormitory of recent housing, but expansion is checked by the new bypass to the west. My house is in a third of an acre of garden which contains several large trees, a partly wild area and two ponds. The presence of the Royal Estate at Sandringham means that there is no danger of any southward extension of habitation.

The area to the south of the village is acid land and there is much woodland. The higher land around the Estate is mainly planted woodland and some of this is coniferous. By contrast, the lower land is wet and boggy and there is a good example of an acid valley mire. The area contains species of rare mosses and lichens. The current policy is to return much of this area to its original state of open heathland and bog. Dersingham Bog is managed as a reserve by Natural England. The smaller part of the bog and the common are the responsibility of the Dersingham United Charities. With the withdrawal by the Norfolk County Council of any conservation funding, the D.U.C. looks after it with funding from Natural England. There is also woodland to the north and west of the village.

During the 1960s there was a municipal rubbish tip in the disused sand pits that were dug into the common. When it was full it was capped with soil and it now forms an area of slightly atypical rough grassland.

To the west is an area of reclaimed saltmarsh which is now arable farmland. It forms flat, open land dissected by drainage ditches. It reaches the sea at the shingle beach at Snettisham Pits, where the Royal Society for the Protection of Birds has a reserve. Further south the sea wall abuts saltmarsh that is very mature, especially in Wolferton Creek. This area is just outside the parish, but the saltmarsh provides the breeding ground for many of the moth species that occur in my garden trap, so it is important to the Dersingham fauna. Species here include Sea Aster *Aster tripolium*, glasswort *Salicornia* spp. Sea-purslane *Atriplex* (*Halimione*) *portulacoides* and Common Sea Lavender *Limonium vulgare*.

New species for the county

On 30 September 2011 a New Neat Cosmet *Mompha bradleyi* was caught in my garden trap. At first its identity was uncertain, but after remounting the genitalia so that

the aedeagus could be seen more clearly, J.Clifton & I determined that it was *M. bradleyi*.

In the spring of 2011 there were several small greyish white moths in my trap that puzzled me. They seemed to be Grey Pine Ermel *Ocnerostoma friesei* but they had emerged too early. I dissected one and realised that I had the White Pine Ermel *O. piniariella*. It has been seen since in my garden on quite a few occasions, but so far there are no other records in Norfolk.

In June 2015 I collected the first Norfolk specimen of Scarce Thorn Case-bearer *Coleophora trigeminella* in my garden.

'Extinct' and rare species

When the Dersingham bypass was being built the 'Dersingham Moth' was invoked unsuccessfully as a putative reason for not disturbing the bog for the new road. In fact, there were two species of moth. Both the Sweet-gale Tortrix *Choristoneura lafauryana* and the Norfolk Tortrix *Archips betulana* were found on the bog at Dersingham feeding on *Myrica gale* by Atmore in the 1880s (Atmore 1889). *A. betulana* has not been seen since about 1900 and *C. lafauryana* since 1962. Both are probably extinct in Britain but one cannot be certain (Clifton 2001). I am certainly still looking.

There are undoubtedly other records of species that were collected in Norfolk and then not seen for about a century and said to be extinct within the county, until I or someone else recently found them. The recent burgeoning of interest in micros has helped in this respect, coupled with the excellent internet site, www.NorfolkMoths.co.uk.

The Obscure Birch Piercer *Pammene obscurana* was known from one site and collected near King's Lynn in 1874. In April 2011 I took two moths that I thought were of this species and this was confirmed by J. Clifton. In August 2015 I took a Dark Fleabane Neb *Apodia bifractella*, the only

West Norfolk record since it was also discovered near King's Lynn in 1874.

In April 2014, while sweeping with my net on the common, I caught a moth that turned out to be Ling Tubic *Amphisbatis incongruella*. This dull brown moth is a heather feeder with few records throughout Britain. There are two previous records for Norfolk, in 1874 and 1899, so the term extinct should be used with care.

While this paper was in preparation in July 2015 a female was examined and found to be a Small Pine Shoot *Clavigesta sylvestrana*. It is the first record of this species in West Norfolk following its discovery in the east at Acle by M. Greenland.

Other moths with a long history of flying below the radar include Lichen Sober *Dichomeris alacella*, found in Norfolk in 1847, then not seen since 1889, until J. Swalwell found it on Dersingham Bog in July 2011. It has now been found across Norfolk and even in my garden. The Eastern Case-bearer *Coleophora vestianella* was found in the county in 1933 and now has been found in my garden on several occasions.

A Lichen Button *Acleris literana*, taken in a Dersingham garden in April 2011 by A. Drewitt, had not been seen since 1899 in this half of the county. Also a Sallow-shoot Piercer *Cydia servillana*, was taken in the same garden in May 2011, a first for Norfolk.

Another reason for new species to come to the county is the northward progression of new moths due to global warming. In August 2012 the Ox-tongue Conch *Cochylis molliculana* made it to Norfolk. The first sighting was at Portland in Dorset 1993 and I was lucky enough to catch one a few days before B. Jones had one at Haddiscoe.

The Fern Smut *Psychoides filicivora* was introduced from Japan to western England at the end of the nineteenth century and has gradually moved across the country to Norfolk. It was captured in my garden

in 2010, just before R. Lee caught one at Cromer. It has formed colonies in my garden and greenhouse, laying its eggs on ferns.

Noteworthy species

Several species found in my garden have their origin on the saltmarshes several miles away. Saltern Bent-wing *Bucculatrix maritima*, Glasswort Case-bearer *Coleophora salicorniae*, Saltmarsh Case-bearer *C. atriplicis*, Saltmarsh Plume *Agdistis bennetii*, Star-wort *Cucullia asteris* and Lyme Grass *Longalatedes elymi* all come into this category.

Sundew Plume *Buckleria paludum* is a species of mires, including Dersingham Bog, where the larvae feed on sundews (*Drosera* spp.). Light Knot Grass *Acronicta menyanthidis* is also found on the Bog as well as on Roydon Common; the nearest place to Norfolk that it occurs is Staffordshire.

Whilst checking the genitalia of pugs I discovered that one of them was a Pauper or Fletcher's Pug *Eupithecia egenaria*, a Red Data Book species. It is a species that feeds on Limes *Tilia* spp. so it probably came from the avenues planted around Sandringham.

The Ash Bud Moth *Prays fraxinella* is a common moth in Norfolk. It occurs in two forms and, in common with continental authors, the two forms have been split and the Dark Ash Bud Moth *Prays ruficeps* is now on the county list. They both feed on Ash *Fraxinus excelsior*.

The Juniper Carpet *Thera juniperata* has a colony on a Juniper *Juniperis communis* that grows in my garden. The spread of this species into suburbia is probably due to the fashion for ornamental junipers in gardens.

Both Dusted Case-bearer *Coleophora adpersella* (with three Norfolk records) and Black-bindweed Case-bearer *C. therinella* (first for West Norfolk) have been found in my garden during 2015. Coleophorids are difficult to identify but despite their

apparent scarcity now they will probably be shown to be much commoner once other moth recorders start to look at the genitalia of the 'little brown jobs' that are caught in their traps.

While this paper was in preparation, a paper was published which showed that *Delplanqueia dilutella* was in fact two species, *D. dilutella* and *D. inscriptella* (Agassiz 2015). It is not known yet whether one or both are found in Norfolk. Consequently it is shown as *dilutella/inscriptella* in the following list.

Migrants

Migrants are frequent and range from the micro Diamond-back Moth *Plutella xylostella* which can fill a trap with over a hundred individuals on occasion, to single occurrences such as Dark Sword-grass *Agrotis ipsilon* and Red-necked Footman *Atolmis rubricollis*. Small Mottled Willow *Spodoptera exigua* was found by J. Hodgkinson in his trap along with a Bordered Straw *Heliothis peltigera*. He also had a Convolvulus Hawk-moth *Agrius convolvuli* in August 2015.

The full list

A list of all moth species recorded from the parish of Dersingham is presented in the Appendix. For each species, if there are no initials after it then it has been recorded at least once by myself. Other moth recorders have regularly trapped in the parish. Their records are gratefully acknowledged by inclusion of their initials: N. Baker (NB), T. Bolderstone (TB), K. Charters (KC), H. Chipperfield (HC), J. Clifton (JC), A. Drewitt (AD), K. Durrant (KD), R. Edmunds (RE), P. Eele (PE), B. Elliott (BE), G.N. Fellows (GF), D.W. H. Ffennell (DF), A. Foster (AF), D. Hipperson (DH), J. Hodgkinson (JH), R. Key (RK), J. R. Langmaid (JL), C. Mills (CM), A. Murray (AM), I. Pritchard (IP), J. Salwell (JS), K. Saul (KS), W. Stewart (WS), M. Otley (MO), M. Parsons (MP), L. Treadwell (LT), R. Ward (RW), J. Webb (JW) & C.G. Williams (CW).

Where many observers have recorded a species I have given priority to J. Clifton, acknowledging his experience. In addition to myself, J. Hodgkinson also looks at the genitalia and so *gen.det.* sometimes appears against his name. A. Drewitt has trapped on the Dersingham Bog for many years and has recorded numerous species but he does not dissect them. R. Edmunds has found many of the leaf miners.

After the names comes an assessment of the distribution of the species in the county of Norfolk in general.

The list below contains both the new species number allocated in the latest Checklist of British Lepidoptera followed by the number assigned by Bradley (2000) and earlier lists in italics.

Acknowledgements

Many people in the Norfolk Moth Group assisted me in many ways. In particular, J. Wheeler, the builder of the excellent web site, www.NorfolkMoths.co.uk, who produced a provisional list of Dersingham-related moths that started me on this paper. A. G. Irwin made comments on the rough draft of this paper. Last but not least, my wife who has put up with my latest mania and who has proof-read this paper many times.

References

- AGASSIZ, D. J. L., BEAVAN, S. D. & HECKFORD, R. J. Eds. 2013. *A Checklist of the Lepidoptera of the British Isles*. Royal Entomological Society.
- AGASSIZ, D. 2015. *Deplanqueia* (sic) *inscriptella* (Duponchel, 1836) a sister species of *D. dilutella* (Denis & Schiffermuller, 1775) (Lepidoptera: Pyralidae) resident in Britain. *Entomologist's Rec. J. Var.* 127: 185-189.
- ATMORE, E. A. 1889. Notes on *Tortrix decretana*, Tr., with a description of its larva. *Ent. Mon. Mag.* 25: 242.
- BRADLEY, J. D. 2000. *Checklist of Lepidoptera recorded from the British Isles*. vi, 116 pp. Fordingbridge. [Privately published.]
- CLIFTON, J. 2001. Dersingham Bog & Roydon Common Moth Survey 2000. *Trans. Norfolk Norwich Nat. Soc.* 34(1): 68-70.

PEET, T. N. D. 1992. *Moths and Butterflies (Lepidoptera)*
of Hickling Broad. Occasional Publication No 4.
Norfolk Norwich Nat. Soc. 23pp.

R.E. Jones. 14 Post Office Road, Dersingham, PE31
6HP. revanj1945@hotmail.com

APPENDIX. Moths recorded in the Dersingham area.

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
Eriocraniidae					
2.001	6	Common Oak Purple	<i>Dyseriocrania subpurpurella</i>	Common	
2.003	8	White-spot Purple	<i>Eriocrania unimaculella</i>	Local	
2.005	10	Small Birch Purple	<i>Eriocrania salopiella</i>	Local	RE
2.006	11	Washed Purple	<i>Eriocrania cicatricella</i>	Local	
2.007	13	Early Purple	<i>Eriocrania semipurpurella</i>	Common	RE
2.008	12	Large Birch Purple	<i>Eriocrania sangii</i>	Local	JH
Hepialidae					
3.001	15	Orange Swift	<i>Triodia sylvina</i>	Common	
3.002	17	Common Swift	<i>Korscheltellus lupulina</i>	Common	
3.004	16	Gold Swift	<i>Phymatopus hecta</i>	Local	JC <i>et al.</i>
3.005	14	Ghost Moth	<i>Hepialus humuli</i>	Common	
Nepticulidae					
4.001	118	Sorrel Pygmy	<i>Enteucha acetosae</i>	Nationally Scarce A	JRL&BE
4.002	116	Drab Birch Pygmy	<i>Stigmella lapponica</i>	Common	JC, RE
4.003	117	Pale Birch Pygmy	<i>Stigmella confusella</i>	Common	JRL&BE
4.005	110	Common Birch Pygmy	<i>Stigmella betulicola</i>	Local	JC
4.006	113	Small Birch Pygmy	<i>Stigmella sakhalinella</i>	Local	JRL&BE
4.007	112	Short-barred Pygmy	<i>Stigmella luteella</i>	Common	AD
4.015	92	Rose Leaf Miner	<i>Stigmella anomalella</i>	Common	
4.022	107	Purple-shot Pygmy	<i>Stigmella regiella</i>	Local	NB
4.023	108	Common Thorn Pygmy	<i>Stigmella crataegella</i>	Common	JC
4.034	77	Small Beech Pygmy	<i>Stigmella tityrella</i>	Common	
4.035	68	Sallow Pygmy	<i>Stigmella salicis</i>	Common	AD
4.038	70	Willow Pygmy	<i>Stigmella obliquella</i>	Local	JC
4.044	64	Double-barred Pygmy	<i>Stigmella continuella</i>	Local	JRL&BE, RE
4.045	50	Golden Pygmy	<i>Stigmella aurella</i>	Common	JRL&BE, JC
4.047	53	Glossy Bramble Pygmy	<i>Stigmella splendidissimella</i>	Common	JC
4.054	79	Least Thorn Pygmy	<i>Stigmella perpygmaeella</i>	Common	<i>gen. det.</i>
4.056	65	Barred Sycamore Pygmy	<i>Stigmella speciosa</i>	Common	RE
4.058	89	Base-spotted Pygmy	<i>Stigmella basiguttella</i>	Common	JRL&BE, RE
4.060	84	Red-headed Pygmy	<i>Stigmella ruficapitella</i>	Common	JC, RE
4.061	83	Black-headed Pygmy	<i>Stigmella atricapitella</i>	Common	JRL&BE <i>et al.</i>
4.062	88	Chestnut Pygmy	<i>Stigmella samiatella</i>	Local	JRL&BE, RE
4.063	86	Common Oak Pygmy	<i>Stigmella roborella</i>	Common	JRL&BE, RE
4.075	22	Maple-seed Pygmy	<i>Ectoedemia louisella</i>	Local	AD
4.076	20	Sycamore-seed Pygmy	<i>Ectoedemia decentella</i>	Nationally Scarce B	
4.078	42	Hypericum Pygmy	<i>Ectoedemia septembrella</i>	Common	AD
4.082	25	Black-spot Sallow Pygmy	<i>Ectoedemia intimella</i>	Local	JC
4.087	36	Five-spot Pygmy	<i>Ectoedemia quinquella</i>	Local	JRL&BE, JC
4.089	37	White-banded Pygmy	<i>Ectoedemia albifasciella</i>	Common	JRL&BE, RE
4.090	38	Spotted Black Pygmy	<i>Ectoedemia subbimaculella</i>	Common	JRL&BE, JC
4.099	34	Large Birch Pygmy	<i>Ectoedemia occultella</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
4.091	39	White-spot Pygmy	<i>Ectoedemia heringi</i>	Local	JC
Opostegidae					
5.001	119	Sorrel Bent-wing	<i>Opostega salaciella</i>	Local	
5.004	121	Mint Bent-wing	<i>Pseudopostega crepusculella</i>	Nationally Scarce B	AD
Helioelzidae					
6.005	157	Birch Lift	<i>Heliozela hammoniella</i>	Local	JRL&BE
Adelidae					
7.001	148	Yellow-barred Long-horn	<i>Nemophora degeerella</i>	Common	
7.004	144	Horehound Long-horn	<i>Nemophora fasciella</i>	Nationally Scarce A	NB
7.006	150	Green Long-horn	<i>Adela reaumurilla</i>	Common	
7.007	149	Early Long-horn	<i>Adela cuprella</i>	Local	
7.014	143	Buff Long-horn	<i>Nematopogon metaxella</i>	Local	
Incurvariidae					
8.002	130	Feathered Bright	<i>Incurvaria masculella</i>	Common	
8.003	131	Common Bright	<i>Incurvaria oehlmanniella</i>	Common	JC <i>et al.</i>
Tischeriidae					
10.001	123	Oak Carl	<i>Tischeria ekebladella</i>	Common	
10.002	124	Small Carl	<i>Tischeria dodonaea</i>	Local	JRL&BE, JC
10.003	125	Bordered Carl	<i>Coptotriche marginea</i>	Common	
Psychidae					
11.002	175	White-speckled Smoke	<i>Narycia duplicella</i>	Common	
11.009	185	Virgin Smoke	<i>Luffia ferchaultella</i>	Common	
11.012	186	Common Sweep	<i>Psyche casta</i>	Common	
Tineidae					
12.010	196	Large Clothes Moth	<i>Morophaga choragella</i>	Local	
12.012	224	Large Brindled Clothes Moth	<i>Triaxomera parasitella</i>	Local	
12.015	215	Corn Moth	<i>Nemapogon granella</i>	Nationally Scarce B	AM
12.016	216	Cork Moth	<i>Nemapogon cloacella</i>	Common	
12.017	217	White-speckled Clothes Moth	<i>Nemapogon wolffiella</i>	Nationally Scarce B	AD
12.020	218	Pale Corn Clothes Moth	<i>Nemapogon variatella</i>	pRDB3	
12.028	240	Case-bearing Clothes Moth	<i>Tinea pellionella</i>	Local	
12.029	244	Plain Clothes Moth	<i>Tinea flavescens</i>	pRDB2	AM
12.032	246	Fulvous Clothes Moth	<i>Tinea semifulvella</i>	Common	
12.033	247	Bird's-nest Moth	<i>Tinea trinotella</i>	Common	
12.036	227	Skin Moth	<i>Monopis laevigella</i>	Common	AD
12.037	228	Carrion Moth	<i>Monopis weaverella</i>	Common	
12.038	229	Yellow-backed Clothes Moth	<i>Monopis obviella</i>	LocalAD	JH
12.039	230	Pale-backed Clothes Moth	<i>Monopis crocicapitella</i>	Local	
12.048	200	Fern Smut	<i>Psychoides filicivora</i>	Local	First for W. Norfolk
Roeslerstammiidae					
13.002	447	Copper Ermel	<i>Roeslerstammia erxebella</i>	Local	
Bucculatricidae					
14.002	266	Daisy Bent-wing	<i>Bucculatrix nigricomella</i>	Local	
14.003	267	Saltern Bent-wing	<i>Bucculatrix maritima</i>	Nationally Scarce B	
14.009	273	Lime Bent-wing	<i>Bucculatrix thoracella</i>	Common	
14.010	274	Oak Bent-wing	<i>Bucculatrix ulmella</i>	Common	
Gracillariidae					
15.001	299	Clover Slender	<i>Parectopa ononidis</i>	Nationally Scarce B	First for W. Norfolk
15.003	281	Clouded Slender	<i>Caloptilia populetorum</i>	Local	
15.004	282	Pale Red Slender	<i>Caloptilia elongella</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
15.005	283	Red Birch Slender	<i>Caloptilia betulicola</i>	Common	AD, JH
15.006	284	Small Red Slender	<i>Caloptilia rufipennella</i>	Common	
15.007	285	Azalea Leaf Miner	<i>Caloptilia azaleella</i>	Local	
15.009	287	New Oak Slender	<i>Caloptilia robustella</i>	Common	
15.010	288	White-triangle Slender	<i>Caloptilia stigmatella</i>	Common	
15.011	289	Scarce Alder Slender	<i>Caloptilia falconipennella</i>	Nationally Scarce B	
15.014	293	Common Slender	<i>Gracilaria syringella</i>	Common	
15.015	294	Ribwort Slender	<i>Aspilapteryx tringipennella</i>	Common	
15.017	296	Little Slender	<i>Calybites phasianipennella</i>	Local	
15.022	310	Garden Apple Slender	<i>Callisto denticulella</i>	Common	
15.025	301	Brown Birch Slender	<i>Parornix betulae</i>	Common	
15.028	303	Hawthorn Slender	<i>Parornix anglicella</i>	Common	
15.029	304	Hazel Slender	<i>Parornix devoniella</i>	Common	
15.030	305	Rowan Slender	<i>Parornix scoticella</i>	Common	JC
15.033	309	Blackthorn Slender	<i>Parornix torquillella</i>	Common	
15.034	315	White Oak Midget	<i>Phyllonorycter harrisella</i>	Common	
15.036	317	Pale Oak Midget	<i>Phyllonorycter heegeriella</i>	Common	JC, AD
15.038	319	Scarce Oak Midget	<i>Phyllonorycter kuhlweiniella</i>	pRDB3	
15.039	320	Common Oak Midget	<i>Phyllonorycter quercifoliella</i>	Common	JC, AD
15.040	321	Garden Midget	<i>Phyllonorycter messaniella</i>	Common	
15.043	323	Common Thorn Midget	<i>Phyllonorycter oxyacanthae</i>	Common	
15.044	324	Rowan Midget	<i>Phyllonorycter sorbi</i>	Common	JC
15.026	326	Brown Apple Midget	<i>Phyllonorycter blancardella</i>	Common	
15.049	329	Sloe Midget	<i>Phyllonorycter spinicolella</i>	Common	JC
15.052	332	Hawthorn Midget	<i>Phyllonorycter corylifoliella</i>	Common	
15.053	332 ^a	Firethorn Leaf-miner	<i>Phyllonorycter leucographella</i>	Common	
15.054	333	Willow Midget	<i>Phyllonorycter viminella</i>	Common	JC
15.055	334	Osier Midget	<i>Phyllonorycter viminetorum</i>	Nationally Scarce A	JC
15.056	335	Long-streak Midget	<i>Phyllonorycter salicicolella</i>	Common	AD
15.059	338	Golden Birch Midget	<i>Phyllonorycter cavella</i>	Local	JRL&BE
15.063	341	Beech Midget	<i>Phyllonorycter maestingella</i>	Common	
15.064	342	Nut Leaf Blister Moth	<i>Phyllonorycter coryli</i>	Common	
15.067	345	Common Alder Midget	<i>Phyllonorycter rajella</i>	Common	
15.069	347	Small Birch Midget	<i>Phyllonorycter anderidae</i>	Nationally Scarce B	JRL&BE, JC
15.075	353	Red Birch Midget	<i>Phyllonorycter ulmifoliella</i>	Common	
15.076	354	Large Midget	<i>Phyllonorycter emberizaepenella</i>	Local	
15.079	357	Small Alder Midget	<i>Phyllonorycter stettinensis</i>	Common	
15.080	358	Broad-barred Midget	<i>Phyllonorycter froelichiella</i>	Common	
15.081	359	Red Hazel Midget	<i>Phyllonorycter nicellii</i>	Common	
15.082	360	Dark Alder Midget	<i>Phyllonorycter kleemannella</i>	Common	
15.083	361	Honeysuckle Midget	<i>Phyllonorycter trifasciella</i>	Common	
15.084	362	Maple Midget	<i>Phyllonorycter acerifoliella</i>	Common	
15.086	364	Sycamore Midget	<i>Phyllonorycter geniculella</i>	Common	
15.089	366 ^a	Horse Chestnut Leaf-miner	<i>Cameraria ohridella</i>	Common	
15.090	367	Willow Bent-wing	<i>Phyllocnistis saligna</i>	Local	
15.092	368	Poplar Bent-wing	<i>Phyllocnistis unipunctella</i>	Common	
Yponomeutidae					
16.001	424	Bird-cherry Ermine	<i>Yponomeuta evonymella</i>	Common	
16.002	425	Orchard Ermine	<i>Yponomeuta padella</i>	Common	AD, JH
16.004	427	Spindle Ermine	<i>Yponomeuta cagnagella</i>	Common	
16.005	428	Willow Ermine	<i>Yponomeuta rorrella</i>	Local	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
16.007	430	Black-tipped Ermine	<i>Yponomeuta plumbella</i>	Local	AD
16.014	436	Copper-tipped Ermel	<i>Pseudoswammerdamia combinella</i>	Common	
16.015	437	Birch Ermel	<i>Swammerdamia caesiella</i>	Common	
16.017	438	Little Ermel	<i>Swammerdamia pyrella</i>	Common	
16.020	441	Hawthorn Ermel	<i>Paraswammerdamia nebulella</i>	Common	
16.021	442	Gold Pine Ermel	<i>Cedestis gyssemiella</i>	Local	JC <i>et al.</i>
16.022	443	Brown Pine Ermel	<i>Cedestis subfasciella</i>	Local	AD
16.023	444	White Pine Ermel	<i>Ocnerostoma piniariella</i>	Nationally Scarce B	
16.024	445	Grey Pine Ermel	<i>Ocnerostoma friesei</i>	Local	
Ypsolophidae					
17.002	452	Hooked Smudge	<i>Ypsolopha nemorella</i>	Local	
17.003	453	Honeysuckle Moth	<i>Ypsolopha dentella</i>	Common	
17.005	455	Wainscot Smudge	<i>Ypsolopha scabrella</i>	Common	
17.008	458	Barred Smudge	<i>Ypsolopha alpella</i>	Local	AD
17.009	459	Wood Smudge	<i>Ypsolopha sylvella</i>	Local	
17.010	460	White-shouldered Smudge	<i>Ypsolopha parenthesesella</i>	Common	
17.011	461	Variable Smudge	<i>Ypsolopha ustella</i>	Common	
17.012	462	Pied Smudge	<i>Ypsolopha sequella</i>	Common	
17.013	463	Elm Smudge	<i>Ypsolopha vittella</i>	Local	AM
17.015	252	Variable Stem-moth	<i>Ochsenheimeria urella</i>	Nationally Scarce B	AM
Plutellidae					
18.001	464	Diamond-back Moth	<i>Plutella xylostella</i>	Migrant	
18.003	465	Grey-streaked Smudge	<i>Plutella porrectella</i>	Common	
18.007	469	Bitter-cress Smudge	<i>Eidophasia messingiella</i>	Local	AM
Glyphipterigidae					
19.001	470	Reed Smudge	<i>Orthotelia sparganella</i>	Local	AM
19.002	397	Speckled Fanner	<i>Glyphipterix thrasonella</i>	Common	JC <i>et al.</i>
19.007	391	Cocksfoot Moth	<i>Glyphipterix simpliciella</i>	Common	
19.010	472	Fleabane Smudge	<i>Digitivalva pulicariae</i>	Local	AM
19.014	476	Bittersweet Smudge	<i>Acrolepia autumnitella</i>	Common	AM
Argyresthiidae					
20.005	409a	Triple-barred Argent	<i>Argyresthia trifasciata</i>	Local	
20.006	407	Juniper Argent	<i>Argyresthia dilectella</i>	Nationally Scarce B	AD
20.007	409b	Cypress Tip Moth	<i>Argyresthia cupressella</i>	Local	
20.011	410	Gold-ribbon Argent	<i>Argyresthia brockeella</i>	Common	
20.012	411	Golden Argent	<i>Argyresthia goedartella</i>	Common	
20.015	414	Brindled Argent	<i>Argyresthia curvella</i>	Local	JH
20.016	415	Netted Argent	<i>Argyresthia retinella</i>	Common	
20.018	417	Blackthorn Argent	<i>Argyresthia spinosella</i>	Common	AD
20.019	418	Apple Fruit Moth	<i>Argyresthia conjugella</i>	Common	
20.020	419	Brown Rowan Argent	<i>Argyresthia semifusca</i>	Common	AD, KD
20.021	420	Cherry Fruit Moth	<i>Argyresthia pruniella</i>	Common	
20.022	421	Hawthorn Argent	<i>Argyresthia bonnetella</i>	Common	
20.023	422	Purple Argent	<i>Argyresthia albistria</i>	Common	
Lyonetiidae					
21.001	263	Apple Leaf Miner	<i>Lyonetia clerkella</i>	Common	
21.004	254	Laburnum Leaf Miner	<i>Leucoptera laburnella</i>	Common	
21.008	260	Pear Leaf Blister Moth	<i>Leucoptera malifoliella</i>	Common	JW
Praydidae					
22.001	449	Ash Bud Moth	<i>Prays fraxinella</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
22.003	449	Dark Ash Bud Moth	<i>Prays ruficeps</i>	Split from <i>P. fraxinella</i> .	
Scythropiidae					
25.001	450	Hawthorn Moth	<i>Scythropia crataegella</i>	Common	
Autostichidae					
27.001	870	Four-spotted Obscure	<i>Oegoconia quadripuncta</i>	Common	
27.003	871	Scarce Obscure	<i>Oegoconia deauratella</i>	Local	JH
Oecophoridae					
28.009	648	White-shouldered House Moth	<i>Endrosis sarcitrella</i>	Common	
28.010	647	Brown House Moth	<i>Hofmannophila pseudospretella</i>	Common	
28.012	644	Small Dingy Tubic	<i>Borkhausenia fuscescens</i>	Common	
28.014	642	Golden-brown Tubic	<i>Crassa unitella</i>	Common	
28.015	640	New Tawny Tubic	<i>Batia lunaris</i>	Common	
28.017	641	Greater Tawny Tubic	<i>Batia lambdella</i>	Local	
28.019	649	Sulphur Tubic	<i>Esperia sulphurella</i>	Common	
28.025	654	Light Streak	<i>Pleurota bicostella</i>	Local	KS, AD
Chimabachidae					
29.001	663	March Tubic	<i>Diurnea fagella</i>	Common	
29.002	664	November Tubic	<i>Diurnea lipsiella</i>	Local	
Lypusidae					
30.004	659	Ling Tubic	<i>Amphisbatis incongruella</i>	Nationally Scarce A	
Peleopodidae					
31.001	658	Long-horned Flat-body	<i>Carcina quercana</i>	Common	
Depressariidae					
32.002	667	Dawn Flat-body	<i>Semioscopis steinkellneriana</i>	Local	RW
32.007	701	Red-letter Flat-body	<i>Agonopterix ocellana</i>	Common	
32.011	704	Broom Flat-body	<i>Agonopterix scopariella</i>	Local	
32.015	692	Ruddy Flat-body	<i>Agonopterix subpropinquella</i>	Common	JH
32.016	696	Black-spot Flat-body	<i>Agonopterix propinquella</i>	Local	
32.017	697	Brindled Flat-body	<i>Agonopterix arenella</i>	Common	
32.018	688	Common Flat-body	<i>Agonopterix heracliana</i>	Common	
32.030	706	Dark-fringed Flat-body	<i>Agonopterix nervosa</i>	Common	JC
32.031	695	Brown-spot Flat-body	<i>Agonopterix alstromeriana</i>	Common	
32.035	714	Coastal Flat-body	<i>Agonopterix yeatiana</i>	Local	
32.036	672	Parsnip Moth	<i>Depressaria radiella</i>	Common	
32.038	674	Brown Flat-body	<i>Depressaria badiella</i>	Local	JC
Ethmiidae					
33.001	718	Dotted Ermel	<i>Ethmia dodecea</i>	Local	
Cosmopterigidae					
34.004	898	Bulrush Cosmet	<i>Limnaecia phragmitella</i>	Common	
34.010	897	Fen Cosmet	<i>Cosmopterix lienigiella</i>	Nationally Scarce B	AD
34.012	908	August Cosmet	<i>Sorhagenia rhamniella</i>	Nationally Scarce A	
Gelechiidae					
35.003	844	White-strap Sober	<i>Syncopacma larseniella</i>	Local	AD, REJ <i>gen. det.</i>
35.011	853	Poplar Sober	<i>Anacamptis populella</i>	Common	JC <i>et al.</i>
35.017	797	Heather Groundling	<i>Neofaculta ericetella</i>	Common	
35.018	858	Square-spot Crest	<i>Hypatima rhomboidella</i>	Common	JC
35.020	856	Small Crest	<i>Anarsia spartiella</i>	Local	
35.022	862	Juniper Webber	<i>Dichomeris marginella</i>	Local	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
35.025	851	Lichen Sober	<i>Dichomeris alacella</i>	Nationally Scarce B	
35.028	866	Gorse Crest	<i>Brachmia blandella</i>	Common	AD
35.029	867	Fen Crest	<i>Brachmia inornatella</i>	Nationally Scarce A	
35.031	868	Orange Crest	<i>Helcystogramma rufescens</i>	Common	
35.036	747	Six-spot Neb	<i>Chrysoesthia sexguttella</i>	Local	
35.038	789	House Groundling	<i>Bryotropha domestica</i>	Common	
35.040	787	Cinereous Groundling	<i>Bryotropha terrella</i>	Common	
35.046	782	Dull Red Groundling	<i>Bryotropha senectella</i>	Local	JH
35.047	779	Dark Groundling	<i>Bryotropha affinis</i>	Common	
35.050	752	Heather Neb	<i>Aristotelia ericinella</i>	Local	
35.053	729	White-border Neb	<i>Isophrictis striatella</i>	Nationally Scarce B	AD, JH
35.056	724	Burdock Neb	<i>Metzneria lappella</i>	Local	AD, JH
35.058	726	Meadow Neb	<i>Metzneria metzneriella</i>	Common	AD
35.060	730	Dark Fleabane Neb	<i>Apodia bifratella</i>	Local	
35.065	728	Bracken Neb	<i>Monochroa cytisella</i>	Local	
35.071	736	Buff-marked Neb	<i>Monochroa lucidella</i>	Local	
35.085	762	Dotted Grey Groundling	<i>Atlirips mouffetella</i>	Common	
35.093	792	Gorse Groundling	<i>Mirificarma mulinella</i>	Common	
35.094	796	Dusky Groundling	<i>Aroga velocella</i>	Local	
35.095	791	Eastern Groundling	<i>Chionodes distinctella</i>	Nationally Scarce A	AD
35.107	859	Humped Crest	<i>Psoricoptera gibbosella</i>	Local	AD
35.109	822	Pointed Groundling	<i>Scrobipalpa acuminatella</i>	Common	
35.114	812	Saltern Groundling	<i>Scrobipalpa instabilella</i>	Nationally Scarce B	
35.123	819	Winter Groundling	<i>Scrobipalpa costella</i>	Common	
35.141	765	Common Groundling	<i>Teleiodes vulgella</i>	Common	
35.143	774	Crescent Groundling	<i>Teleiodes luculella</i>	Common	
35.146	776	Large Groundling	<i>Teleiopsis diffinis</i>	Common	
35.151	770	Black-speckled Groundling	<i>Carpatolechia proximella</i>	Common	
35.153	773	Tawny Groundling	<i>Pseudotelphusa paripunctella</i>	Nationally Scarce B	DF
35.159	760	Pine Groundling	<i>Exoteleia dodecella</i>	Local	
35.160	755	Black-dotted Groundling	<i>Stenolechia gemmella</i>	Local	PC
Batrachedridae					
36.001	878	Poplar Cosmet	<i>Batrachedra praeangusta</i>	Common	JC
Coleophoridae					
37.005	490	Common Oak Case-bearer	<i>Coleophora lutipennella</i>	Common	
37.006	491	Rose Case-bearer	<i>Coleophora gryphipennella</i>	Common	
37.007	492	Tipped Oak Case-bearer	<i>Coleophora flavipennella</i>	Common	
37.009	496	Buff Birch Case-bearer	<i>Coleophora milvipennis</i>	Local	JRL&BE
37.015	493	Common Case-bearer	<i>Coleophora serratella</i>	Common	
37.028	510	Least Case-bearer	<i>Coleophora juncicolella</i>	Local	JC
37.032	515	White-legged Case-bearer	<i>Coleophora albitarsella</i>	Local	
37.033	516	Large Clover Case-bearer	<i>Coleophora trifolii</i>	Local	
37.035	517	Small Clover Case-bearer	<i>Coleophora alcyonipennella</i>	Local	
37.038	522	Woundwort Case-bearer	<i>Coleophora lineolea</i>	Local	
37.048	518	Meadow Case-bearer	<i>Coleophora mayrella</i>	Common	
37.050	532	White Sallow Case-bearer	<i>Coleophora albidella</i>	Local	JC
37.051	537	White Oak Case-bearer	<i>Coleophora kuehnella</i>	Local	
37.052	535	Forest Case-bearer	<i>Coleophora ibipennella</i>	Local	
37.053	536	White Birch Case-bearer	<i>Coleophora betulella</i>	Local	JC
37.054	534	Scarce Wood Case-bearer	<i>Coleophora currucipennella</i>	pRDB3	JC
37.061	530	Downland Case-bearer	<i>Coleophora lixella</i>	Nationally Scarce B	AD

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
37.063	544	Gorse Case-bearer	<i>Coleophora albicosta</i>	Common	
37.066	526	Larch Case-bearer	<i>Coleophora laricella</i>	Common	
37.069	587	Buff Rush Case-bearer	<i>Coleophora caespititiella</i>	Common	
37.070	583	Jointed-rush Case-bearer	<i>Coleophora tamesis</i>	Local	
37.071	582	Grey Rush Case-bearer	<i>Coleophora glaucicolella</i>	Common	
37.073	584	Common Rush Case-bearer	<i>Coleophora alticolella</i>	Common	
37.083	565	Orache Case-bearer	<i>Coleophora saxicolella</i>	Local	
37.084	566	Speckled Case-bearer	<i>Coleophora sternipennella</i>	Nationally Scarce B	
37.086	568	Pale Orache Case-bearer	<i>Coleophora versurella</i>	Local	
37.087	572	Eastern Case-bearer	<i>Coleophora vestianella</i>	Nationally Scarce A	
37.088	573	Saltmarsh Case-bearer	<i>Coleophora atriplicis</i>	Nationally Scarce B	
37.093	559	Pale Thistle Case-bearer	<i>Coleophora peribenanderi</i>	Common	
37.099	553	Hedge Case-bearer	<i>Coleophora striatipennella</i>	Common	
37.104	567	Dusted Case-bearer	<i>Coleophora adpersella</i>	Nationally Scarce B	
37.105	550	Campion Case-bearer	<i>Coleophora nutantella</i>	Nationally Scarce A	
37.107	589	Body-marked Case-bearer	<i>Coleophora chypeiferella</i>	Nationally Scarce A	
37.108	588	Glasswort Case-bearer	<i>Coleophora salicorniae</i>	Nationally Scarce B	
Elachistidae					
38.004	610	Swan-feather Dwarf	<i>Elachista argentella</i>	Common	
38.025	597	Black-headed Dwarf	<i>Elachista atricomella</i>	Common	AD, JW
38.032	602	Pearl Dwarf	<i>Elachista apicipunctella</i>	Local	
38.037	607	Little Dwarf	<i>Elachista canapennella</i>	Common	
38.039	609	Triple-spot Dwarf	<i>Elachista maculicerusella</i>	Common	
38.045	629	Bog Dwarf	<i>Elachista utonella</i>	Nationally Scarce B	
Parametriotidae					
39.001	905	Hawthorn Cosmet	<i>Blastodacna hellerella</i>	Common	
Momphidae					
40.002	886	Buff Cosmet	<i>Mompha ochraceella</i>	Common	
40.004	888	Marbled Cosmet	<i>Mompha propinquella</i>	Local	
40.006	890	Scarce Cosmet	<i>Mompha jurassicella</i>	Nationally Scarce A	
40.007	889a	New Neat Cosmet*	<i>Mompha bradleyi</i>	Nationally Scarce B	First for Norfolk
40.008	892	Garden Cosmet	<i>Mompha subbistrigella</i>	Common	
40.010	893	Common Cosmet	<i>Mompha epilobiella</i>	Common	
Blastobasidae					
41.002	873	Dingy Dowd	<i>Blastobasis adustella</i>	Common	
41.003	874	London Dowd	<i>Blastobasis lacticolella</i>	Common	
Stathmopodidae					
42.002	877	Alder Signal	<i>Stathmopoda pedella</i>	Nationally Scarce B	
Alucitidae					
44.001	1288	Many-plumed Moth	<i>Alucita hexadactyla</i>	Common	
Pterophoridae Plume moths					
45.001	1488	Saltmarsh Plume	<i>Agdistis bennetii</i>	Local	
45.004	1501	Triangle Plume	<i>Platyptilia gonodactyla</i>	Common	JH, AD
45.010	1497	Beautiful Plume	<i>Amblyptilia acanthadactyla</i>	Common	
45.012	1509	Brown Plume	<i>Stenoptilia pterodactyla</i>	Common	
45.023	1495	Crescent Plume	<i>Marasmarcha lunaedactyla</i>	Local	
45.029	1493	Sundew Plume	<i>Buckleria paludum</i>	Nationally Scarce A	
45.030	1513	White Plume	<i>Pterophorus pentadactyla</i>	Common	
45.037	1523	Dusky Plume	<i>Oidaematophorus lithodactyla</i>	Local	AD
45.043	1517	Hemp-agrimony Plume	<i>Adaina microdactyla</i>	Common	
45.044	1524	Common Plume	<i>Emmelina monodactyla</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
Epermenioidae					
47.001	478	Yellow-spotted Lance-wing	<i>Phaulernis fulviguttella</i>	Nationally Scarce B	AM
47.002	477	Scale-tooth Lance-wing	<i>Phaulernis dentella</i>	Nationally Scarce A	AM
47.005	483	Golden Lance-wing	<i>Epermenia chaerophyllella</i>	Common	
47.006	481	Large Lance-wing	<i>Epermenia falciformis</i>	Local	JC
Choreutidae					
48.001	385	Common Nettle-tap	<i>Anthophila fabriciana</i>	Common	
48.007	389	Apple Leaf Skeletoniser	<i>Choreutis pariana</i>	Local	AD
Tortricidae					
49.002	1014	Hedge Shade	<i>Isotrias rectifasciana</i>	Local	JC, KC
49.004	1010	Red-barred Tortrix	<i>Ditula angustiorana</i>	Common	
49.011	976	Pine Tortrix	<i>Archips oporana</i>	Nationally Scarce A	JC
49.012	978	Norfolk Tortrix	<i>Archips betulana</i>	Probably extinct	
49.013	977	Large Fruit-tree Tortrix	<i>Archips podana</i>	Common	
49.015	980	Variiegated Golden Tortrix	<i>Archips xylosteara</i>	Common	
49.019	984	Sweet-gale Tortrix	<i>Choristoneura lafauryana</i>	Probably extinct	
49.020	974	Heather Tortrix	<i>Argyrotaenia ljugiana</i>	Common	
49.021	987	Larch Tortrix	<i>Ptycholomoides aeriferana</i>	Common	AD
49.023	971	White-faced Tortrix	<i>Pandemis cinnamomeana</i>	Common	
49.024	969	Chequered Fruit-tree Tortrix	<i>Pandemis corylana</i>	Common	
49.025	970	Barred Fruit-tree Tortrix	<i>Pandemis cerasana</i>	Common	
49.026	972	Dark Fruit-tree Tortrix	<i>Pandemis heparana</i>	Common	
49.028	986	Dark-barred Tortrix	<i>Syndemis musculana</i>	Common	
49.029	1002	Large Ivy Tortrix	<i>Lozotaenia forsterana</i>	Common	
49.030	985	Carnation Tortrix	<i>Cacoecimorpha pronubana</i>	Common	
49.031	989	Timothy Tortrix	<i>Aphelia paleana</i>	Common	
49.037	993	Cyclamen Tortrix	<i>Clepsis spectrana</i>	Common	
49.038	994	Privet Tortrix	<i>Clepsis consimilana</i>	Common	
49.039	998	Light Brown Apple Moth	<i>Epiphyas postvittana</i>	Common	
49.040	1001	Orange Pine Tortrix	<i>Lozotaeniodes formosanus</i>	Common	
49.044	1025	Winter Shade	<i>Tortricodes alternella</i>	Common	
49.047	1030	Bluebell Shade	<i>Eana incanana</i>	Local	
49.049	1024	Light Grey Tortrix	<i>Cnephasia incertana</i>	Common	
49.050	1020	Grey Tortrix	<i>Cnephasia stephensiana</i>	Common	
49.051	1021	Flax Tortrix	<i>Cnephasia asseclana</i>	Common	
49.054	1023	Dover Shade	<i>Cnephasia genitalana</i>	Local	
49.059	1033	Green Oak Tortrix	<i>Tortrix viridana</i>	Common	
49.060	1032	Yellow Oak Button	<i>Aleimma loeflingiana</i>	Common	
49.061	1037	White-triangle Button	<i>Acleris holmiana</i>	Common	JC
49.062	1036	Maple Button	<i>Acleris forsskaleana</i>	Common	
49.063	1035	Yellow Rose Button	<i>Acleris bergmanniana</i>	Common	AD
49.066	1038	Dark-triangle Button	<i>Acleris laterana</i>	Common	
49.069	1041	Ashy Button	<i>Acleris sparsana</i>	Common	
49.070	1042	Rhomboid Tortrix	<i>Acleris rhombana</i>	Common	
49.071	1062	Notch-wing Button	<i>Acleris emargana</i>	Common	
49.076	1054	Tufted Button	<i>Acleris cristana</i>	Common	JC
49.077	1048	Garden Rose Tortrix	<i>Acleris variegana</i>	Common	
49.078	1043	Ginger Button	<i>Acleris aspersana</i>	Common	AD
49.080	1053	Sallow Button	<i>Acleris hastiana</i>	Common	
49.082	1055	Heath Button	<i>Acleris hyemana</i>	Local	
49.083	1044	Rusty Oak Button	<i>Acleris ferrugana</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
49.084	1045	Rusty Birch Button	<i>Acleris notana</i>	Common	
49.086	1051	Grey Birch Button	<i>Acleris logiana</i>	Local	
49.087	1061	Lichen Button	<i>Acleris literana</i>	Local	AD
49.090	1015	Brassy Tortrix	<i>Eulia ministrana</i>	Common	AD, JH
49.091	1011	Yellow-spot Tortrix	<i>Pseudargyrotoza contwagana</i>	Common	
49.092	921	Plain Conch	<i>Phtheochroa inopiana</i>	Local	
49.095	925	Rough-winged Conch	<i>Phtheochroa rugosana</i>	Common	
49.097	936	Straw Conch	<i>Cochylimorpha straminea</i>	Common	JH
49.103	932	Large Saltmarsh Conch	<i>Phalonidia affinitana</i>	Local	
49.109	937	Hook-marked Straw Moth	<i>Agapeta hamana</i>	Common	
49.110	938	Knapweed Conch	<i>Agapeta zoegana</i>	Common	
49.111	954	Marbled Conch	<i>Eupoecilia angustana</i>	Common	
49.120	947	Yarrow Conch	<i>Aethes smeathmanniana</i>	Common	
49.123	951	Hemlock Yellow Conch	<i>Aethes beatricella</i>	Local	
49.127	945	Thistle Conch	<i>Aethes cnicana</i>	Common	
49.128	946	Burdock Conch	<i>Aethes rubigana</i>	Common	
49.131	957	Blue-fleabane Conch	<i>Cochylidia heydeniana</i>	Nationally Scarce A	AD
49.132	956	Chamomile Conch	<i>Cochylidia implicitana</i>	Local	
49.133	968	Birch Conch	<i>Cochylis nana</i>	Common	JH
49.134	962	Rosy Conch	<i>Cochylis roseana</i>	Local	JH
49.136	965	White-bodied Conch	<i>Cochylis hybridella</i>	Local	
49.137	964	Little Conch	<i>Cochylis dubitana</i>	Common	
49.138	964a	Ox-tongue Conch	<i>Cochylis molliculana</i>	Local	
49.139	966	Black-headed Conch	<i>Cochylis atricapitana</i>	Common	
49.114	1113	Diamond-back Marble	<i>Eudemis profundana</i>	Common	AD, JH
49.149	1092	White-shouldered Marble	<i>Apotomis turbidana</i>	Common	JC et al.
49.150	1093	Birch Marble	<i>Apotomis betuletana</i>	Common	
49.151	1094	Sallow Marble	<i>Apotomis capreana</i>	Local	JC et al.
49.154	1087	Woodland Marble	<i>Orthotaenia undulana</i>	Common	AD
49.155	1086	White-backed Marble	<i>Hedya salicella</i>	Common	
49.156	1083	Marbled Orchard Tortrix	<i>Hedya nubiferana</i>	Common	
49.157	1082	Plum Tortrix	<i>Hedya pruniana</i>	Common	
49.158	1084	Buff-tipped Marble	<i>Hedya ochroleucana</i>	Common	
49.159	1085	Shoulder-spot Marble	<i>Hedya atropunctana</i>	Local	
49.161	1063	Barred Marble	<i>Celypha striana</i>	Common	
49.162	1064	Roseate Marble	<i>Celypha rosaceana</i>	Local	
49.166	1076	Common Marble	<i>Celypha lacunana</i>	Common	
49.180	1079	Pine Marble	<i>Piniphila bifasciana</i>	Local	
49.183	1108	Smoky-barred Marble	<i>Lobesia abscisana</i>	Common	
49.184	1106	Oak Marble	<i>Lobesia reliquana</i>	Local	
49.185	1109	Shore Marble	<i>Lobesia littoralis</i>	Local	
49.186	1097	Teasel Marble	<i>Endothenia gentianaeana</i>	Common	AD
49.191	1102	Black-edged Marble	<i>Endothenia nigricostana</i>	Local	AD
49.192	1103	Heath Marble	<i>Endothenia ericetana</i>	Local	
49.193	1104	Blotched Marble	<i>Endothenia quadrimaculana</i>	Local	
49.194	1111	Rush Marble	<i>Bactra lancealana</i>	Common	
49.195	1110	Mottled Marble	<i>Bactra furfurana</i>	Local	JC et al.
49.199	1217	Honeysuckle Bell	<i>Eucosmomorpha albersana</i>	Local (I.S. Register)	HC
49.200	1216	Cherry Bark Moth	<i>Enarmonia formosana</i>	Local	
49.202	1118	Bridge Roller	<i>Ancylis uncella</i>	Local	JC et al.
49.206	1121	Dark Roller	<i>Ancylis upupana</i>	Nationally Scarce	BJH

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
49.215	1115	Triangle-marked Roller	<i>Ancylis achatana</i>	Common	
49.216	1120	Red Roller	<i>Ancylis mitterbacheriana</i>	Common	
49.219	1204	Lemon Bell	<i>Thiodia citrana</i>	Nationally Scarce B	
49.223	1159	Holly Tortrix	<i>Rhopobota naevana</i>	Common	
49.224	1205	Bud Moth	<i>Spilonota ocellana</i>	Common	
49.230	1151	White-blotch Bell	<i>Epinotia trigonella</i>	Common	AF, KS, MP
49.231	1155	Large Birch Bell	<i>Epinotia brunnichiana</i>	Common	
49.240	1136	Common Birch Bell	<i>Epinotia immundana</i>	Common	
49.243	1135	Birch Bell	<i>Epinotia demarniana</i>	Local	
49.244	1132	White Sallow Bell	<i>Epinotia subocellana</i>	Common	
49.245	1137	Square-barred Bell	<i>Epinotia tetraquetrana</i>	Common	
49.248	1139	Nut Bud Moth	<i>Epinotia tenerana</i>	Common	
49.249	1134	Small Birch Bell	<i>Epinotia ramella</i>	Common	
49.251	1146	Pine Bell	<i>Epinotia rubiginosana</i>	Local	JC
49.254	1133	Crescent Bell	<i>Epinotia bilunana</i>	Common	
49.255	1138	Grey Poplar Bell	<i>Epinotia nisella</i>	Common	JC, KS
49.259	1163	Spruce Bud Moth	<i>Zeiraphera ratzeburgiana</i>	Local	
49.260	1165	Cock's-head Bell	<i>Zeiraphera isertana</i>	Common	
49.264	1202	Two-coloured Bell	<i>Eucosma obumbratana</i>	Local	
49.265	1201	Hoary Bell	<i>Eucosma cana</i>	Common	
49.266	1200	Bright Bell	<i>Eucosma hohenwartiana</i>	Common	
49.269	1197	Marbled Bell	<i>Eucosma campoliliana</i>	Common	
49.272	1193	Saltmarsh Bell	<i>Eucosma tripoliana</i>	Local	
49.275	1192	Pale Lettuce Bell	<i>Eucosma conterminana</i>	Local	AD
49.279	1169	Common Cloaked Shoot	<i>Gypsonoma dealbana</i>	Common	
49.281	1168	White Cloaked Shoot	<i>Gypsonoma sociana</i>	Common	JH
49.283	1167	Rosy Cloaked Shoot	<i>Gypsonoma aceriana</i>	Local	
49.285	1184	Thistle Bell	<i>Epiblema scutulana</i>	Common	AD
49.288	1183	White-foot Bell	<i>Epiblema foenella</i>	Common	
49.292	1174	Yellow-faced Bell	<i>Notocelia cynosbatella</i>	Common	
49.294	1175	Bramble Shoot Moth	<i>Notocelia uddmanniana</i>	Common	
49.295	1178	Summer Rose Bell	<i>Notocelia roborana</i>	Common	AD, JH
49.297	1177	Common Rose Bell	<i>Notocelia rosaecolana</i>	Common	AD
49.298	1176	Triple-blotched Bell	<i>Notocelia trimaculana</i>	Common	
49.300	1209	Pine Bud Moth	<i>Pseudococcyx turionella</i>	Nationally Scarce B	JC
49.303	1206	Small Pine Shoot Moth	<i>Clavigesta sylvestrana</i>	Nationally Scarce A	
49.304	1207	Pine Leaf-mining Moth	<i>Clavigesta purdeyi</i>	Local	
49.305	1210	Pine Shoot Moth	<i>Rhyacionia buoliana</i>	Local	
49.306	1211	Orange-spotted Shoot	<i>Rhyacionia pinicolana</i>	Common	
49.307	1212	Spotted Shoot Moth	<i>Rhyacionia pinivorana</i>	Common	
49.313	1279	Sharp-winged Drill	<i>Dichrorampha acuminatana</i>	Local	
49.315	1281	Round-winged Drill	<i>Dichrorampha simpliciana</i>	Local	
49.318	1284	Gold-fringed Drill	<i>Dichrorampha vancouverana</i>	Local	JH
49.319	1275	Narrow-blotch Drill	<i>Dichrorampha flavidorsana</i>	Nationally Scarce B	AD
49.320	1274	Broad-blotch Drill	<i>Dichrorampha alpinana</i>	Local	
49.321	1273	Common Drill	<i>Dichrorampha petiverella</i>	Common	AD
49.324	1257	Pea Moth	<i>Cydia nigricana</i>	Common	
49.325	1255	Grey Gorse Piercer	<i>Cydia ulicetana</i>	Common	
49.330	1269	Pine-cone Piercer	<i>Cydia conicolana</i>	Nationally Scarce B	JC
49.338	1261	Codling Moth	<i>Cydia pomonella</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
49.339	1256	Sallow-shoot Piercer	<i>Cydia servillana</i>	Nationally Scarce B	AD, first for Norfolk. Collection JW
49.341	1260	Marbled Piercer	<i>Cydia splendana</i>	Common	
49.342	1259	Large Beech Piercer	<i>Cydia fagiglandana</i>	Common	
49.343	1262	Vagrant Piercer	<i>Cydia amplana</i>	Migrant	JH
49.345	1219	Red Piercer	<i>Lathronympha strigana</i>	Common	AD, JH
49.349	1242	Dark Gorse Piercer	<i>Grapholita internana</i>	Local	
49.357	1247	Plum Fruit Moth	<i>Grapholita funebrana</i>	Local	
49.358	1246	Deep-brown Piercer	<i>Grapholita tenebrosana</i>	Local	
49.363	1228	Black-bordered Piercer	<i>Pammene argyrana</i>	Local	
49.366	1225	Obscure Birch Piercer	<i>Pammene obscurana</i>	Nationally Scarce A	
49.367	1236	Acorn Piercer	<i>Pammene fasciana</i>	Common	
49.375	1234	Regal Piercer	<i>Pammene regiana</i>	Common	AD
49.376	1233	Sycamore Piercer	<i>Pammene aurita</i>	Local	
49.381	1221	Little Beech Piercer	<i>Strophedra weirana</i>	Local	
Cossidae					
50.002	161	Leopard Moth	<i>Zeuzera pyrina</i>	Common	
Sesiidae					
52.007	381	Large Red-belted Clearwing	<i>Synanthedon culiciformis</i>	Nationally Scarce B	
52.008	380	Red-tipped Clearwing	<i>Synanthedon formicaeformis</i>	Nationally Scarce B	JC
52.013	373	Currant Clearwing	<i>Synanthedon tipuliformis</i>	Nationally Scarce B	
52.014	382	Six-belted Clearwing	<i>Bembecia ichneumoniformis</i>	Nationally Scarce B	CM, AD Snettisham
Zygaenidae					
54.002	163	Forester	<i>Adscita statices</i>	Local	CM, PE, AM
Pyralidae					
62.001	1428	Bee Moth	<i>Aphomia sociella</i>	Common	
62.006	1425	Wax Moth	<i>Galleria mellonella</i>	Common	JC <i>et al.</i>
62.007	1433	Double-striped Knot-horn	<i>Cryptoblabes bistriga</i>	Local	
62.015	1462	Powdered Knot-horn	<i>Delplanqueia dilutella</i>	Local	AD
62.023	1442	Heather Knot-horn	<i>Pempelia palumbella</i>	Local	JC <i>et al.</i>
62.024	1445	Beautiful Knot-horn	<i>Rhodophaea formosa</i>	Local	AM
62.025	1454b	New Pine Knot-horn	<i>Dioryctria sylvestrella</i>	Nationally Scarce B	
62.027	1455	Brown Pine Knot-horn	<i>Dioryctria simplicella</i>	Local	
62.028	1454	Dark Pine Knot-horn	<i>Dioryctria abietella</i>	Common	
62.029	1452	Dotted Oak Knot-horn	<i>Phycita roborella</i>	Common	
62.034	1436	Warted Knot-horn	<i>Acrobasis repandana</i>	Common	
62.035	1439	Grey Knot-horn	<i>Acrobasis advenella</i>	Common	
62.036	1438	Thicket Knot-horn	<i>Acrobasis suavella</i>	Local	JH
62.038	1437	Broad-barred Knot-horn	<i>Acrobasis consociella</i>	Local	
62.042	1458	Thistle Ermine	<i>Myelois circumvoluta</i>	Common	JC <i>et al.</i>
62.047	1461	Dark Spruce Knot-horn	<i>Assara terebrella</i>	Nationally Scarce A	AD
62.048	1470	Ash-bark Knot-horn	<i>Euzophera pinguis</i>	Common	
62.054	1481	Twin-barred Knot-horn	<i>Homoeosoma sinuella</i>	Common	
62.055	1480	Large Clouded Knot-horn	<i>Homoeosoma nebulella</i>	Nationally Scarce B	JC
62.057	1485	Chalk Knot-horn	<i>Phycitodes maritima</i>	Local	AD
62.058	1483	Ermine Knot-horn	<i>Phycitodes binaevella</i>	Common	
62.065	1474	False Cacao Moth	<i>Ephestia unicolorella</i>	Local	AD, RW, KC <i>gen. det.</i>
62.072	1417	Meal Moth	<i>Pyralis farinalis</i>	Common	
62.074	1421	Large Tabby	<i>Aglossa pinguinalis</i>	Local	AD

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
62.075	1413	Gold Triangle	<i>Hypsopygia costalis</i>	Common	
62.076	1415	Double-striped Tabby	<i>Hypsopygia glaucinalis</i>	Common	
62.077	1424	Rosy Tabby	<i>Endotricha flammealis</i>	Common	
Crambidae					
63.005	1365	Straw-barred Pearl	<i>Pyrausta despicata</i>	Common	
63.006	1361	Small Purple and Gold (Mint Moth)	<i>Pyrausta aurata</i>	Common	
63.007	1362	Common Purple & Gold	<i>Pyrausta purpuralis</i>	Common	AD, AM
63.015	1371	Lesser Pearl	<i>Sitochroa verticalis</i>	Local	
63.017	1377	Long-winged Pearl	<i>Anania lancealis</i>	Common	
63.018	1378	Elder Pearl	<i>Anania coronata</i>	Common	
63.020	1380	Fenland Pearl	<i>Anania perlucidalis</i>	Common	
63.022	1385	Ochreous Pearl	<i>Anania crocealis</i>	Local	
63.023	1382	Golden Pearl	<i>Anania verbascalis</i>	Nationally Scarce B	
63.025	1376	Small Magpie	<i>Anania hortulata</i>	Common	
63.028	1375	European Corn Borer	<i>Ostrinia nubilalis</i>	Local / Migrant	
63.031	1395	Rusty-dot Pearl	<i>Udea ferrugalis</i>	Migrant	
63.033	1388	Pale Straw Pearl	<i>Udea lutealis</i>	Common	
63.034	1390	Dusky Pearl	<i>Udea prunalis</i>	Common	
63.037	1392	Olive Pearl	<i>Udea olivalis</i>	Common	
63.038	1405	Mother of Pearl	<i>Pleuroptya ruralis</i>	Common	
63.052	1398	Rush Veneer	<i>Nomophila noctuella</i>	Migrant	
63.057	1356	Garden Pebble	<i>Evergestis forficalis</i>	Common	
63.058	1357	Marbled Yellow Pearl	<i>Evergestis extimalis</i>	Local	JH
63.060	1358	Chequered Straw	<i>Evergestis pallidata</i>	Common	
63.062	1332	Large Grey	<i>Scoparia subfusca</i>	Common	JC
63.063	1334a	Base-lined Grey	<i>Scoparia basistrigalis</i>	Local	
63.064	1334	Common Grey	<i>Scoparia ambigualis</i>	Common	
63.066	1333	Meadow Grey	<i>Scoparia pyralella</i>	Common	
63.067	1338	Little Grey	<i>Eudonia lacustrata</i>	Common	
63.069	1342	Narrow-winged Grey	<i>Eudonia angustea</i>	Common	
63.073	1340	Ground-moss Grey	<i>Eudonia truncicolella</i>	Common	JC et al.
63.074	1344	Small Grey	<i>Eudonia mercurella</i>	Common	
63.075	1336	Marsh Grey	<i>Eudonia pallida</i>	Local	
63.077	1290	Wainscot Veneer	<i>Chilo phragmitella</i>	Local	
63.079	1292	Bulrush Veneer	<i>Calamotropha paludella</i>	Local	
63.080	1293	Garden Grass-veneer	<i>Chrysoteuchia culmella</i>	Common	
63.081	1294	Grass-veneer	<i>Crambus pascuella</i>	Common	
63.083	1297	Marsh Grass-veneer	<i>Crambus uliginosellus</i>	Nationally Scarce B	
63.086	1301	Hook-streaked Grass-Veneer	<i>Crambus lathoniellus</i>	Common	
63.087	1299	Dark Grass-veneer	<i>Crambus hamella</i>	Nationally Scarce B	
63.088	1302	Yellow Satin Veneer	<i>Crambus perlella</i>	Common	
63.089	1305	Common Grass-veneer	<i>Agriphila tristella</i>	Common	
63.090	1306	Barred Grass-veneer	<i>Agriphila inquinatella</i>	Common	
63.091	1307	White-streak Grass-veneer	<i>Agriphila latistria</i>	Local	
63.092	1303	Pale-streak Grass-veneer	<i>Agriphila selasella</i>	Local	
63.093	1304	Pearl Veneer	<i>Agriphila straminella</i>	Common	
63.095	1309	Elbow-stripe Grass-veneer	<i>Agriphila geniculea</i>	Common	
63.099	1313	Pearl Grass-veneer	<i>Catoptria pinella</i>	Common	
63.102	1316	Chequered Grass-veneer	<i>Catoptria falsella</i>	Common	
63.109	1323	Waste Grass-veneer	<i>Pediasia contaminella</i>	Nationally Scarce B	
63.110	1324	Saltmarsh Grass-veneer	<i>Pediasia aridella</i>	Nationally Scarce B	JH

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
63.111	1326	Little Grass-veneer	<i>Platytes cerussella</i>	Local	
63.112	1325	Hook-tipped Grass-veneer	<i>Platytes alpinella</i>	Nationally Scarce B	
63.114	1345	Brown China-mark	<i>Elophila nymphaeata</i>	Common	JH, AD
63.115	1331	Water Veneer	<i>Acentria ephemerella</i>	Common	
63.116	1354	Small China-mark	<i>Cataclysta lemnata</i>	Common	
63.117	1348	Ringed China-mark	<i>Parapoynx stratiotata</i>	Common	
63.118	1350	Beautiful China-mark	<i>Nymphula stagnata</i>	Local	
63.120	1328	Giant Water-veneer	<i>Schoenobius gigantella</i>	Local	JC <i>et al.</i>
63.121	1329	Pale Water-veneer	<i>Donacaula forficella</i>	Local	
63.122	1330	Scarce Water-veneer	<i>Donacaula mucronellus</i>	Nationally Scarce B	AD
Drepanidae					
65.001	1645	Scalloped Hook-tip	<i>Falcaria lacertinaria</i>	Common	
65.002	1646	Oak Hook-tip	<i>Watsonalla binaria</i>	Common	
65.003	1647	Barred Hook-tip	<i>Watsonalla cultraria</i>	Local	AD
65.005	1648	Pebble Hook-tip	<i>Drepana falcataria</i>	Common	
65.007	1651	Chinese Character	<i>Cilix glaucata</i>	Common	
Thyatiridae					
65.008	1652	Peach Blossom	<i>Thyatira batis</i>	Common	
65.009	1653	Buff Arches	<i>Habrosyne pyritoides</i>	Common	
65.010	1654	Figure of Eighty	<i>Tethea ocularis</i>	Common	
65.013	1657	Common Lutestring	<i>Ochropacha duplaris</i>	Common	AF, MP, DF. Not seen since 1986
65.015	1660	Frosted Green	<i>Polyploca ridens</i>	Local	
65.016	1659	Yellow Horned	<i>Achlya flavicornis</i>	Common	
Lasiocampidae					
66.001	1631	December Moth	<i>Poecilocampa populi</i>	Common	
66.002	1632	Pale Eggar	<i>Trichiura crataegi</i>	Common	
66.007	1637	Oak Eggar	<i>Lasiocampa quercus</i>	Common	
66.008	1638	Fox Moth	<i>Macrothylacia rubi</i>	Common	JC <i>et al.</i>
66.010	1640	Drinker	<i>Euthrix potatoria</i>	Common	
66.012	1642	Lappet	<i>Gastropacha quercifolia</i>	Common	AD, JH
Saturniidae					
68.001	1643	Emperor Moth	<i>Saturnia pavonia</i>	Common	JC <i>et al.</i>
Sphingidae					
69.001	1979	Lime Hawk-moth	<i>Mimas tiliae</i>	Common	
69.002	1980	Eyed Hawk-moth	<i>Smerinthus ocellata</i>	Common	
69.003	1981	Poplar Hawk-moth	<i>Laothoe populi</i>	Common	
69.004	1972	Convolvulus Hawk-moth	<i>Agrius convolvuli</i>	Migrant	JH
69.006	1976	Privet Hawk-moth	<i>Sphinx ligustri</i>	Common	
69.007	1978	Pine Hawk-moth	<i>Sphinx pinastri</i>	Local	
69.009	1983	Broad-bordered Bee Hawk-moth	<i>Hemaris fuciformis</i>	Nationally Scarce B	
69.010	1984	Humming-bird Hawk-moth	<i>Macroglossum stellatarum</i>	Migrant	
69.016	1991	Elephant Hawk-moth	<i>Deilephila elpenor</i>	Common	
69.017	1992	Small Elephant Hawk-moth	<i>Deilephila porcellus</i>	Local	
69.018	1993	Silver-striped Hawk-moth	<i>Hippotion celerio</i>	Migrant	J Crouch 1959
Geometridae					
70.002	1698	Purple-bordered Gold	<i>Idaea muricata</i>	Nationally Scarce B	JC <i>et al.</i>
70.004	1699	Least Carpet	<i>Idaea rusticata</i>	Local	
70.006	1705	Dwarf Cream Wave	<i>Idaea fuscovenosa</i>	Local	
70.008	1707	Small Dusty Wave	<i>Idaea seriata</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
70.011	1708	Single-dotted Wave	<i>Idaea dimidiata</i>	Common	
70.012	1711	Treble Brown Spot	<i>Idaea trigeminata</i>	Local	
70.013	1702	Small Fan-footed Wave	<i>Idaea biselata</i>	Common	
70.015	1712	Small Scallop	<i>Idaea emarginata</i>	Local	
70.016	1713	Riband Wave	<i>Idaea aversata</i>	Common	
70.018	1715	Plain Wave	<i>Idaea straminata</i>	Local	
70.024	1690	Small Blood-vein	<i>Scopula imitaria</i>	Common	
70.025	1692	Lesser Cream Wave	<i>Scopula immutata</i>	Local	
70.027	1693	Cream Wave	<i>Scopula floslactata</i>	Local	
70.029	1682	Blood-vein	<i>Timandra comae</i>	Common	
70.032	1677	Birch Mocha	<i>Cyclophora albipunctata</i>	Local	
70.036	1680	Maiden's Blush	<i>Cyclophora punctaria</i>	Local	
70.037	1681	Clay Triple-lines	<i>Cyclophora linearia</i>	Local	
70.038	1716	Vestal	<i>Rhometra sacraria</i>	Migrant	AD
70.041	1734	July Belle	<i>Scotopteryx luridata</i>	Common	
70.045	1732	Shaded Broad-bar	<i>Scotopteryx chenopodiata</i>	Common	AD, JH
70.047	1720	Gem	<i>Nycterosea obstipata</i>	Migrant	KC
70.049	1728	Garden Carpet	<i>Xanthorhoe fluctuata</i>	Common	
70.051	1724	Red Twin-spot Carpet	<i>Xanthorhoe spadicearia</i>	Common	
70.052	1725	Dark-barred Twin-spot Carpet	<i>Xanthorhoe ferrugata</i>	Common	
70.053	1722	Flame Carpet	<i>Xanthorhoe designata</i>	Common	
70.054	1727	Silver-ground Carpet	<i>Xanthorhoe montanata</i>	Common	
70.055	1726	Large Twin-spot Carpet	<i>Xanthorhoe quadrifasiata</i>	Local	
70.056	1736	Royal Mantle	<i>Catarhoe cuculata</i>	Local	
70.059	1742	Yellow Shell	<i>Camptogramma bilineata</i>	Common	
70.061	1738	Common Carpet	<i>Epirrhoe alternata</i>	Common	
70.063	1740	Galium Carpet	<i>Epirrhoe galiata</i>	Local	AM, LT
70.065	1794	Sharp-angled Carpet	<i>Euphyia unangulata</i>	Local	
70.066	1746	Shoulder Stripe	<i>Earophila badiata</i>	Common	
70.067	1747	Streamer	<i>Anticlea derivata</i>	Common	
70.068	1748	Beautiful Carpet	<i>Mesoleuca albicillata</i>	Common	AD, LT
70.069	1749	Dark Spinach	<i>Pelurga comitata</i>	Common	
70.070	1745	Mallow	<i>Larentia clavaria</i>	Common	
70.074	1777	July Highflyer	<i>Hydriomena furcata</i>	Common	
70.075	1778	May Highflyer	<i>Hydriomena impluviata</i>	Common	
70.077	1767	Pine Carpet	<i>Pennithera firmata</i>	Common	
70.079	1769	Spruce Carpet	<i>Thera britannica</i>	Common	
70.081	1768	Grey Pine Carpet	<i>Thera obeliscata</i>	Common	
70.082	1771	Juniper Carpet	<i>Thera juniperata</i>	Local	
70.085	1765	Barred Yellow	<i>Cidaria fulvata</i>	Common	
70.087	1752	Purple Bar	<i>Cosmorhoe ocellata</i>	Common	
70.089	1754	Phoenix	<i>Eulithis prunata</i>	Common	
70.090	1755	Chevron	<i>Eulithis testata</i>	Common	
70.092	1757	Spinach	<i>Eulithis mellinata</i>	Common	
70.093	1758	Barred Straw	<i>Gandaritis pyraliata</i>	Common	
70.094	1759	Small Phoenix	<i>Ecliptopera silaceata</i>	Common	
70.095	1760	Red-green Carpet	<i>Chlorochysta siterata</i>	Common	
70.097	1764	Common Marbled Carpet	<i>Chlorochysta truncata</i>	Common	
70.100	1776	Green Carpet	<i>Colostygia pectinataria</i>	Common	
70.101	1775	Mottled Grey	<i>Colostygia multistrigaria</i>	Common	AM
70.103	1750	Water Carpet	<i>Lampropteryx suffumata</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
70.105	1800	Northern Winter Moth	<i>Operophtera fagata</i>	Common	
70.106	1799	Winter Moth	<i>Operophtera brumata</i>	Common	
70.107	1795	November Moth	<i>Epirrita dilutata</i>	Common	
70.109	1797	Autumnal Moth	<i>Epirrita autumnata</i>	Common	
70.112	1874	Dingy Shell	<i>Euchoeca nebulata</i>	Local	
70.114	1876	Small Yellow Wave	<i>Hydrelia flammeolaria</i>	Common	
70.118	1791	Brown Scallop	<i>Philereme vetulata</i>	Local	AD
70.119	1792	Dark Umber	<i>Philereme transversata</i>	Local	
70.121	1789	Scallop Shell	<i>Hydria undulata</i>	Local	
70.123	1790	Tissue	<i>Triphosa dubitata</i>	Local	AM
70.126	1781	Small Waved Umber	<i>Horisme vitalbata</i>	Common	
70.127	1782	Fern	<i>Horisme tersata</i>	Common	
70.128	1784	Pretty Chalk Carpet	<i>Melanthia procellata</i>	Common	
70.131	1809	Twin-spot Carpet	<i>Mesotype didymata</i>	Common	
70.132	1802	Rivulet	<i>Perizoma affinitata</i>	Common	
70.133	1803	Small Rivulet	<i>Perizoma alchemillata</i>	Common	
70.138	1808	Sandy Carpet	<i>Perizoma flavofasciata</i>	Common	
70.141	1862	Double-striped Pug	<i>Gymnoscelis rufifasciata</i>	Common	
70.142	1858	V-Pug	<i>Chloroclystis v-ata</i>	Common	
70.144	1860	Green Pug	<i>Pasiphila rectangulata</i>	Common	
70.146	1813	Haworth's Pug	<i>Eupithecia haworthiata</i>	Local	
70.147	1811	Slender Pug	<i>Eupithecia tenuiata</i>	Common	
70.150	1816	Toadflax Pug	<i>Eupithecia linariata</i>	Common	
70.151	1817	Foxglove Pug	<i>Eupithecia pulchellata</i>	Common	
70.155	1823	Netted Pug	<i>Eupithecia venosata</i>	Local	
70.156	1852	Brindled Pug	<i>Eupithecia abbreviata</i>	Common	
70.157	1853	Oak-tree Pug	<i>Eupithecia dodoneata</i>	Common	
70.158	1854	Juniper Pug	<i>Eupithecia pusillata</i>	Common	AD, JH
70.160	1835	White-spotted Pug	<i>Eupithecia tripunctaria</i>	Local	
70.161	1851	Golden-rod Pug	<i>Eupithecia virgaureata</i>	Local	JH gen. det.
70.162	1857	Dwarf Pug	<i>Eupithecia tantillaria</i>	Common	
70.164	1824	Pauper Pug / Fletcher's Pug	<i>Eupithecia egenaria</i>	Red Data Book	
70.166	1842	Plain Pug	<i>Eupithecia simpliciatata</i>	Local	AD, JH
70.168	1846	Narrow-winged Pug	<i>Eupithecia nanata</i>	Common	
70.169	1848	Ash Pug (Angle-barred Pug)	<i>Eupithecia innotata</i> f. <i>fraxinata</i>	Common	
70.171	1844	Ochreous Pug	<i>Eupithecia indigata</i>	Common	
70.173	1825	Lime-speck Pug	<i>Eupithecia centaureata</i>	Common	
70.175	1826	Triple-spotted Pug	<i>Eupithecia trisignaria</i>	Local	JH
70.176	1827	Freyer's Pug	<i>Eupithecia intricata</i> <i>arceuthata</i>	Common	
70.179	1830	Wormwood Pug	<i>Eupithecia absinthiata</i>	Common	
70.182	1832	Currant Pug	<i>Eupithecia assimilata</i>	Common	
70.183	1834	Common Pug	<i>Eupithecia vulgata</i>	Common	
70.184	1819	Mottled Pug	<i>Eupithecia exiguata</i>	Common	
70.186	1841	Yarrow Pug	<i>Eupithecia millefoliata</i>	Nationally Scarce B	AD
70.187	1838	Tawny Speckled Pug	<i>Eupithecia icterata</i>	Common	
70.188	1839	Bordered Pug	<i>Eupithecia succenturiata</i>	Common	
70.189	1840	Shaded Pug	<i>Eupithecia subumbrata</i>	Local	AD, LT
70.190	1837	Grey Pug	<i>Eupithecia subfuscata</i>	Common	
70.192	1867	Treble-bar	<i>Aplocera plagiata</i>	Common	
70.195	1864	Streak	<i>Chesias legatella</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
70.197	1871	Grey Carpet	<i>Lithostege griseata</i>	Red Data Book	AD
70.198	1879	Seraphim	<i>Lobophora halterata</i>	Local	
70.199	1882	Small Seraphim	<i>Pterapherapteryx sexalata</i>	Local	JC <i>et al.</i>
70.200	1883	Yellow-barred Brindle	<i>Acasis viretata</i>	Local	
70.202	1881	Early Tooth-striped	<i>Trichopteryx carpinata</i>	Common	
70.203	1661	Orange Underwing	<i>Archiearis parthenias</i>	Local	
70.205	1884	Magpie Moth	<i>Abraxas grossulariata</i>	Common	
70.206	1885	Clouded Magpie	<i>Abraxas sylvata</i>	Local	JC, AD, KC
70.207	1887	Clouded Border	<i>Lomaspilis marginata</i>	Common	
70.208	1888	Scorched Carpet	<i>Ligdia adustata</i>	Local	
70.211	1889	Peacock Moth	<i>Macaria notata</i>	Local	
70.212	1890	Sharp-angled Peacock	<i>Macaria alternata</i>	Local	
70.214	1893	Tawny-barred Angle	<i>Macaria liturata</i>	Common	
70.215	1897	V-Moth	<i>Macaria wauaria</i>	Local.	DF. Not seen since the 1960s
70.218	1894	Latticed Heath	<i>Chiasmia clathrata</i>	Common	
70.222	1902	Brown Silver-line	<i>Petrophora chlorosata</i>	Common	
70.224	1904	Scorched Wing	<i>Plagodis dolabraria</i>	Local	
70.226	1906	Brimstone Moth	<i>Opisthograptis luteolata</i>	Common	
70.227	1907	Bordered Beauty	<i>Epione repandaria</i>	Common	AD, LT, AM, DF
70.231	1910	Lilac Beauty	<i>Apeira syringaria</i>	Local	
70.232	1911	Large Thorn	<i>Ennomos autumnaria</i>	Nationally Scarce B	AD, JH
70.233	1912	August Thorn	<i>Ennomos quercinaria</i>	Local	AD, KC
70.234	1913	Canary-shouldered Thorn	<i>Ennomos alniaria</i>	Common	
70.236	1915	September Thorn	<i>Ennomos erosaria</i>	Common	DF. Not seen since the 1960s
70.237	1917	Early Thorn	<i>Selenia dentaria</i>	Common	
70.239	1919	Purple Thorn	<i>Selenia tetralunaria</i>	Common	
70.240	1920	Scalloped Hazel	<i>Odontopera bidentata</i>	Common	
70.241	1921	Scalloped Oak	<i>Crocallis elingnaria</i>	Common	
70.243	1922	Swallow-tailed Moth	<i>Ourapteryx sambucaria</i>	Common	
70.244	1923	Feathered Thorn	<i>Colotois pennaria</i>	Common	
70.254	1663	March Moth	<i>Alsophila aescularia</i>	Common	
70.246	1925	Small Brindled Beauty	<i>Apocheima hispidaria</i>	Local	AM
70.247	1926	Pale Brindled Beauty	<i>Pligalia pilosaria</i>	Common	
70.248	1927	Brindled Beauty	<i>Lycia hirtaria</i>	Common	
70.251	1930	Oak Beauty	<i>Biston strataria</i>	Common	
70.252	1931	Peppered Moth	<i>Biston betularia</i>	Common	
70.253	1932	Spring Usher	<i>Agriopis leucophaearia</i>	Common	
70.254	1933	Scarce Umber	<i>Agriopis aurantiaria</i>	Common	
70.255	1934	Dotted Border	<i>Agriopis marginaria</i>	Common	
70.256	1935	Mottled Umber	<i>Erannis defoliaria</i>	Common	
70.257	1936	Waved Umber	<i>Menophra abruptaria</i>	Common	
70.258	1937	Willow Beauty	<i>Peribatodes rhomboidaria</i>	Common	
70.265	1941	Mottled Beauty	<i>Alcis repandata</i>	Common	
70.268	1944	Pale Oak Beauty	<i>Hypomecis punctinalis</i>	Common	
70.270	1947	Engrailed	<i>Ectropis crepuscularia</i>	Common	
70.271	1948	Small Engrailed	<i>Ectropis sp.</i>	Local. Now thought to be the same species as Engrailed on DNA evidence.	
70.273	1950	Brindled White-spot	<i>Parectropis similaria</i>	Local	JC, AD

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
70.274	1951	Grey Birch	<i>Aethalura punctulata</i>	Common	
70.275	1952	Common Heath	<i>Ematurga atomaria</i>	Common	
70.276	1954	Bordered White	<i>Bupalus piniaria</i>	Common	
70.277	1955	Common White Wave	<i>Cabera pusaria</i>	Common	
70.278	1956	Common Wave	<i>Cabera exanthemata</i>	Common	
70.279	1957	White-pinion Spotted	<i>Lomographa bimaculata</i>	Common	
70.280	1958	Clouded Silver	<i>Lomographa temerata</i>	Common	
70.282	1960	Early Moth	<i>Theria primaria</i>	Common	
70.283	1961	Light Emerald	<i>Campaea margaritata</i>	Common	
70.284	1962	Barred Red	<i>Hylaea fasciaria</i>	Common	
70.294	1968	Yellow Belle	<i>Aspitates ochrearia</i>	Local	
70.297	1665	Grass Emerald	<i>Pseudoterpna pruinata</i>	Common	AD, AM, LT
70.299	1666	Large Emerald	<i>Geometra papilionaria</i>	Common	
70.300	1667	Blotched Emerald	<i>Comibaena bajularia</i>	Local	
70.302	1673	Small Emerald	<i>Hemistola chrysoprasaria</i>	Local	
70.303	1674	Little Emerald	<i>Jodis lactearia</i>	Common	LT
70.305	1669	Common Emerald	<i>Hemithea aestivaria</i>	Common	
Notodontidae					
71.003	1995	Puss Moth	<i>Cerura vinula</i>	Common	AD, JH
71.005	1997	Sallow Kitten	<i>Furcula furcula</i>	Common	
71.007	1998	Poplar Kitten	<i>Furcula bifida</i>	Local	
71.009	1999	Lobster Moth	<i>Stauropus fagi</i>	Common	
71.010	2014	Marbled Brown	<i>Drymonia dodonaea</i>	Local	
71.011	2015	Lunar Marbled Brown	<i>Drymonia ruficornis</i>	Common	
71.012	2000	Iron Prominent	<i>Notodonta dromedarius</i>	Common	
71.013	2003	Pebble Prominent	<i>Notodonta ziczac</i>	Common	
71.016	2005	Great Prominent	<i>Peridea anceps</i>	Local	
71.017	2007	Swallow Prominent	<i>Pheosia tremula</i>	Common	
71.018	2006	Lesser Swallow Prominent	<i>Pheosia gnoma</i>	Common	
71.020	2011	Pale Prominent	<i>Pterostoma palpina</i>	Common	
71.021	2008	Coxcomb Prominent	<i>Ptilodon capucina</i>	Common	
71.022	2009	Maple Prominent	<i>Ptilodon cucullina</i>	Local	
71.025	1994	Buff-tip	<i>Phalera bucephala</i>	Common	
71.027	2019	Chocolate-tip	<i>Clostera curtula</i>	Local	
71.028	2017	Small Chocolate-tip	<i>Clostera pigra</i>	Nationally Scarce B. Not seen since the 1960s	DF
Erebidae					
72.001	2469	Herald	<i>Scoliopteryx libatrix</i>	Common	
72.002	2474	Straw Dot	<i>Rivula sericealis</i>	Common	
72.003	2477	Snout	<i>Hypena proboscidalis</i>	Common	
72.009	2031	White Satin	<i>Leucoma salicis</i>	Local	
72.010	2033	Black Arches	<i>Lymantria monacha</i>	Local	
72.012	2029	Brown-tail	<i>Euproctis chrysorrhoea</i>	Local	
72.013	2030	Yellow-tail	<i>Euproctis similis</i>	Common	
72.015	2028	Pale Tussock	<i>Calliteara pudibunda</i>	Common	
72.017	2026	Vapourer	<i>Orgyia antiqua</i>	Common	
72.019	2061	Buff Ermine	<i>Spilosoma luteum</i>	Common	
72.020	2060	White Ermine	<i>Spilosoma lubricipeda</i>	Common	
72.022	2063	Muslin Moth	<i>Diaphora mendica</i>	Common	
72.023	2059	Clouded Buff	<i>Diacrisia sannio</i>	Local	AD, AM, CW, IP

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
72.024	2064	Ruby Tiger	<i>Phragmatobia fuliginosa</i>	Common	
72.025	2056	Wood Tiger	<i>Parasemia plantaginis</i>	Local	RK. Seen on Sandringham Warren in 1987
72.026	2057	Garden Tiger	<i>Arctia caja</i>	Common	AM, DF. Only one record since the 1960s
72.031	2069	Cinnabar	<i>Tyria jacobaeae</i>	Common	
72.035	2037	Rosy Footman	<i>Miltochrista miniata</i>	Local	
72.036	2038	Muslin Footman	<i>Nudaria mundana</i>	Local	
72.037	2035	Round-winged Muslin	<i>Thumatha senex</i>	Local	
72.037	2040	Four-dotted Footman	<i>Cybosia mesomella</i>	Local	
72.042	2039	Red-necked Footman	<i>Atolmis rubricollis</i>	Local (Migrant)	
72.043	2049	Buff Footman	<i>Eilema depressa</i>	Local	
72.044	2044	Dingy Footman	<i>Eilema griseola</i>	Common	
72.045	2050	Common Footman	<i>Eilema lurideola</i>	Common	
72.046	2047	Scarce Footman	<i>Eilema complana</i>	Local	
72.049	2043	Orange Footman	<i>Eilema sororcula</i>	Local	
72.052	2493	Dotted Fan-foot	<i>Macrochilo cribrumalis</i>	Nationally Scarce B	
72.053	2489	Fan-foot	<i>Herminia tarsipennalis</i>	Common	
72.054	2492	Small Fan-foot	<i>Herminia grisealis</i>	Common	
72.060	2485	Marsh Oblique-barred	<i>Hypenodes humidalis</i>	Nationally Scarce B	
72.061	2484	Pinion-streaked Snout	<i>Schrankia costaestrigalis</i>	Local	
72.062	2482	White lined Snout	<i>Schrankia taenialis</i>	Nationally Scarce B	AM Emmet colln. in 1967
72.063	2466	Blackneck	<i>Lygephila pastinum</i>	Local	
72.067	2470	Small Purple-barred	<i>Phytometra viridaria</i>	Local. Invertebrate Site Register 1987, 1988	
72.069	2473	Beautiful Hook-tip	<i>Laspeyria flexula</i>	Local	
72.078	2452	Red Underwing	<i>Catocala nupta</i>	Common	
72.084	2462	Mother Shipton	<i>Callistege mi</i>	Common	AM
Noctuidae					
73.001	2450	Spectacle	<i>Abrostola tripartita</i>	Common	
73.002	2449	Dark Spectacle	<i>Abrostola triplasia</i>	Common	
73.012	2434	Burnished Brass	<i>Diachrysia chrysitis</i>	Common	
73.014	2437	Golden Plusia	<i>Polychrysia moneta</i>	Common	
73.015	2441	Silver Y	<i>Autographa gamma</i>	Migrant	
73.016	2442	Beautiful Golden Y	<i>Autographa pulchrina</i>	Common	
73.017	2443	Plain Golden Y	<i>Autographa jota</i>	Common	
73.018	2444	Gold Spangle	<i>Autographa bractea</i>	Migrant	AM 2007
73.022	2439	Gold Spot	<i>Plusia festucae</i>	Common	
73.024	2410	Marbled White Spot	<i>Protodeltote pygarga</i>	Common	
73.026	2412	Silver Hook	<i>Protodeltote uncula</i>	Local	JC, AD, AM
73.032	2425	Nut-tree Tussock	<i>Colocasia coryli</i>	Common	
73.036	2281	Alder Moth	<i>Acronicta alni</i>	Local	
73.037	2283	Dark Dagger	<i>Acronicta tridens</i>	Common	JH gen. det.
73.038	2284	Grey Dagger	<i>Acronicta psi</i>	Common	REJ gen. det.
73.039	2279	Sycamore	<i>Acronicta aceris</i>	Local	
73.040	2280	Miller	<i>Acronicta leporina</i>	Local	
73.042	2286	Light Knot Grass	<i>Acronicta menyanthidis</i>	Local	JC et al.
73.045	2289	Knot Grass	<i>Acronicta rumicis</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
73.046	2278	Poplar Grey	<i>Subacronicta megacephala</i>	Common	
73.047	2291	Coronet	<i>Craniophora ligustri</i>	Local	AD
73.052	2216	Shark	<i>Cucullia umbratica</i>	Common	AD
73.053	2214	Chamomile Shark	<i>Cucullia chamomillae</i>	Local	
73.055	2217	Star-wort	<i>Cucullia asteris</i>	Nationally Scarce B	
73.058	2221	Mullein	<i>Cucullia verbasci</i>	Common	
73.061	2394	Anomalous	<i>Stilbia anomala</i>	Local	AM, LT
73.062	2297	Copper Underwing	<i>Amphipyra pyramidea</i>	Common	REJ <i>gen. det.</i>
73.063	2298	Svensson's Copper Underwing	<i>Amphipyra berbera</i>	Common	REJ <i>gen. det.</i>
73.064	2299	Mouse Moth	<i>Amphipyra tragopoginiis</i>	Common	
73.065	2227	Sprawler	<i>Asteroscopus sphinx</i>	Common	
73.068	2245	Green-brindled Crescent	<i>Allophyes oxyacanthae</i>	Common	
73.069	2243	Early Grey	<i>Xylocampa areola</i>	Common	
73.072	2401	Marbled Clover	<i>Heliothis viriplaca</i>	Red Data Book	JC <i>et al.</i>
73.074	2403	Bordered Straw	<i>Heliothis peltigera</i>	Migrant	LT, JH
73.076	2400	Scarce Bordered Straw	<i>Helicoverpa armigera</i>	Migrant	AD, JH
73.084	2293	Marbled Beauty	<i>Bryophila domestica</i>	Common	
73.087	2385	Small Mottled Willow	<i>Spodoptera exigua</i>	Migrant	JH
73.092	2387	Mottled Rustic	<i>Caradrina morpheus</i>	Common	
73.095	2389	Pale Mottled Willow	<i>Caradrina clavipalpis</i>	Common	
73.096	2381	Uncertain	<i>Hoplodrina alsines</i>	Common	
73.097	2382	Rustic	<i>Hoplodrina blanda</i>	Common	
73.099	2384	Vine's Rustic	<i>Hoplodrina ambigua</i>	Common	
73.100	2391	Silky Wainscot	<i>Chilodes maritimus</i>	Local	
73.101	2380	Treble Lines	<i>Charanyca trigrammica</i>	Common	
73.102	2302	Brown Rustic	<i>Rusina ferruginea</i>	Common	
73.105	2301	Bird's Wing	<i>Dypterygia scabriuscula</i>	Local	
73.106	2300	Old Lady	<i>Mormo maura</i>	Local	
73.109	2303	Straw Underwing	<i>Thalpophila matura</i>	Common	
73.113	2306	Angle Shades	<i>Phlogophora meticulosa</i>	Common	
73.114	2305	Small Angle Shades	<i>Euplexia lucipara</i>	Common	
73.119	2368	Crescent	<i>Helotropha leucostigma</i>	Local	JH, AD, AM, DF
73.120	2352	Dusky Sallow	<i>Eremobia ochroleuca</i>	Common	
73.121	2364	Frosted Orange	<i>Gortyna flavago</i>	Common	
73.123	2361	Rosy Rustic	<i>Hydraecia micacea</i>	Common	
73.124	2362	Butterbur	<i>Hydraecia petasitis</i>	Local	AD, JH
73.126	2358	Saltern Ear	<i>Amphipoea fucosa</i>	Local	JH <i>gen. det.</i>
73.128	2360	Ear Moth	<i>Amphipoea oculea</i>	Common	REJ <i>gen. det.</i>
73.131	2353	Flounced Rustic	<i>Luperina testacea</i>	Common	
73.134	2375	Large Wainscot	<i>Rhizedra lutosa</i>	Common	
73.136	2369	Bulrush Wainscot	<i>Nonagria typhae</i>	Common	JC <i>et al.</i>
73.137	2377	Fen Wainscot	<i>Arenostola phragmitidis</i>	Local	
73.138	2348	Lyme Grass	<i>Longalatedes elymi</i>	Nationally Scarce B	
73.139	2370	Twin-spotted Wainscot	<i>Lenisa geminipuncta</i>	Local	
73.141	2371	Brown-veined Wainscot	<i>Archauara dissoluta</i>	Local	AD
73.142	2379	Small Rufous	<i>Coenobia rufa</i>	Local	
73.144	2350	Small Wainscot	<i>Denticucullus pygmaea</i>	Common	
73.145	2349	Mere Wainscot	<i>Photedes fluxa</i>	Nationally Scarce B	
73.147	2345	Small Dotted Buff	<i>Photedes minima</i>	Common	KS <i>et al.</i>
73.151	2373	Webb's Wainscot	<i>Globia sparganii</i>	Nationally Scarce B	JH

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
73.154	2330	Dusky Brocade	<i>Apamea remissa</i>	Common	
73.155	2327	Clouded Brindle	<i>Apamea epomidion</i>	Common	JH
73.156	2326	Clouded-bordered Brindle	<i>Apamea crenata</i>	Common	
73.157	2333	Large Nutmeg	<i>Apamea anceps</i>	Local	
73.158	2334	Rustic Shoulder-knot	<i>Apamea sordens</i>	Common	
73.159	2331	Small Clouded Brindle	<i>Apamea unanimitis</i>	Common	AD
73.160	2335	Slender Brindle	<i>Apamea scolopacina</i>	Common	
73.162	2321	Dark Arches	<i>Apamea monoglypha</i>	Common	
73.163	2322	Light Arches	<i>Apamea lithoxyloa</i>	Common	
73.168	2336	Double Lobed	<i>Lateroligia ophiogramma</i>	Common	AD, AM
73.169	2343	Common Rustic	<i>Mesapamea secalis</i>	Common	JH gen. det.
73.170	2343a	Lesser Common Rustic	<i>Mesapamea didyma</i>	Common	JH gen. det.
73.171	2342	Rosy Minor	<i>Litoligia literosa</i>	Common	
73.172	2341	Cloaked Minor	<i>Mesoligia furuncula</i>	Common	
73.173	2337	Marbled Minor	<i>Oligia strigilis</i>	Common	JC gen. det.
73.174	2339	Tawny Marbled Minor	<i>Oligia latruncula</i>	Common	JC gen. det.
73.176	2340	Middle-barred Minor	<i>Oligia fasciuncula</i>	Common	
73.180	2272	Barred Sallow	<i>Tiliacea aurago</i>	Common	
73.181	2273	Pink-barred Sallow	<i>Xanthia togata</i>	Common	
73.182	2274	Sallow	<i>Cirrhia icteritia</i>	Common	
73.183	2275	Dusky-lemon Sallow	<i>Cirrhia gilvago</i>	Local	JH
73.186	2267	Beaded Chestnut	<i>Agrochola lychuidis</i>	Common	
73.187	2266	Brown-spot Pinion	<i>Agrochola litura</i>	Common	
73.188	2265	Flounced Chestnut	<i>Agrochola helvola</i>	Common	
73.189	2263	Red-line Quaker	<i>Agrochola lota</i>	Common	
73.190	2264	Yellow-line Quaker	<i>Agrochola macilenta</i>	Common	
73.192	2262	Brick	<i>Agrochola circellaris</i>	Common	
73.193	2270	Lunar Underwing	<i>Omphaloscelis lunosa</i>	Common	
73.194	2258	Chestnut	<i>Conistra vaccinii</i>	Common	
73.195	2259	Dark Chestnut	<i>Conistra ligula</i>	Common	
73.201	2236	Pale Pinion	<i>Lithophane socia</i>	Local	
73.202	2237	Grey Shoulder-knot	<i>Lithophane ornitopus</i>	Common	
73.206	2240	Blair's Shoulder-knot	<i>Lithophane leautieri</i>	Common	
73.210	2256	Satellite	<i>Eupsilia transversa</i>	Common	
73.213	2312	Olive	<i>Ipimorpha subtusa</i>	Local	
73.216	2318	Dun-bar	<i>Cosmia trapezina</i>	Common	
73.219	2269	Centre-barred Sallow	<i>Atethmia centrargo</i>	Common	
73.220	2225	Minor Shoulder-knot	<i>Brachylomia viminalis</i>	Common	KC 2002
73.221	2268	Suspected	<i>Parastichtis suspecta</i>	Local	
73.222	2314	Dingy Shears	<i>Apterogenum ypsilon</i>	Local	
73.224	2247	Merveille du Jour	<i>Griposia aprilina</i>	Common	
73.225	2248	Brindled Green	<i>Dryobotodes eremita</i>	Common	
73.231	2231	Deep-brown Dart	<i>Aporophyla lutulenta</i>	Common	AD
73.233	2232	Black Rustic	<i>Aporophyla nigra</i>	Common	
73.237	2252	Large Ranunculus	<i>Polymixis flavicincta</i>	Local	
73.241	2179	Pine Beauty	<i>Panolis flammea</i>	Common	
73.242	2188	Clouded Drab	<i>Orthosia incerta</i>	Common	
73.244	2187	Common Quaker	<i>Orthosia cerasi</i>	Common	
73.245	2182	Small Quaker	<i>Orthosia cruda</i>	Common	
73.246	2185	Lead-coloured Drab	<i>Orthosia populeti</i>	Local	
73.247	2186	Powdered Quaker	<i>Orthosia gracilis</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
73.249	2190	Hebrew Character	<i>Orthosia gothica</i>	Common	
73.250	2189	Twin-spotted Quaker	<i>Orthosia munda</i>	Common	
73.252	2177	Hedge Rustic	<i>Tholera cespitis</i>	Common	
73.253	2178	Feathered Gothic	<i>Tholera decimalis</i>	Common	
73.254	2176	Antler Moth	<i>Cerapteryx graminis</i>	Common	
73.255	2145	Nutmeg	<i>Anarta trifolii</i>	Common	
73.257	2142	Beautiful Yellow Underwing	<i>Anarta myrtilli</i>	Common	
73.261	2150	Grey Arches	<i>Polia nebulosa</i>	Common	
73.263	2157	Light Brocade	<i>Lacanobia w-latinum</i>	Local	
73.264	2158	Pale-shouldered Brocade	<i>Lacanobia thalassina</i>	Common	
73.265	2156	Beautiful Brocade	<i>Lacanobia contigua</i>	Local	AM
73.266	2159	Dog's Tooth	<i>Lacanobia suasa</i>	Local	
73.267	2160	Bright-line Brown-eye	<i>Lacanobia oleracea</i>	Common	
73.270	2155	Dot Moth	<i>Melanchra persicariae</i>	Common	
73.271	2163	Broom Moth	<i>Ceramica pisi</i>	Common	JC
73.273	2147	Shears	<i>Hada plebeja</i>	Common	
73.274	2154	Cabbage Moth	<i>Mamestra brassicae</i>	Common	
73.275	2152	White Colon	<i>Sideridis turbida</i>	Nationally Scarce B	AD
73.276	2166	Campion	<i>Sideridis rivularis</i>	Common	
73.279	2164	Broad-barred White	<i>Hecatera bicolorata</i>	Common	
73.281	2173	Lychnis	<i>Hadena bicruris</i>	Common	
73.282	2170	Varied Coronet	<i>Hadena compta</i>	Common	
73.283	2171	Marbled Coronet	<i>Hadena confusa</i>	Local	
73.286	2167	Tawny Shears	<i>Hadena perplexa</i>	Common	
73.289	2196	Striped Wainscot	<i>Mythimna pudorina</i>	Local	
73.290	2192	Brown-line Bright Eye	<i>Mythimna conigera</i>	Common	
73.291	2199	Common Wainscot	<i>Mythimna pallens</i>	Common	
73.293	2198	Smoky Wainscot	<i>Mythimna impura</i>	Common	
73.294	2197	Southern Wainscot	<i>Mythimna straminea</i>	Local	
73.297	2194	White-point	<i>Mythimna albipuncta</i>	Common	
73.298	2193	Clay	<i>Mythimna ferrago</i>	Common	
73.301	2205	Shoulder-striped Wainscot	<i>Leucania comma</i>	Common	
73.305	2209	Flame Wainscot	<i>Senta flammea</i>	Nationally Scarce A	JH
73.313	2081	White-line Dart	<i>Euxoa eruta</i>	Common	
73.314	2082	Garden Dart	<i>Euxoa nigricans</i>	Common	DF. Not seen since the 1960s
73.317	2089	Heart and Dart	<i>Agrotis exclamationis</i>	Common	
73.319	2087	Turnip Moth	<i>Agrotis segetum</i>	Common	
73.320	2088	Heart and Club	<i>Agrotis clavis</i>	Common	
73.322	2085	Archer's Dart	<i>Agrotis vestigialis</i>	Local	
73.325	2092	Shuttle-shaped Dart	<i>Agrotis puta</i>	Common	
73.327	2091	Dark Sword-grass	<i>Agrotis ipsilon</i>	Migrant?	
73.328	2098	Flame	<i>Axylia putris</i>	Common	
73.329	2102	Flame Shoulder	<i>Ochropleura plecta</i>	Common	
73.332	2122	Purple Clay	<i>Diarsia brunnea</i>	Common	
73.333	2120	Ingrailed Clay	<i>Diarsia mendica</i>	Common	
73.334	2123	Small Square-spot	<i>Diarsia rubi</i>	Common	
73.336	2139	Red Chestnut	<i>Cerastis rubricosa</i>	Common	
73.338	2118	True Lover's Knot	<i>Lycophotia porphyrea</i>	Common	
73.342	2107	Large Yellow Underwing	<i>Noctua pronuba</i>	Common	
73.343	2110	Broad-bordered Yellow Underwing	<i>Noctua fimbriata</i>	Common	

Check-list No.	Bradley No.	English name	Scientific name	Norfolk and conservation status	Recorder(s)
73.344	2108	Lunar Yellow Underwing	<i>Noctua orbona</i>	Nationally Scarce B	
73.345	2109	Lesser Yellow Underwing	<i>Noctua comes</i>	Common	
73.346	2112	Least Yellow Underwing	<i>Noctua interjecta</i>	Common	
73.348	2111	Lesser Broad-bordered Yellow Underwing	<i>Noctua janthe</i>	Common	
73.349	2113	Stout Dart	<i>Spaelotis ravida</i>	Local	DF. Not seen since the 1960s
73.351	2114	Double Dart	<i>Graphiphora angur</i>	Common	
73.352	2138	Green Arches	<i>Anaplectoides prasina</i>	Common	AD
73.353	2130	Dotted Clay	<i>Xestia baja</i>	Common	REJ <i>gen. det.</i>
73.354	2131	Square-spotted Clay	<i>Xestia stigmatica</i>	Nationally Scarce B	
73.356	2135	Heath Rustic	<i>Xestia agathina</i>	Local	
73.357	2134	Square-spot Rustic	<i>Xestia xanthographa</i>	Common	JC <i>et al.</i>
73.358	2133	Six-striped Rustic	<i>Xestia sexstrigata</i>	Common	
73.359	2126	Setaceous Hebrew Character	<i>Xestia c-nigrum</i>	Common	
73.360	2127	Triple-spotted Clay	<i>Xestia ditrapezium</i>	Local	AD, JH, AM, DF
73.361	2128	Double Square-spot	<i>Xestia triangulum</i>	Common	
73.365	2117	Autumnal Rustic	<i>Eugnorisma glareosa</i>	Common	
73.368	2136	Gothic	<i>Naenia typica</i>	Local	
Nolidae					
74.002	2076	Kent Black Arches	<i>Meganola albula</i>	Nationally Scarce B	
74.003	2077	Short-cloaked Moth	<i>Nola cucullatella</i>	Common	
74.004	2078	Least Black Arches	<i>Nola confusalis</i>	Local	
74.007	2421	Scarce Silver-lines	<i>Bena bicolorana</i>	Local	
74.008	2422	Green Silver-lines	<i>Pseudoips prasinana</i>	Common	
74.009	2423	Oak Nycteoline	<i>Nycteola revayana</i>	Local	
74.011	2418	Cream-bordered Green Pea	<i>Earias clorana</i>	Nationally Scarce B	



Three new galls from Norfolk induced by species of *Mayetiola* (Diptera, Cecidomyiidae)

Robert Maidstone

At Aslacton on 11 December 2013 I pulled up several plants of Barren Brome *Bromus sterilis* with hard, onion-like swellings at the base. The galls were formed by the swollen leaf bases, inside which were one or two red pupae. The central shoot had been aborted but some of the plants had tried to produce side shoots from below the gall.

Redfern *et al.* (2011) does not mention either *Bromus* as a host or onion-like swellings at the base of grass seedlings so I sent a couple of the galls to Dr Keith Harris who managed to extract a larva from one. He was able to confirm that it was one of the species of *Mayetiola* with a hastiform sternal spatula. The larvae of *Mayetiola* all induce relatively inconspicuous galls on grasses and cereals and are frequently overlooked, especially in the UK where even the notorious Hessian Fly *M. destructor* fails to cause devastation as it does in the wheat belts of the USA. Dr Harris referred me to Ertel (1975) which gives illustrations of the larvae of *Mayetiola* species.

Three pieces of evidence are important when identifying galls: the host species, the form of the gall and, most definitively, the structure of the gall-former itself.

It appears that each *Mayetiola* species is restricted to a single grass genus, or group of related genera. However, evidence for polyphagous behaviour (feeding on several hosts) may have been determined from experimental work rather than reflecting the natural choice of the species. Conversely, as many as three species of *Mayetiola* may parasitise a single genus of grasses.

Mayetiola midges lay their eggs on the open leaf and the larvae crawl down towards the base of the leaf where they initiate the

gall either at the base of the leaves or at a node when the culm has begun to develop. The resulting constriction prevents further downward movement by the larvae.

Mayetiola galls, as described by various authors, are of three basic forms: 'onion galls', 'hair-galls' or 'saddle-galls', but within these three forms the gall can be robust and obvious, or weak and insignificant.

'Onion galls' forms either at the base of seedlings or of shoots that are not undergoing stem extension. They can be formed either from swollen leaf bases (robust) or the larvae may be present with little or no swelling of the leaf tissues (weak).

'Hair galls' form as a mass of adventitious roots emanating from the stem just above a node. The term 'root gall' is best avoided for these structures as it suggests they are on the root. 'Hair galls' may form at the ground surface or higher up, clear of the soil. The larva is found between the stem and leaf sheath. Redfern *et al.* (2011) suggest that the larva lies opposite the adventitious roots but often the root mass encircles the stem so this is not obvious.

When the midge larvae are squeezed between the leaf sheath and stem a depression in the stem results within which the larva lies. This depression often has a raised rim, the 'saddle gall'. The 'saddle gall' is not visible unless the leaf sheath is stripped off. Some authors describe this as the gall rather than describe the gall in its entirety (i.e. as it is seen in the field). Sometimes the stem fails to develop and the larvae lay on the aborted part-developed leaves (Figs. 1 & 2). One gall I dissected had two pupae

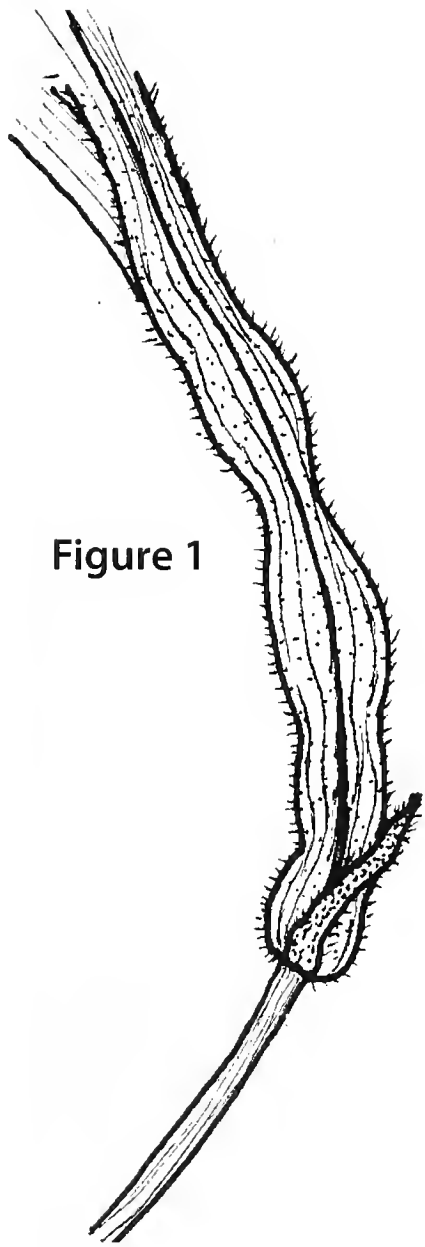


Figure 1

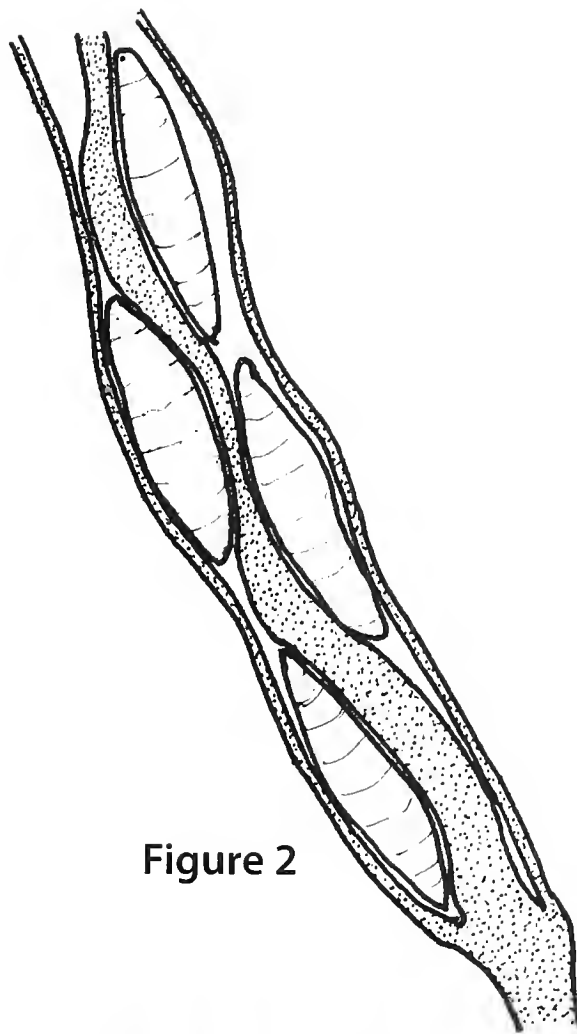


Figure 2

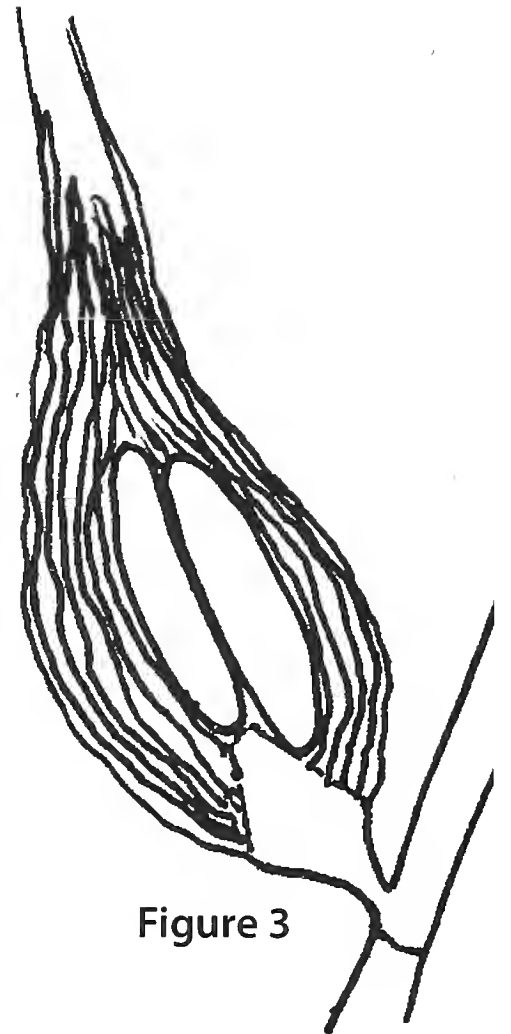


Figure 3

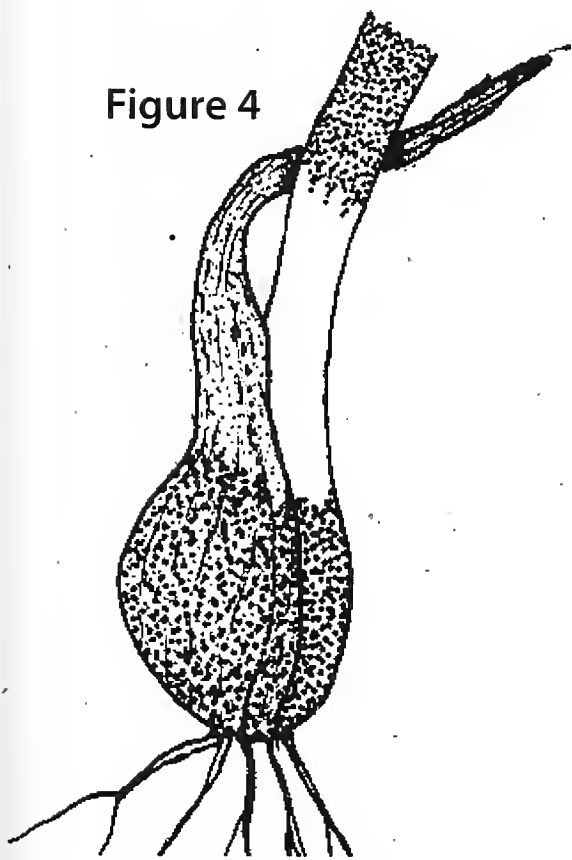


Figure 4

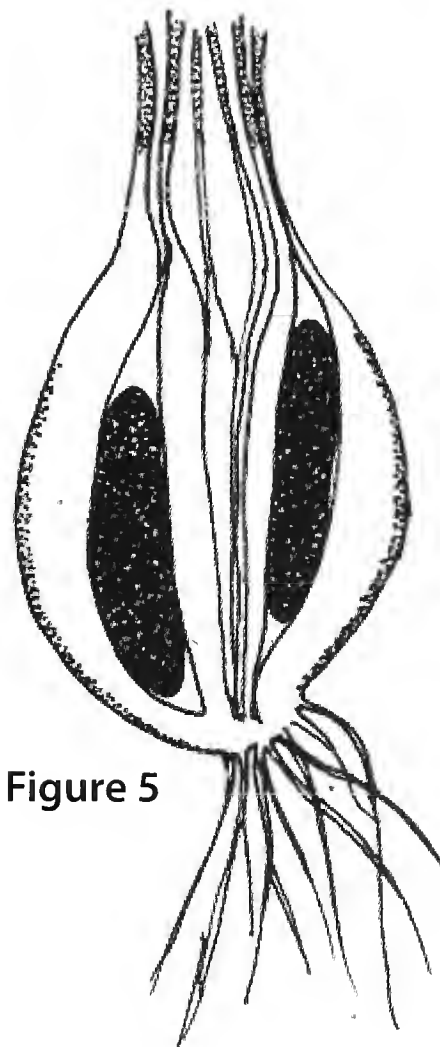


Figure 5

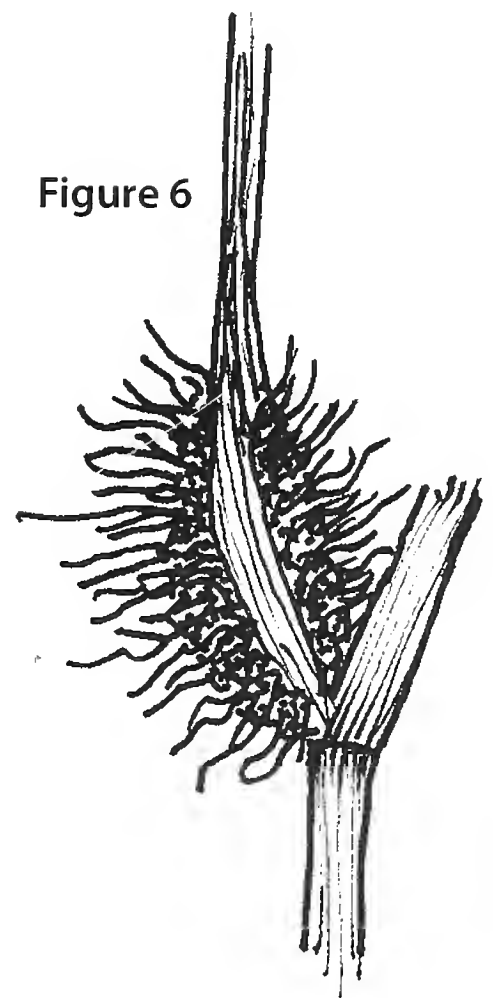


Figure 6

sitting on a short, conical, stunted stem enclosed within the leaf sheaths (Fig. 3).

As some species of *Mayetiola* are known to have more than one generation each year, the form of the gall may change depending on the state of the host plant's growth, and thus different descriptions are needed for identification of the galls.

Identification of the larvae involves examination of the sternal spatula to determine whether it is bifid or hastate, but unfortunately its form is not always significantly different between species. Other microscopic differences in the papillae around the spatula, and on the anal segments, can be used but need slide

preparations beyond the scope of the author. Nevertheless, using Ertel (1975) I have been able to determine not only the identity of the gall on *Bromus* but also to re-examine galls I had collected in the past and determine two more species as new to Norfolk.

Mayetiola bromicola. Onion-like swellings (Figs. 4 & 5) at the base of overwintering *B. sterilis* seedlings, contained a larva with a hastiform sternal spatula determined as *M. bromicola* Roberti. Galls of this type have now been found at Aslacton, 11 December 2013, Starston, 7 January 2014 and Great Moulton, 18 January 2014. Adult midges did hatch from the Barren Brome galls in late October, just when the seeds would naturally be germinating, suggesting a single generation.

Mayetiola festucae. A gall found at Sisland in October 2006 (Figs. 3, 6 & 7) on *Festuca* sp. resembled *M. radificica* but as this species occurs on *Poa nemoralis* in northern Britain (Redfern 2011), this identification was discounted. However, Ertel (1975) has described a new species, *Mayetiola festucae*, on *Festuca rubra* with a similar type of gall. Further galls were found at Sisland on 10 February 2014.

Mayetiola avenae. The finding of onion-galls at the base of *Arrhenatherum elatius* side-shoots at Chedgrave on 7 April 2014 prompted re-examination of similar galls collected in 2004 at Hardwick (Fig. 8). These contained red pupae (Fig. 9). The larvae collected in 2014 were found to have hastate sternal spatulas and I now consider both specimens to be *M. avenae*. Although there is no previous record of midges galling *Arrhenatherum* in this manner.

Also at Sisland (10 Feb 2014) one onion gall (Fig. 10) was found on a living side shoot of *Holcus lanatus*. Another dead, partly grown stem yielded several dead larvae (from which parasitoid wasps hatched in April 2014) and a few pupae from underneath the leaf sheath (fig 1). These larvae also had hastate sternal spatulas and appear to be *Mayetiola holci* which is already known from the county and included in Redfern *et al.* (2011).

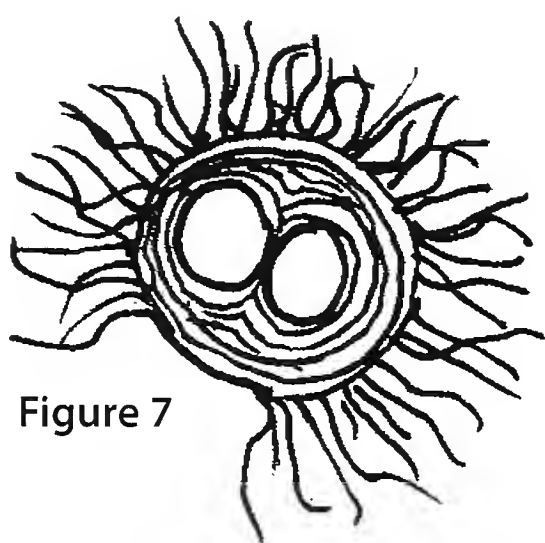


Figure 7

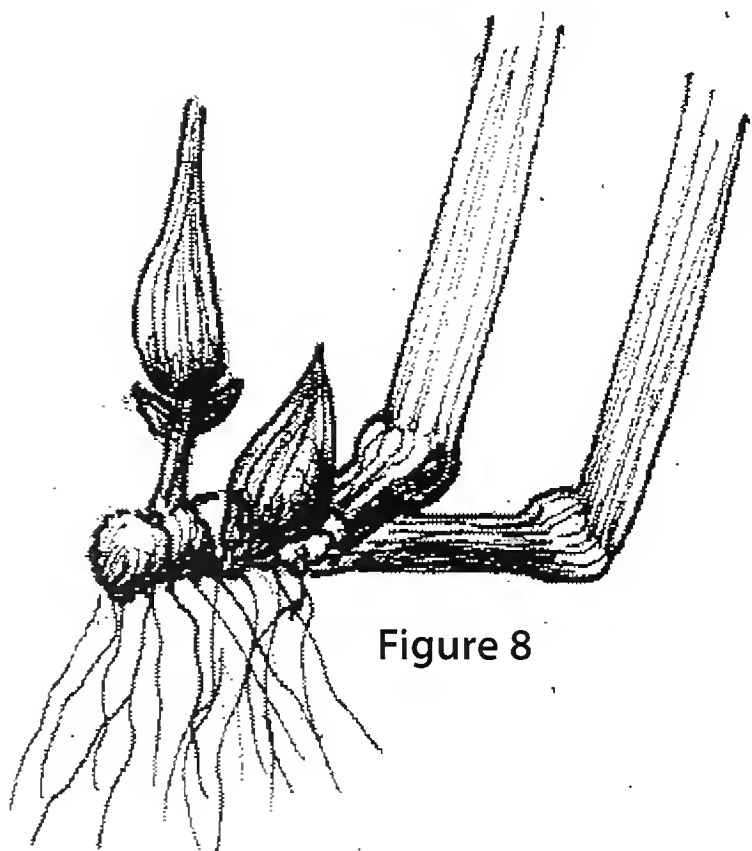


Figure 8

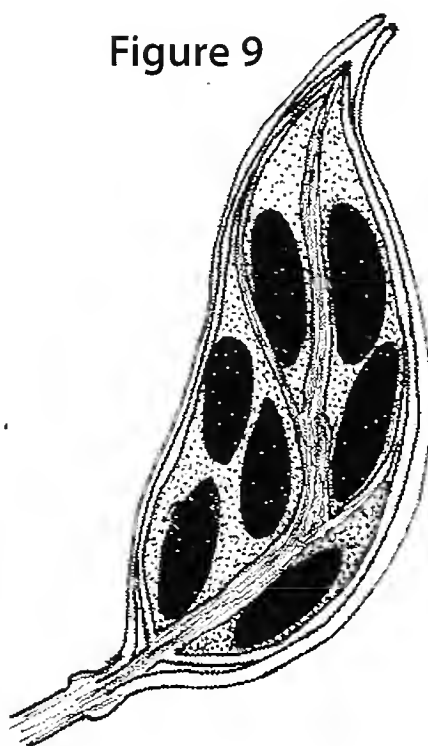


Figure 9

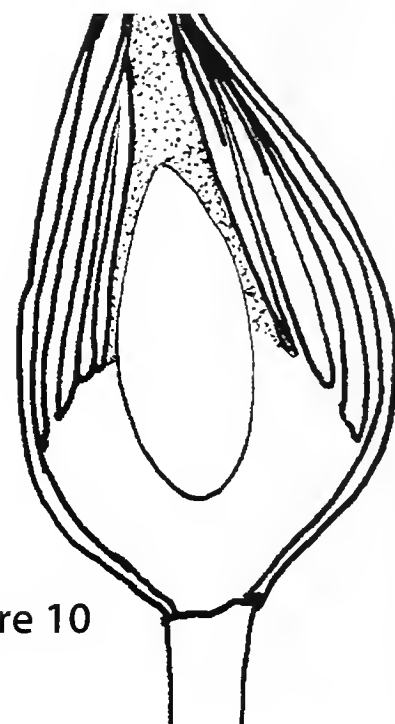


Figure 10

All the plants on which *Mayetiola* were found in 2014 were at sites with broken vegetation cover, not lawns or well-knit grassland.

In late 2015 I was allowed access to a copy of Roberti's (1953) paper, in Italian, where he separates *Mayetiola bromicola* from *M. destructor* on the basis of the shape of the larvae sternal spatula and its life history. However he states that the adults are very similar and that the differences seem inconsistent but feels the consistent differences in the larval form and food plant justify a different name.

This paper also highlights the necessity of observing and recording the lifestyle and habitats of wildlife rather than relying solely on visual features.

Acknowledgements

Thanks are given to Dr Keith Harris for identifying the midge genus and pointing me to Ertel's paper, and to Alex Preece of Forncett for helping with the translation of that paper. And to Dr Tony Irwin for the loan of Roberti's paper and Sarah Norman for assisting in its translation.

References

- ERTEL, M. 1975. Untersuchungen zur Larvalsystematik der Gattung *Mayetiola* (Cecidomyiidae, Diptera). *Stuttg. Beitr. Naturk. Ser.* 267: 1-64.
- REDFERN, M., SHIRLEY, P. & BLOXHAM, M. 2011. *British Plant Galls* [2nd edn.]. Field Studies Council Occasional Publication 125.
- ROBERTI, D. 1953. Contributo alla conoscenza della specie italiane di *Mayetiola* Kieffer, *Boll. Lab. Ent. agr. Portici*, 12: 98-153

Robert W. Maidstone. 8 Farrow Close, Great Moulton, Norwich. NR15 2HR
robertwmaidstone@gmail.com

Paul Banham 1928-2015

The Society has lost a long-standing and loyal supporter by the recent death of Paul Banham. He was General Secretary for nine years from 1962, Editor of the Mammal Report for many years and was appointed a Vice-President in 1966. At Wymondham College he taught modern languages for 17 years but in 1969 he and his wife, Eleanor moved to Wells to run the newly-opened field studies centre in the old Polka Road School. Here, Paul was able to pursue his own interests in natural history and employ his gift for enthusing and educating young people. In 2010 he wrote, "I had always dreamt of a job in which my 'naturalist' side might take over, especially in somewhere like North Norfolk. I applied and to my great delight, landed the job." Paul retired in 1989.

Another great interest was Norfolk dialects, which was the subject of one of his talks to the Society. He demonstrated that whilst the dialect was similar throughout the County, it was quite different in the City of Norwich.

My first contact with Paul was when he telephoned to ask me to join the Society's Council, or Committee as it then was. In more recent times we often met in Wells, usually as he cycled along the East Quay where my wife and I would be having a picnic in the car, when Paul would update us with the latest ornithological news from the area.

Paul was one of the few in Norfolk to study seaweeds. Roy Baker, a long-time friend who took over from him as Secretary of the Society, writes: "He even persuaded Keith Clarke, Derek Howlett and myself to survey the entrance to Yarmouth Harbour in search of them. We clambered over the boulder

shore near the Gorleston Ferry landing at low tide then Keith sent me along the breakwater at Gorleston beach to collect more. The arrangement was that he would shout if a big wave approached and I would scramble to safety. Keith was unreliable and I became soaked – but we sent our collections to Paul."

He will be greatly missed by his many friends in the Society and elsewhere, and our condolences are sent to his son and daughter.

Don Dorling¹

A tribute from Diane Robinson

I first met Paul Banham in 1959 when, as an eleven-year old, I was one of a number of pupils bussed daily to Wymondham College where he taught and lived with his wife Eleanor and young family. Our group formed the first intake of the County Grammar School established at the College pending the building of a new school. For seven years 'Mr Banham' was my form-master and acting Head of County Grammar, and throughout our adolescent years he provided strong leadership, always guiding us with calm authority, fairness and wisdom – respected and liked by all. His French lessons were invariably delivered with pace and interest.

During Friday lunchtimes he held a Wildlife Club. About a dozen of us would walk round the extensive grounds through woodland and grassland, observing and learning from the expert. One afternoon he gave me a leaflet, suggesting that my parents might be interested ... Indeed they were

¹ Sadly, a few days after writing this obituary, Don Dorling passed away. It is hoped that the next volume of Transactions will carry his obituary.

– it included an application form for the Norfolk & Norwich Naturalists' Society. We joined as a family and many years of nature photography and learning amongst like-minded people ensued.

Becoming a teacher myself some years later, I was able to see Paul in his new role as Warden (1969-1989) of Wells Field Study Centre. My Primary age classes thoroughly enjoyed their 'hands on' experiences, making discoveries along the beach, in the pinewoods and over the saltmarsh, always stimulated by his teaching. Trips to nearby Binham Priory and Warham Camp would be the focus for Eleanor, Assistant Warden.

What a great team they made! They also ran courses for teachers. In 1995, Paul produced his booklet *Natural History of Wells-next-the-Sea*, illustrated by Eleanor.

I will always remember Paul as a knowledgeable naturalist, an efficient organiser, a fair, wise and well-respected leader and an inspiring teacher able to enthuse children, teenagers and adults alike and enrich their lives. His influence for good, and in particular for an understanding and appreciation of the wonders of the natural world, will surely live on in the many who, like myself, were so fortunate to have known him.

Diane Robinson

Lil Evans 1915-2015

Lil Evans and her husband Reg (who died in 2004) recorded fungi in Norfolk from the time they returned to the county in 1975. Their card indices of 37000 records were converted to electronic form and provided the basis of the Norfolk Fungus Database. They worked, both in the field and in the workroom as a team of two, although Lil's particular expertise was in myxomycete (slime mould) identification, for which she was nationally known. She also wrote an illustrated guide to the plant galls of Norfolk and published papers in this field.

Neither Lil nor Reg were members of NNNS Council but they supported the Society in many ways, primarily by leading field meetings. They were always willing to share their knowledge

and both of them actively encouraged beginners to develop their fungal interests. Many of us count them as our mentors. My first memory of the couple was as a schoolboy in Birmingham (Reg was a pharmacist in Stratford-upon-Avon). Both were active members of the Birmingham Natural History Society and on one foray Reg picked up a dead log and, lens to eye, reeled off the names of the microfungi as he scanned it from one end to the other. Lil noted down the names, and occasionally prompted her husband!

In the last few years, reduced mobility limited Lil's natural history activities but until very recently she was willingly identifying slime moulds sent to her by friends. She died just a few months short of her 100th birthday.

Tony Leech

Nail Fungus *Poronia punctata* in Norfolk, and possible factors affecting its appearance at Hockwold Heath and Cranwich Camp

Nicola Edwards, Tony Leech & Doug Warner

The Nail Fungus *Poronia punctata* is a distinctive species that occurs on the dung of horses and, much less commonly, that of other herbivores. It may have been quite widespread before the middle of the 20th century but since then has been almost restricted to the New Forest. Recently, however, it has been recorded more widely in southern England, including Norfolk, probably as a consequence of the increasing use of ponies for conservation grazing where they are used to prevent scrub encroachment. *P. punctata* is designated as Near Threatened on the UK Fungi Red Data List (Evans et al. 2006) and is a Biodiversity Action Plan species.

In this study, factors affecting its appearance on horse dung, including the nature of the vegetation and the condition of the dung, were investigated.

The fungus and its lifecycle

P. punctata is an ascomycete in the family Xylariaceae. Its 'fruiting bodies' (ascomata) appear as buff-coloured discs (stromata), typically 5-15 mm in diameter, on the surface of the dung. Each disc arises from a dark stalk embedded in the dung, giving the whole fungus the appearance of a clout or nail when extracted from the dung. Within the upper surface are numerous perithecia appearing as black dots (Figs. 1 & 2. p. 39). Each is a spherical cavity lined with asci, each of which contains eight spores. The ripe spores pass out of the perithecium via a small pore in its apex. These spores are dispersed by the wind and may land on vegetation which is ingested by a horse and thereby pass through its gut to arrive in fresh dung. Here it develops

into a mycelium which colonises the dung and feeds on the organic matter present.

Spores produced in this way are the product of a sexual process but it is likely that *Poronia* is homothallic, that is, self-fertilizing. In addition, the young ascomata produce asexual spores visible as a powdery covering before the perithecia are visible.

Occurrence and distribution

There is anecdotal evidence that *P. punctata* was much commoner in the past. Although this distinctive fungus is readily seen when present (but see *P. erici*, below), it is generally the case for fungi that their recording is patchy and greatly influenced by variable 'recorder effort'. Examination of the 272 records (December 2015) for this species on the Fungal Record Database of Britain and Ireland (FRDBI) showed that 22% of these records were made before 1945 and that none was made between 1945 and 1970. To determine whether this pattern is unusual it was compared with records for Field Mushroom *Agaricus campestris*, a species often associated with non-intensive agriculture, and for Fly Agaric *Amanita muscaria*, a well-recorded species associated with birch trees (Table 1). These data do suggest that disappearance of *P. punctata* after the Second World War and its subsequent increase in abundance are real.

Only seven of the pre-1945 records which had locality data were from Hampshire whereas virtually all of the post-1970 records were from that county. Exceptions were from Dorset (1984), Surrey (1985), Oxfordshire (1995, 1996) and Anglesey (2001), but since 2001 nearly half of the 40 records have been from counties other

Table 1. Number of records in FRDBI for different periods.

Percentages are those of total records.

Period	Nail Fungus	Field Mushroom	Fly Agaric
<1945	60 (22%)	196 (6.8%)	240 (3.3%)
1945-1970	0	108 (3.7%)	119 (1.6%)
>1970	212 (78%)	2592 (89.5%)	6951 (95.1%)

than Hampshire (including Sussex, Kent, Berkshire, Herefordshire and Norfolk). This supports the hypothesis that this once widespread fungus became rare when horses ceased to be extensively used in agriculture but persisted in New Forest ponies and is now spreading again as ponies are used for conservation grazing.

Norfolk records:

- 1873 near Hunstanton TF6740. CB Plowright, 1 December.
- 1941 Wacton Common TM1890. EA Ellis, 4 May.
- 1944 Horsford Heath (Woods) TG1818. EA Ellis, 30 July.
- 2012 Hockwold Heath TL7590. J Spencer, March.
- 2013 Roydon Common and Grimstone Warren J Preston, November.

The only record from Suffolk is 1874 from Yarmouth, on the Norfolk /Suffolk Border.

Site Manager Andrew Palles-Clarke has commented that when *Poronia* was first found at Hockwold it only occurred at Hockwold Heath on a couple of droppings but over last two to three years seems to have flourished and is now at Weeting Heath too.

Poronia erici

In 1988, *Poronia erici*, a smaller species but with larger spores, was described from specimens collected on rabbit dung in Germany (Lohmeyer & Benkert 1988) and was later found at Holme (TF7145) by Ray Purser in 2010 (Leech *et al.* 2011)). This species has been recorded from horse dung both in Australia and, in 2010, from Snape Warren in Suffolk. This makes it possible, even likely, that the record for *P. punctata*

on the Norfolk Fungus Databases as '1982 Holme, Broad Water TF714504. PC Holland, 5 June', is actually for *P. erici* as it is likely to be within one km (and possibly much less) of the 2010 discovery. The grid reference given for the 1982 record (TF714504) must be incorrect as it specifies a point five km north of Holme beach! The name Broad Water, however, and the easting, suggest that it is within one km, and possibly much less, of the 2010 record.

Conditions for 'fruiting'

A large number of studies have reported somewhat contradictory findings concerning the ecological requirements for *P. punctata* (for references see Edwards 2015) but as the fungus is only visible when it is fruiting, these may be requirements either for growth or for fruiting *per se*.

Fruiting is most commonly observed in the autumn or winter months but there is some fruiting in summer months. The fungus can withstand being frozen.

All British records in FRDBI in which the origin of the dung is specified are from horse (or pony) dung, with the exception of one 19th century record from cow dung. In North America it occurs more commonly on cow dung.

In most studies, more fruiting was seen on dung that was still in lumps but it also occurred on 'collapsed' dung (due to activities of insect larvae) and on desiccated dung.

P. punctata is typically found on dung where grazing is of low quality, mainly on acidic habitats, the most likely conditions under which conservation grazing is taking place. Whether this is due to the effect of diet (for

example on the lower nitrogen content of vegetation on unimproved grassland), on dung properties or on environmental factors pertaining after defaecation is not clear. It has been suggested that the failure to find fruiting bodies on dung deposited in woodland could be due to increased beetle activity in dung deposited there.

The greater abundance of fruiting on habitats where the vegetation is shorter rather than longer may reflect variation in transmission of the fungus.

To enable *P. punctata* populations to persist in a herd of horses, either fruiting must be continuous throughout the year or the spores must be viable for sufficiently long periods. Although ascospores are viable for long periods, the slender vegetation they adhere to is not and must be grazed within its lifecycle or before non-vector species consume it.

Sites and ponies

The study areas

Hockwold Heath (TL7589/7590) is approximately 2 km north-west of Weeting and consists of two areas. A 40 hectare area (Site A) and an adjacent 30 hectare area (Site B). Cranwich Camp (TL7794) is approximately 2 km west of Mundford and consists of 22 hectares of reversion land. Both sites were clear-felled in approximately 2000 and are parts of the once extensive Breckland heaths.

Soil inversion has recently been carried out on part of the Hockwold Heath. In this technique the invasive plant species are turned underneath the nutrient-poor chalky mineral layer which is brought to the surface in order to encourage species, some either unique to Breckland or with very few UK habitats, to colonise the newly created bare ground.

Both sites are owned by the Forestry Commission and managed by Norfolk Wildlife Trust (NWT).

Ponies

Dartmoor ponies are used to prevent scrub invasion and to maintain an open sward. It is intended that this will maintain a suitable breeding habitat for Stone Curlew. Hockwold Heath has been grazed by ponies since 2007. Ponies are grazed on site A from April to October and on site B from October to March. Cranwich Camp has been grazed continuously since 2014. The ponies are mixed age mares at a low stocking rate.

Methods

A series of belt transects were created by walking predetermined routes across each of the three sites. The transect lines were chosen to include the different habitats present. The position of dung piles within two metres either side of the line walked were recorded by GPS and the presence or absence of *P. punctata* fruiting bodies noted. If fungi were present, the total number and maximum diameter were recorded. Fieldwork was carried out between December 2014 and February 2015.

Around each dung pile, a 2 x 2 metre quadrat was used to survey the height and composition of the vegetation surrounding the dung. The structure of each pile of dung was assessed to be normal, disturbed, collapsing or flat, and its condition (related to moisture content) to be normal, normal ageing, saturated or desiccated. Moisture, pH and nitrogen levels in soil (Ellenberg factors) were also predicted from the vegetation composition.

Results and discussion

Grazing regime

Although Table 2 shows there to be much higher incidence of *P. punctata* in areas in which summer grazing had been carried out (so was not occurring at the time of study), it could not be concluded that this is causally related as dung structure was different for the older dung.

In this study it was not possible to ascertain whether *Poronia* mycelium was present in all

Table 2. Number of dung piles examined and the incidence of the fungus.

	Hockwold A	Hockwold B	Cranwich Camp
Grazing regime	Summer	Winter	Year round
No. of transects	4	6	3
Total transect length (m)	1198	974	445
No. of dung piles	80	87	97
% piles with fungus	27.5	6.9	3.1
Maximum no./pile	496	140	21

dung or whether only certain ponies were responsible for dispersing the fungus.

Vegetation type

Table 3 shows that the highest incidence of *P. punctata* was observed in Group 1 habitats. However, χ^2 tests showed that none of the associations was statistically significant. This suggests that the overall habitat type does not strongly influence the development of fruiting bodies. Similar negative conclusions were apparent for vegetation height and Ellenberg factors.

However, vegetation composition immediately surrounding dung was found to significantly influence the appearance

of fruiting bodies through a multivariate MANOVA test. Microclimates created by local vegetation are predicted to influence dung suitability through determination of coprophilous invertebrate assemblage (Masunga *et al.* 2006; Klein 1989).

Dung structure and condition

The dung condition and structure characteristics correlated strongly with number and size of fruiting bodies. Fruiting bodies were observed on all structures, but not all moisture conditions.

'Disturbed' dung was able to support fruiting bodies across the moisture gradient and generally had the highest percentage

Table 3. Incidence of fungus on dung in different vegetation types.

Group	NVC community	% dung piles with <i>P. punctata</i>	Total no. fruiting bodies
1	U4, U4b, U16 and W11. These communities all have a similar field layer, with fine leaved grasses and few dicotyledons.	19	640
2	MG1, a mainly coarse grassland with many dicotyledons, characteristic of little grazing.	4	35
3	MG5 and MG5a, mainly fine-leaved grasslands, characteristic of grazed land with some dicotyledons	13	525
4	OV27, an open community, characteristic of disturbed ground with stands of Rosebay Willowherb (<i>Epilobium angustifolium</i>).	12.5	310
5	W16a, English Oak (<i>Quercus robur</i>) woodland with a species-poor field layer (no canopy layer was recorded – field layer thought to be represented)	15	145

occurrences and number of fruiting bodies. Moderate disturbance of dung can improve aeration by opening air pockets and channels (Dix & Webster 1995). However, if 'disturbed' dung is greatly picked apart, by dung beetles, birds or mechanical means, it becomes less likely to support fruiting, possibly because the mycelium is disrupted (Bignell & King 2011; Dix & Webster 1995).

Dung with 'normal' structure supported fewest colonies, possibly because this generally tended to be younger so that mycelia had not developed sufficiently. 'Collapsing' dung also supported little fruiting – such dung is older and has a lower water-retaining ability and fewer air pockets (Dix & Webster 1995; Isaac 1998). The single dung pile supporting the most fruiting bodies (496) was characterised as 'desiccated-normal'.

Desiccated dung occurred rarely, probably due to weather conditions. Saturated dung was more common and supported the largest fruiting bodies when disturbed or collapsing.

These different combinations of condition and structure are thought to regulate nutrient uptake and consequent mycelium growth, leading to appearance of fruiting bodies when dung edges are reached (Tudor *et al.* 2012; Engh *et al.* 2010; Jennings & Lysek 1996).

Effect of worming treatment

The use of vermifuges is known to reduce insect numbers and diversity in herbivore dung, and a negative effect on coprophilous fungi has been suggested. Any effect would be difficult to investigate as it could be manifested directly or via an influence on insects which could alter dung properties in ways which could harm or benefit *Poronia*.

The only anthelmintic used since at least 2012 is pyrantel (a tetrahydropyrimidine), although avermectins had been used previously. Whereas these avermectins could delay dung decomposition by arthropods for

up to six months, pyrantel photodegrades and rapidly loses insecticidal activity when excreted (Horvat *et al.* 2012). Pyrantel is used biannually on both sites with the last dose administered in November 2014 (Andrew Palles-Clarke, pers. com.).

As no untreated controls were available, it was not possible to investigate the effect of the worming treatment on the appearance of *Poronia*. It is simply noted that the treatment does not prevent appearance of the fungus.

Management

This study has confirmed that *Poronia* is flourishing at these sites but because of the duration of the study and the complexity of the possible interactions between ponies, insects and vegetation, it has not been possible to define precisely the conditions required for *Poronia* fruiting.

The suggestion (Spooner & Roberts 2005) that year-round grazing is required to support *P. punctata* is not supported in this study as Cranwich Camp, with its lower incidence of *Poronia*, is grazed constantly and Hockwold Heath ponies interchange between site A and B. It is possible, however, that air-borne spores could be blown between these sites which are adjacent.

Even if all factors were known it would be unrealistic to tailor management to the benefit of *Poronia* if this jeopardised other priorities on the site, including restoration of a diverse Breckland flora and arthropod fauna, and maintaining suitable habitat for nesting Stone Curlew. Nevertheless, it is encouraging to know that current management is consistent with maintaining a population of *Poronia*.

Origin

A final unanswered question is how the fungus was introduced to the site. The presumption must be that it was in the gut of one or more of the introduced ponies. All of the ponies have come from the Dartmoor

area but it is curious that the only record from South Devon on FRDBI is from 1923. Since this distinctive fungus has only been seen recently at Hockwold and Cranwich it may have been introduced with recent stock, rather than there with original ponies (Andrew Palles-Clarke, pers. com.).

This investigation was successfully submitted for an MSc degree at the University of Hertfordshire and awarded the John Houghton prize.

Acknowledgements

Thanks to Andrew Palles-Clark (Norfolk Wildlife Trust) for invaluable assistance during the project. A final thanks goes to my family (NE) for extensive support throughout the project.

References

- BIGNELL, S. & KING, D. 2011. *Monitoring survey for the nail fungus, Poronia punctata, in the New Forest.* Hampshire & Isle of Wight Wildlife Trust.
- DIX, N.J. & WEBSTER, J. 1995. *Fungal Ecology.* London: Chapman & Hall.
- EDWARDS, N.L. 2015. *Does Breckland vegetation and its management influence abundance of Poronia punctata?* MSc Thesis. University of Hertfordshire School of Life and Medical Sciences.
- ENGH, I., NOWROUSIAN, M. & KÜCK, U. 2010. *Sordaria macrospora, a model organism to study fungal cellular development.* *European Journal of Cell Biology* 89: 864-872.
- ISAAC, S. 1998. Mycology answers. What factors influence the germination and outgrowth of fungal spores? *Mycologist* 12: 91-92.
- JENNINGS, D.H. & LYSEK, G. 1996. *Fungal biology: Understanding the fungal lifecycle.* Oxford: BIOS Scientific Publications Ltd.
- KLEIN, B.C. 1989. Effects of forest fragmentation on dung and carrion beetle communities in central Amazonia. *Ecology* 70: 1715-1725.
- LEECH, T., FRANCIS, S., MAHLER, N. & PURSER, R. 2011. *Poronia erici, a small nail fungus, recently recorded in Norfolk and Suffolk, and notes on the distribution of nail fungus Poronia punctata.* *Transactions of the Norfolk & Norwich Naturalists' Society* 44: 58-60.
- LOHMEYER, T.R. & BENKERT, D. 1988. *Poronia erici* ein neue art der Xylariales (Ascomycetes). *Z. Mycol.* 54(1): 93-102.
- MASUNGA, G.S., ANDRESEN, Ø., TAYLOR, J.E. & DHILLION, S.S. 2006. Elephant dung

decomposition and coprophilous fungi in two habitats of semi-arid Botswana. *Mycological Research* 110: 1214-1226.

- NEWTON, A. C. 2010. Fungi. In A. C. Newton (Ed.), *Biodiversity in the New Forest.* (pp 112-121). Berkshire: Pisces Publications & Bournemouth University.
- SPOONER, B.M. & ROBERTS, P. 2006. *Fungi.* New Naturalist 96. Collins.
- TUDOR, D., ROBINSON, S. C., & COOPER, P. A. 2012. The influence of moisture content variation on fungal pigment formation in spalted wood. *AMB Express* 2: 69.

N.L. Edwards. Sparsholt College, Wesley Lane, Sparsholt, SO21 2NF
nicola.edwards@sparsholt.ac.uk

Dr A.R. Leech. 3, Eccles Road, Holt, Norfolk NR25 6HJ. tonyleech3@gmail.com

Dr D.J. Warner. University of Hertfordshire, Hatfield, Hertfordshire. d.j.warner@herts.ac.uk



Figure 1. Nail Fungus *Poronia punctata* on horse dung at Grimston Warren. Photo: Robert Smith.



Figure 2. Conidial stage of Nail Fungus *Poronia punctata* on horse dung at Hockwold Heath. Photo: Nicola Edwards.

A brief account of the wildlife and history of the North Walsham & Dilham Canal

Jo Parmenter

Background

The North Walsham and Dilham Canal is the canalised channel of the River Ant, which rises near Antingham Ponds, to the north-west of North Walsham, and flows to its confluence with the River Bure to the south of Ludham (see map, Fig. 1, p. 42). The canalised section, which is just over 14 km in length, lies between Antingham Ponds and the Smallburgh River; a minor tributary of the River Ant. The canal flows through a narrow floodplain which widens somewhat towards the downstream end. The entire catchment of the North Walsham and Dilham Canal upstream of Honing Lock covers 49.3km² (George 1992).

The main rivers of Broadland have gentle gradients, with the commonly accepted fall being around 3 cm per kilometre. The situation changes around the periphery of Broadland and the overall fall over the 10 km length of the canal is approximately 8.5 m, or 85 cm per kilometre. Three locks are located on the canal, however, and the gradient of the sections between the locks is very gentle, and similar to the gradients which might be found on the lower reaches of the Broadland rivers.

The North Walsham and Dilham Canal is owned by the North Walsham Canal Company Ltd., with the exception of the stretch between Honing Lock and the Smallburgh River.

From the junction of the Smallburgh River to Tonnage Bridge, the channel is open and potentially navigable by small craft in its current condition. Upstream to the Hundred Stream confluence, otherwise known as the East Ruston Branch, the channel is rather shallow,

but still open. Further upstream still, the channel becomes increasingly overgrown and silted, although the stretch between Honing Common and the Hundred Stream confluence has been dredged and cleared of overhanging vegetation in recent years. Upstream of Honing Bridge, the canal is effectively derelict, with the exception of sections near Ebridge Mill. Although some stretches remain navigable, much of the canal is too overgrown and too shallow to allow boat traffic. The channel becomes more open upstream of Ebridge Mill, and much of the section between Ebridge and Spa Common is navigable by small craft.

The public have a right of navigation beyond the Smallburgh River as far as Honing Lock, which is the upstream limit of tidal influence. The entire canal remains a statutory navigation upstream to Swafield. The sections upstream of Swafield have been legally 'abandoned'. In practice, there is very little boat activity upstream of the Smallburgh River, as most craft which are taken this far upstream are either berthed at Dilham or Smallburgh or are visiting the public staithe at Dilham. There are no public moorings upstream of the Smallburgh River, although several private craft are berthed at Tonnage Bridge. Very few motorised craft are taken upstream of Tonnage Bridge, and the very minor boat traffic beyond this point is almost entirely comprised of canoes, with most such activity taking place during the summer months.

Large numbers of people use the footpath running along the south side of the canal between Honing Lock and Tonnage Bridge, usually as part of a circular route which incorporates part of the Weaver's Way,

and a second footpath section follows the canal from Bacton Wood Mill upstream of Pigney's Wood, where it meets the Paston Way. There are no other footpaths alongside the canal, and there is no towpath.

The landscape and history of the North Walsham -Dilham Canal

The section of the canal downstream of Honing Bridge lies within the Broads National Character Area (<http://publications.naturalengland.org.uk/publication/11549064>) and that upstream forms part of the North-east Norfolk and Flegg National Character Area (<http://publications.naturalengland.org.uk/publication/4543880858959872?category=587130>).

The Broads Character Area is typically a flat, open landscape, with numerous shallow open water bodies (The Broads), connected by rivers and waterways, and variously surrounded by grazed marshland, fenland and carr woodland. The upper reaches of the valleys, including the southern extent of the canal, have a more sheltered, enclosed character and the floodplain is occupied by small areas of fen, and by dense carr woodland. There are also quite extensive tracts of rough grazing marsh, most notably alongside the canal at East Ruston and Dilham. The surrounding 'uplands' in the northernmost part of Broadland fall within the North-east Norfolk Character Area, a gently undulating region of fertile loam soils with a long agricultural history. There is little woodland on the interfluvial plateaux, with the exception of plantation woodland such as that at Bacton Wood, and small patches of oak and birch woodland at Honing Common. The extensive floodplain fens and grazing marshes which are found downstream of Honing Bridge are replaced in the sheltered valley of the upper reaches of the Ant by gently sloping pastures. Small patches of wet woodland and scrub also occur. The enclosed, intimate pastoral landscape of the valley contrasts strikingly with the often large open arable fields,

which are typically bounded by field banks rather than hedgerows, and long views of the surrounding 'uplands'.

This area has a long history of human occupation, as the light, fertile soils of the uplands were readily cultivated, and during the 11th century, north-east Norfolk was once one of the most densely populated areas in the county. Wool production was a major economic activity from the mid-14th century until the 18th century, and the production of textiles was central to the economic prosperity of many local villages, particularly Worstead, a short distance to the west of the canal, where 'worsted cloth' originated.

Evidence of past human activity in the area comes from clusters of archaeological findspots along the route of the canal, many of which date to the Neolithic period, and there is a striking density of cropmarks of ring ditches and enclosures a short distance to the north-east of Spa Common. The first documented evidence of the various mills along the watercourse mentions Ebridge Mill, in c.AD937. There are also Domesday descriptions of the mills at both Briggate and Ebridge. The Ant was strategically important within the east coast defensive system during both world wars, as evidenced by the large number of pillboxes and gun emplacements along its course.

Work on the canalisation of the River Ant did not start until 1825. The canal had six locks, and was designed for small, 20-ton wherries. The canal was not a financial success. The anticipated trade in heavier goods such as coal did not develop as tolls were too high and the advent of better roads, and subsequently railway links, to Norwich and Great Yarmouth in the 1870s and 80s provided an alternative, and cheaper, mode of transport. Flooding in 1912 resulted in a breach of the canal bank above Bacton Wood Lock. A more fundamental problem for the efficient functioning of the canal, however, was an insufficient water

supply. The canal is fed from the ponds at Antingham, a relatively short distance upstream, and the catchment is simply too small to provide the necessary flows. The volume of trade was quickly found to be too low to be profitable; ironically, if trade volumes had been higher, the water supply would not have been sufficient to replace the water released through the functioning of the locks. The section above Swafield Locks became abandoned by 1893, and the wherry *Ella* made the final trading journey on the canal from Bacton Staithe in 1934 (Boyes & Russell 1977). The East Anglian Waterways Association (EAWA) took over responsibility for maintenance of the canal in the early 1990s, and in the last 20 years various restoration work has

been undertaken to a number of the locks and other structures along the canal. In 2008, EAWA set up the North Walsham and Dilham Canal Trust.

The natural history of the North Walsham-Dilham Canal

The marginal and bankside vegetation is typical of a slightly enriched lowland river system, however the canal and floodplain as a whole comprises a regionally important wetland site and a habitat for a number of protected species, for example Kingfisher, Otter and Water Vole. A total of nine nationally scarce plant species have been recorded, while the invertebrate interest includes a number of Red Data Book and Notable species.



Figure 1. Map showing the course of the North Walsham & Dilham canal (in blue).

The floodplain through which the canal flows features a number of sites which are of recognised conservation value, including one Site of Special Scientific Interest (SSSI), Broad Fen, Dilham. This SSSI forms part of the internationally important Broads Special Protection Area (SPA) and Ramsar site and is also a Special Area of Conservation (SAC). A number of County Wildlife Sites (CWS) are also associated with, or include sections of, the canal, including Honing Common (CWS 2202), Old Corner Common (CWS 1217), Dilham Meadows (CWS 1218) and Spa Common (CWS 1173).

The aquatic macrophyte interest of the canal is mainly limited to extensive beds of Yellow Water-lily *Nuphar lutea*, although there are some stands of Water Starwort *Callitriche* spp., and also of Canadian Pondweed *Elodea canadensis*.

The margins of the canal are typically fringed with an emergent zone, which in places has spread to cover most of the width of the channel. The marginal vegetation can include a diverse range of species, for example Pink Water Speedwell *Veronica catenata*, Brooklime *Veronica beccabunga*, Water Forget-me-not *Myosotis scorpioides* and Water-cress *Nasturtium officinale* as well as emergents such as Common Reed *Phragmites australis*, Branched Bur-reed *Sparganium erectum*, Common Reedmace (Bulrush) *Typha latifolia* and Greater and Lesser Pond-sedge *Carex riparia* and *C. acutiformis*.

The bankside vegetation varies considerably, depending upon the adjacent habitat type and management, but unmanaged open stretches are typically composed of Common Reed *Phragmites australis*, Stinging Nettle *Urtica dioica*, Greater Willow-herb *Epilobium hirsutum*, Cleavers *Galium aparine*, Bramble *Rubus fruticosus* agg. and Hedge Bindweed *Calystegia sepium*, often interspersed with trees and scrub.

The flora of the grazing marshes along the canalised River Ant is for the most part

rather impoverished, but in those areas where agricultural improvements have not taken place, or where pasture management has lapsed, some large tracts of species-rich marshy meadow still remain. The species typically found in the unimproved marshes include a diversity of rushes *Juncus* spp. and sedges *Carex* spp., and where the grazing pressure is not too high, a number of flowering plants are also present, including Yellow Flag *Iris pseudacorus*, Meadow Vetchling *Lathyrus pratensis*, Marsh Thistle *Cirsium palustre* and Marsh Marigold *Caltha palustris*.

The dykes in the upper Ant valley are few in number, but, where well-managed, they can support an interesting aquatic flora, including a number of locally uncommon plant species, such as Bog Pondweed *Potamogeton polygonifolius*, Ivy-leaved Crowfoot *Ranunculus hederaceus* and Narrow-leaved Water-plantain *Alisma lanceolatum*.

Small patches of fen vegetation occur along the entire length of the canal, but most frequently on the wider floodplain downstream of Honing Bridge. The fen communities are generally species-poor, neglected litter fen and tall herb fen, with small areas of species-poor reedbed. Along the edges of the channel, quite extensive stands of reedswamp, and, more commonly, Reed Sweet-grass *Glyceria maxima* or pond sedge swamp can be seen. At the Smallburgh River junction, the floodplain on the western bank is occupied by a quite large area of open fen, Broad Fen, Dilham SSSI. An extinct broad lies under the southern part of this fen site; this is now almost entirely terrestrialised with the exception of a narrow channel and is now vegetated by fen, scrub and carr communities. Broad Fen was formerly a station for the rare Fen Orchid *Liparis loeselii*, but this species has become extinct there. An extension to the main broad basin, presumably 19th century cuttings, supports species-rich *Cladium mariscus* dominated tall herb fen and areas of *Carex* sedge fen.

Much of the scrub comprises Goat Willow (Sallow) *Salix caprea* and Grey Willow *Salix cinerea*, however small stands of Osier *Salix viminalis* may also be found. Extensive stands of mature alder-dominated carr woodland may be seen, typically along the lower reaches of the canal. The ground flora is dominated by wetland species including Greater Pond-sedge *Carex riparia*, Bittersweet *Solanum dulcamara* and Wavy Bitter-cress *Cardamine flexuosa*. On drier ground, and particularly along the floodplain margins, oak becomes the dominant species, often in association with either ash or birch. Some mixed or coniferous plantation woodland can also be found along the course of the canal, in particular at Broad Fen and close to the junction with the Hundred Stream.

The high water-table makes much of the floodplain unsuitable for burrowing mammals, although Moles occur along the marginal banks and may move into the woodland, fen or grazing marsh when conditions permit. Stoats are frequent and Badger, Weasel, Hedgehog and Brown Hare also occur. Otters are present, and the canal appears to be an important habitat for this species; breeding almost certainly occurs here. Little is known about the small mammal population, but Harvest Mice, Field Voles, Common Shrews, Water Shrews and Pigmy Shrews all occur here, in addition to a large population of Wood Mice. The canal and associated wetland may be locally important for populations of Water Shrew, and is known to support a regionally important population of Water Voles.

The most commonly occurring bats along the canal are Common and Soprano Pipistrelle, although the canal itself is a very important feeding habitat for Daubenton's Bat. Other species which have been noted in small numbers in and around the floodplain are Natterer's Bat, Brown Long-eared Bat, Noctule, Barbastelle and Serotine.

The Ant floodplain provides a range of habitats, and a number of species of bird specific to wetland habitats breed here, including Grasshopper Warbler and Kingfisher. The area is also important for woodland birds, including Great Spotted Woodpecker, Treecreeper and Tawny Owl. The grazing marshes are of lower interest for breeding waders than might be expected, but still provide a useful feeding habitat. The corridor as a whole is very important for hunting Barn Owl, and a number of breeding pairs are present.

Common Toads, Common Frogs and Smooth Newts breed in suitable waterbodies along the length of the canal. Grass Snakes and Common Lizards breed in the vicinity of the canal and a small Slow-worm population is also present.

The canal is not of any particular significance as a fishery, although it supports species of interest including Stone Loach and Nine-spined Stickleback.

On the basis of current knowledge, Broad Fen is important for its population of wetland invertebrates, and presumably the other small areas of fen and carr along the canal also have some invertebrate interest, although very few records exist to confirm this. Hairy Dragonfly *Brachytron pratense* and Variable Damselfly *Coenagrion pulchellum* occur along the canal, as does the Red Data Book Norfolk Hawker *Aeshna isosceles*. The Banded Demoiselle *Calopteryx splendens* occurs quite commonly along some stretches of water.

Acknowledgements

I would like to thank the East Anglian Waterways Association for funding some of the original survey work.

References

- GEORGE, M. 1992. *The land use, ecology and conservation of Broadland*. Chichester: Packard.
- BOYES, J. & RUSSELL, R. 1977. *The Canals of Eastern England*. David and Charles.
- Dr J.M.Parmenter. The Landscape Partnership, Norwich. jo.parmenter@tlp.uk.com

The effect of the December 2013 tidal surge on the wildlife of Blakeney Point, Norfolk

Richard Porter & Ajay Tegala

Introduction

On the evening of Thursday 5 December 2013 a major tidal surge (3.1 m Above Ordnance Datum Newlyn) hit the coast of north Norfolk. A huge volume of water was pushed south around the rear flank of a deep area of low pressure which moved east through the North Sea into southern Scandinavia. Exacerbated by strong winds, this resulted in widespread flooding as a wall of water, of at least two metres above the normal high tide level, swept onto the shore, overtopping the dunes and sea defences in a number of places in East Anglia. Following the surge, the sea retreated fairly rapidly, unlike the situation in 1953 when a strong north-east wind, coupled with a high tide, held up the flood water for several days, causing widespread devastation.

In this paper we attempt to examine the effects of the tidal surge on the habitats and wildlife of the National Trust's Blakeney Point. Fortunately, through regular monitoring of many taxa, good records of pre-surge data are available for comparison.

We have not covered the damage to buildings and infrastructure, but for the record the Old Lifeboat Station (now the University College London's building) was flooded to a depth of 1.55 metres and damage to the Lifeboat Station and other infrastructures resulted in an insurance claim of over £100,000. All the huts were flooded and damaged and parts of the boardwalk ripped up. The Watch House was also flooded.

Methods

During 2014, the year following the tidal

surge of December 2013, selective surveys were undertaken to monitor the population of mammals, breeding and migrant birds, butterflies, moths and plant distribution. Plant distribution was further studied in 2015 on the shingle ridge. The data were compared to those collected systematically for at least the previous ten years. Changes to the habitats that comprise Blakeney Point were also assessed. The Grey Seal *Halichoerus grypus* breeding colony, which was active at the time of the surge, was monitored carefully.

Results

Changes to habitats

The most noticeable changes were caused by massive shingle deposition along the shingle ridge, which deposited up to an estimated 1.5 m of shingle over the existing shingle smothering much of the vegetation (Plates 1.1 & 1.2 p. 46).

The seaward edges of the dunes were scoured to a width of at least two metres (Plate 1.3 p. 46) and the erosion and wind-blown sand resulted in extensive fans of sand being deposited over Beach Way so that it resembled a lunar landscape. Sandy deposits were also a feature of parts of the shingle ridge that had not been affected by the overtopping of shingle (Plate 2.1 p. 47). At the extreme western end of the Point, as on the main ridge, shingle was pushed inland, partly burying the Shrubby Sea-blite *Suaeda vera* bushes on Far Point.

Along the beach, masses of Sea-purslane *Atriplex portulacoides* had been deposited along the tideline, along with branches of pine trees *Pinus* sp. (Plate 2.2 p. 47). These had almost certainly been brought from East Hills/Wells Wood to the west.



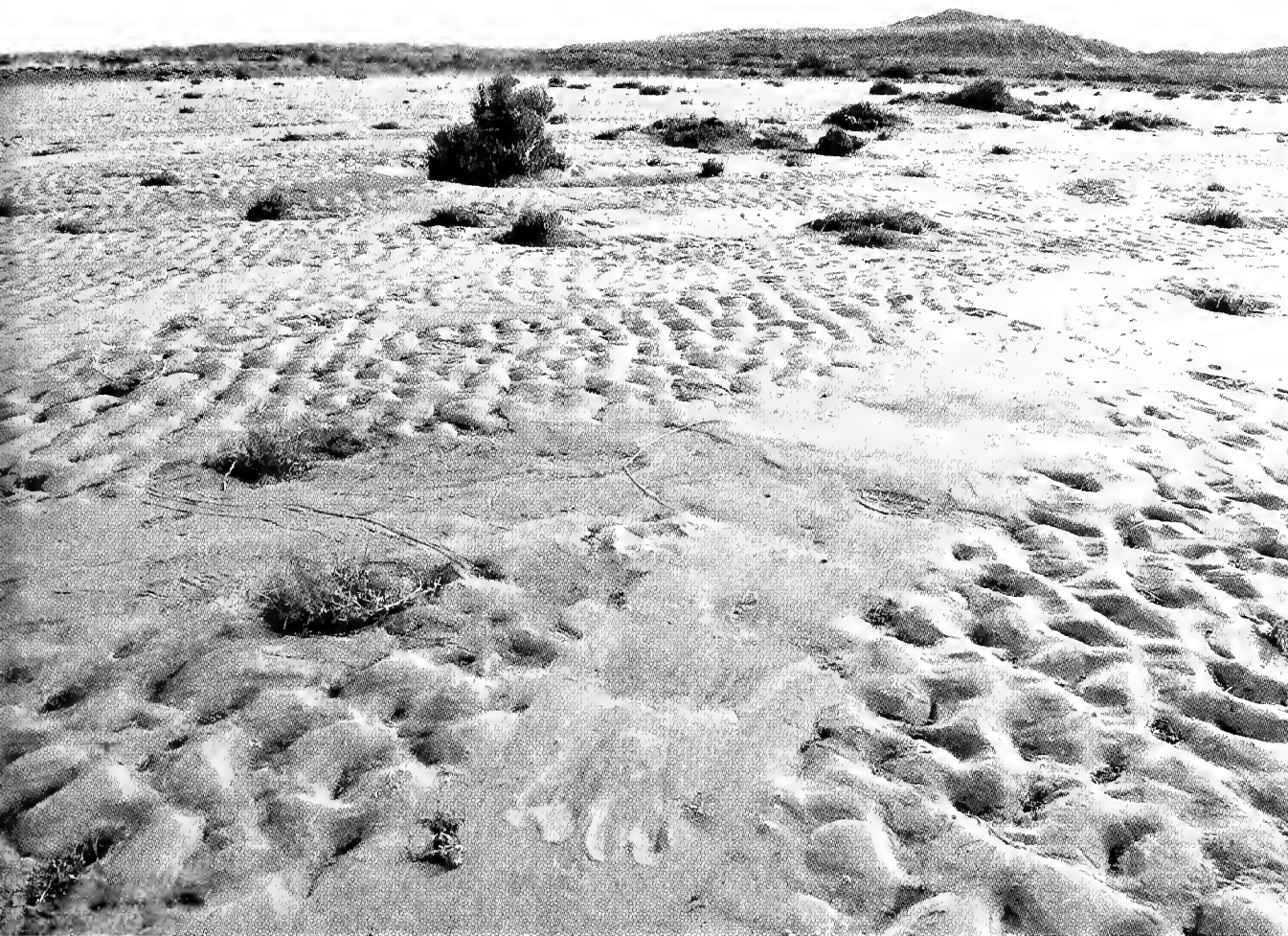
1. (left) Over 75% of the vegetation on the shingle ridge, Blakeney Point, was smothered by shingle, producing a barren landscape, 9 Dec 2013. *Photo: R.F. Porter.*

Plate 1. Effect of tidal surge on Blakeney Point.

2. (right) Shingle deposits reached up to 1.5 m along parts of the shingle ridge March 2014. *Photo: R.F. Porter.*



3. (left) The dunes took a hammering, Blakeney Point, 9 December 2013. *Photo: R.F. Porter..*



**Plate 2. Effect
of tidal surge on
Blakeney Point.**

1. *(left)* The aftermath of the tidal surge saw areas of Blakeney Point innundated by sand, 9 December 2013. Photo: R.F. Porter.



2. *(right)* The aftermath of the tidal surge saw vegetation from saltmarshes to the west strewn along the tideline of Blakeney Point, December 2013. Photo: R.F. Porter.



3. *(left)* Grey Seals in the inundated Lifeboat Station garden, 9 December 2013. Photo: R.F. Porter.

Mammals

Grey Seals: The tidal surge occurred at the height of the Grey Seal breeding season on Blakeney Point. Two days prior to the surge, 1,223 pups were counted, most less than a month old and totally dependent on their mothers' milk. Their location on the westernmost section of the Point placed the colony in the face of the surge and we expected many would be displaced. However, only three pups were found stranded without their mothers; one at Morston and two at Cley. It was two days after the surge that access to the colony became possible and only five pups were found displaced - in the Lifeboat House garden and by the Plantation, but were with their mothers (Plate 2.3 p. 47). A pup count recorded 1,235, twelve more than the pre-surge count. Although the exact response by the seals during the surge is unknown, it is presumed that they found their way to the taller dunes that were not flooded. The colony went on to have its best breeding season ever, with a total of 1,566 pups born and 97.9% raised to weaning, which is about normal.

Terrestrial mammals: Many of the Point's mammals live in areas of the dunes that were not flooded. Numerous Wood Mouse *Apodemus sylvaticus* holes were noted in autumn 2014, more than 20 in the main dunes, suggesting that no long-term damage to the population was caused by

the surge. As usual, Common Shrews *Sorex araneus* were occasionally heard in the summer. There were two Weasel *Mustela nivalis* sightings and around ten Stoat *Mustela erminea* sightings throughout 2014, which is not significantly lower than recent years. Brown Rats *Rattus norvegicus* were thought to be absent for the first half of 2014. This may be linked to submergence of parts of Far Point that may have harboured rat populations. However, significant control work was carried out in winter 2012/13, which could also be responsible for the low numbers of rats. Rat activity was observed towards the end of 2014.

The presence of Red Foxes *Vulpes vulpes* was noted at the Hood and in the main dunes in the two months prior to the surge, and activity was noted at the Long Hills two days after. With subsequent sightings early in 2014, it would appear the resident fox was not deterred by the surge.

Brown Hares *Lepus europaeus* have never been systematically counted on Blakeney Point, but casual post-surge observations suggest similar numbers to recent years on the main dunes and their immediate environs. However fewer animals were noted along the main shingle ridge, possibly the result of habitat destruction, especially of food plants.

Rabbits *Lepus europaeus* have been very rare on the Point since being wiped out by



Figure 1.
Oystercatcher
breeding pairs
2004-2014.

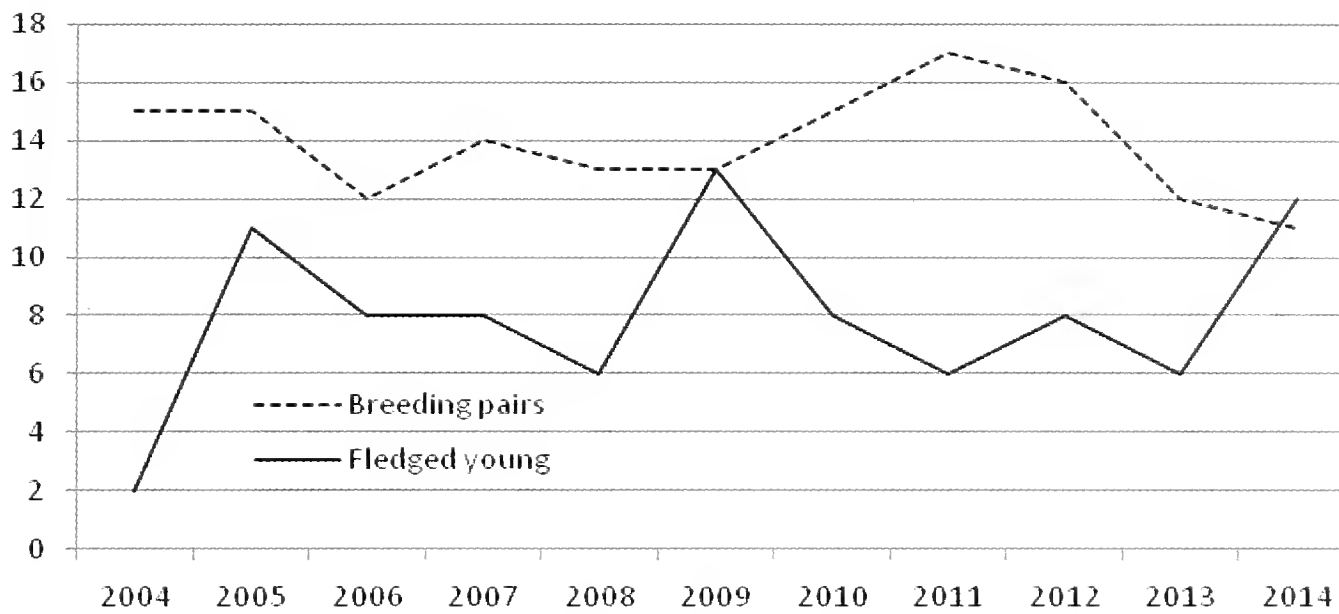


Figure 2. Ringed Plover breeding pairs and productivity 2004-2014.

myxomatosis in the 1990s. One was seen regularly in the Lifeboat House garden throughout autumn 2013; its presence throughout spring and summer of 2014 shows that it survived the surge, assuming that this was the same individual, which is most likely considering the remoteness of the location.

Birds

Breeding birds: The tidal surge caused much vegetation on the main ridge to be smothered with shingle, thus at the start of the breeding season the ridge was still barren. There was concern that this may have a negative impact on ground-nesting birds that need vegetation to provide cover for their young.

Oystercatcher *Haematopus ostralegus* numbers have shown a gradual decline since 2004 (Fig. 1). This appears to have

accelerated following the surge, with breeding pairs at their lowest recorded level. The lack of vegetation cover on the ridge is a possible explanation for this, however it should be noted that Oystercatchers have experienced a very low survival rate of young in recent years.

The Ringed Plover *Charadrius hiaticula* breeding population did not appear to have been affected by the surge (Fig. 2). Although there was one fewer breeding pair than in 2013, productivity was higher in 2014.

By the time Little Terns *Sternula albifrons* nesting on the ridge had young, Sea Sandwort *Honckenia peploides*, one of the dominant plant species, had started to re-establish itself and was utilised for nest cover. Numbers and productivity typically fluctuate (Fig. 3), probably as

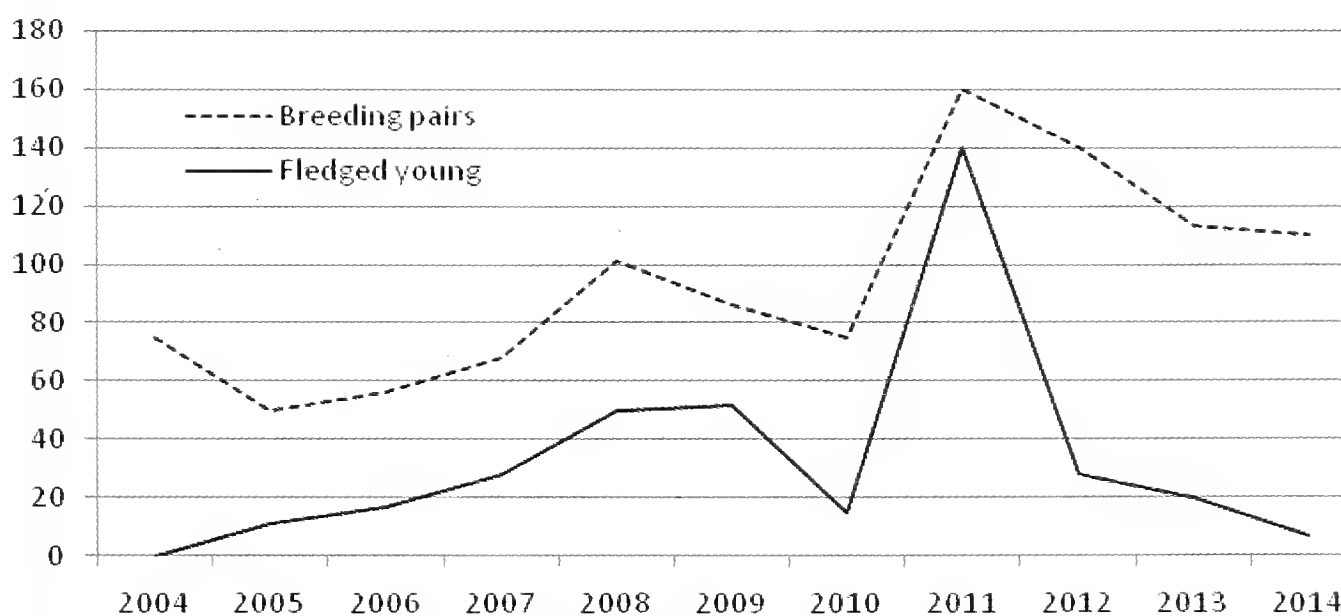


Figure 3. Little Tern breeding pairs and productivity 2004-2014.

Plate 3. Effect of tidal surge on Blakeney Point.

1. *(left)* Flooding of the Little Tern beach colony in mid-June 2014. *Photo:* Sarah Johnson.



2. *(right)* The shingle ridge in July 2014, to show the extent Sea Sandwort. *Photo:* R.F.Porter.



3. *(left)* Yellow Horned-poppies, Blakeney Point, 2015. *Photo:* R.F. Porter.



Plate 4. Beetles new to Norfolk. See p. 91.



1. (left) *Carabus arvensis*. Photo: Roy Anderson.

2. (right) *Panagaeus cruxmajor*. Photo: Gabriele Krumm.



3. (left) *Elater ferrugineus*. Photo: Isidro Martinez.

4. (right) *Rhinocyllus conicus*. Photo: Josef Dvorak.



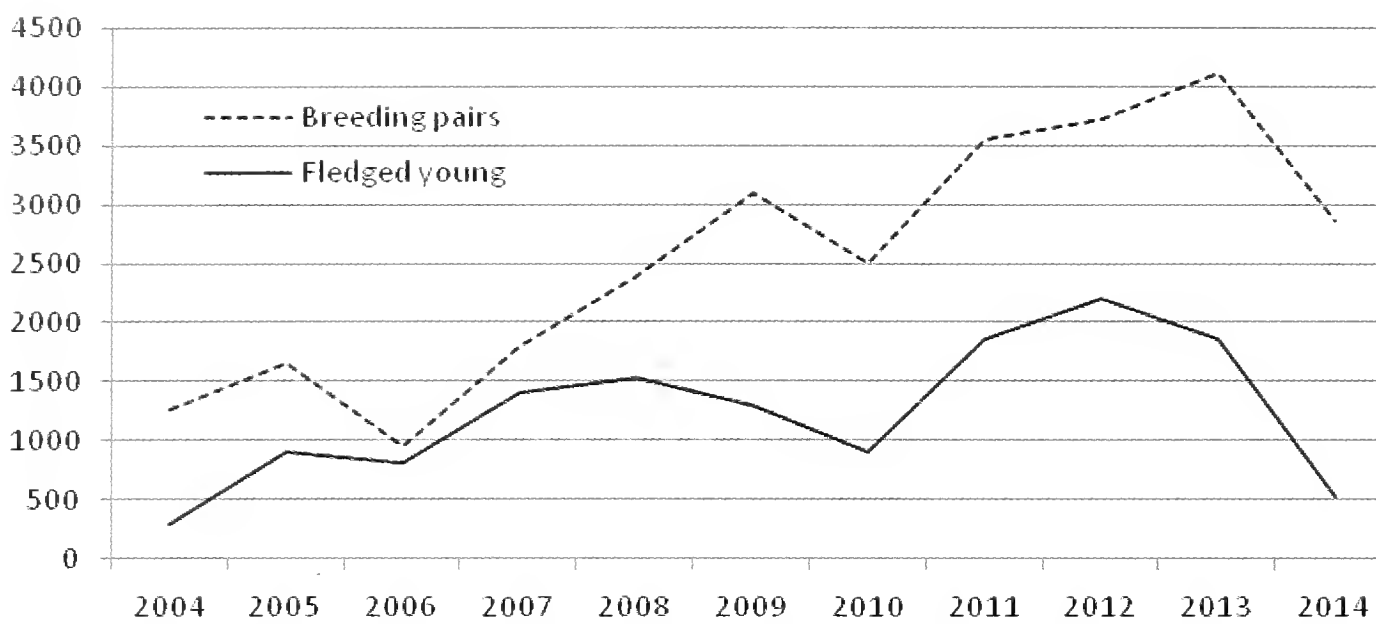


Figure 4.
Sandwich Tern
breeding pairs
and productivity
2004-2014.

a result of predation, disturbance, food availability and weather. All these factors were experienced during the 2014 season and certainly affected productivity. As to effects that can be linked to the tidal surge, the most obvious was witnessed on Far Point. Here Little Terns nested in a low area of the beach created as a result of the surge and subsequent changes to the beach profile between December and March. Tidal flooding in mid-June (Plate 3.1, p. 50) caused 60 out of 67 nests to be flooded.

In 2013, the Sandwich Tern *Sterna sandvicensis* colony moved from the usual nesting area on Far Point to the thin tip of Far Point as the usual area had become overgrown with Shrubby Sea-blite. However, shingle and sand deposition, the result of the tidal surge, buried much of this, making it once again suitable for nesting. Perhaps in response to this, in 2014 the colony returned to its usual location next to the nesting Black-headed Gulls *Chroicocephalus ridibundus*, the colony of which was unaffected.

The surge also created a shingle ridge to the north of the Shrubby Sea-blite area in which the gulls nest; this ridge conveniently gave the nesting terns a more commanding view, probably adding to their security. A total of 2,859 pairs bred in 2014 (Fig. 4).

Whilst Sandwich Tern nesting habitat may have been improved by the tidal surge, it

is worthy of note that this was not the case after the 1953 surge when just 51 pairs nested due to unsuitable nesting sites.

Passerine breeding populations on the Point did not appear to have been adversely affected by the tidal surge, which is unsurprising considering the breeding habitat for most species had not appreciably changed. Whilst Skylark *Alauda arvensis* numbers have shown a decline over the past ten years, they now appear to have stabilised (Fig. 5) with a very slight, but not significant, increase in singing males in 2014.

The number of Meadow Pipit *Anthus pratensis* breeding pairs is also relatively stable (Fig. 6) and the species had a successful 2014 breeding season: a number of pairs were double-brooded and ten monitored nests all fledged young.

Much of the habitat that is occupied by nesting Wrens *Troglodytes troglodytes*, Dunnocks *Prunella modularis*, Reed Buntings *Emberiza schoeniclus* and Linnets *Carduelis cannabina* was relatively unchanged by the tidal surge and the breeding populations of these species was in line with that of previous years.

Breeding pairs of Grey Partridges *Perdix perdix* have increased on Blakeney Point since they first appeared in 2008 (Fig. 7), rising from three to nine pairs. The tidal surge did not appear to affect numbers

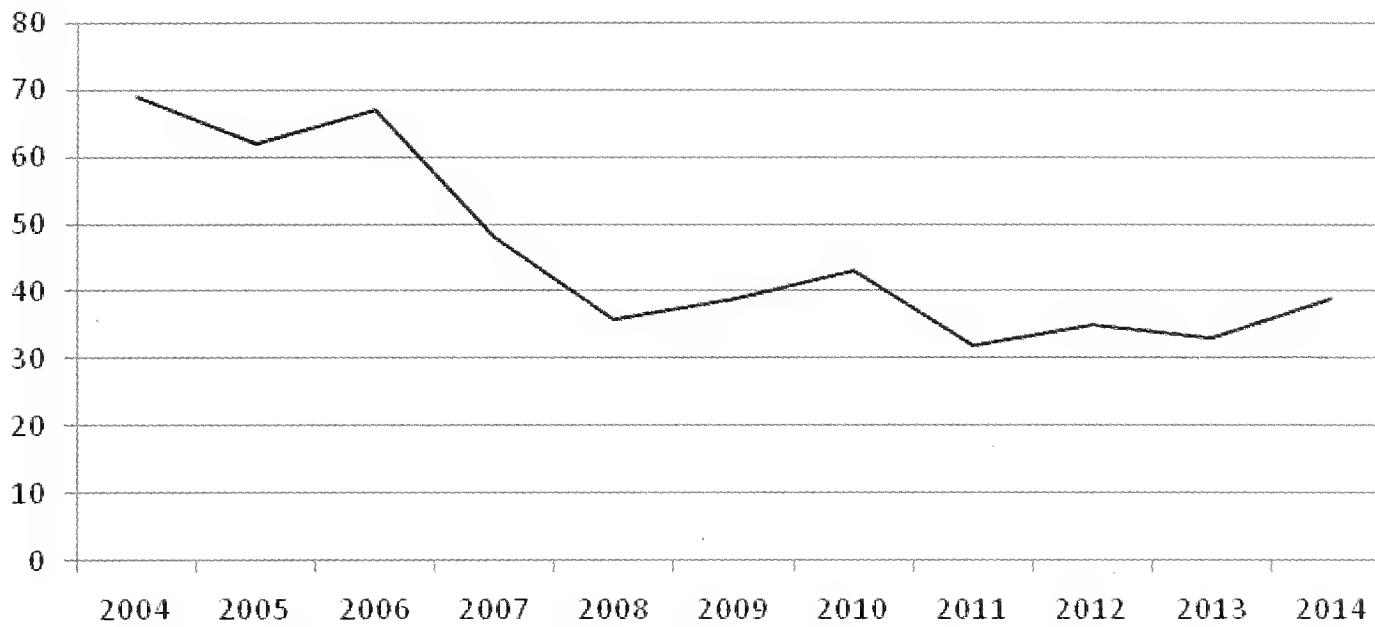


Figure 5. Skylark breeding pairs 2004-2014.

in 2014 when there was just a slight drop to seven pairs. However, there was a noticeable decrease in the number of fledged young; in winter 2012/13 coveys totalled over 40 birds, whereas post-surge, in autumn/winter 2014/15, they totalled just eight. This decrease in productivity may be linked to reduced availability of invertebrates, following the tidal surge, leading to starvation of young.

Wintering birds: Following the tidal surge it was nearly two months before any passerines were seen feeding on the Point as the weed seeds that collect on the sand and shingle, especially along the inner tide-line had been washed away. Typically in winter there would be small numbers of Linnets, Reed Buntings, Skylarks, Rock Pipits *Anthus petrosus*, Meadow Pipits, Linnets and Reed Buntings with, occasionally, a

flock of Snow Buntings *Plectrophenax nivalis* and rarely Shore Larks *Eremophila alpestris*. Even during February numbers remained much lower than in normal winters. However by winter 2014/2015 numbers of feeding passerines appeared to be back to normal.

Invertebrates

The only invertebrates that were monitored post-surge were butterflies, but casual information on moths was collected. It may be worthy of note that the two colonies of Saltmarsh Bee *Colletes halophilus* on the Point were unaffected, though the breeding site of one was inundated for probably two days.

Butterflies: The tidal surge appeared to have adversely impacted the breeding populations of two species of butterfly,

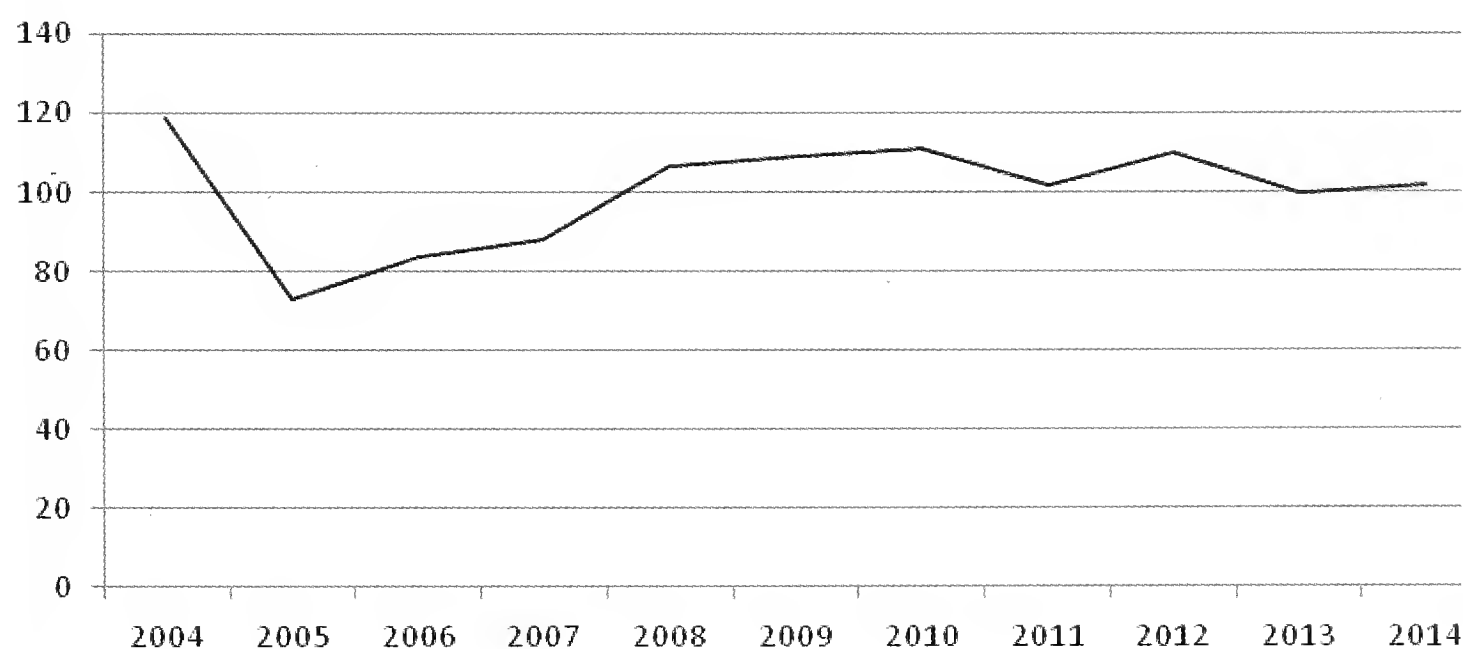


Figure 6. Meadow Pipit breeding pairs 2004-2014.

Plate 5



1. *Crimson Speckled*. Photo: James Lowen. See p. 84.



2. *Silvery Gem*. Photo: Richard Eagling. See p. 83.



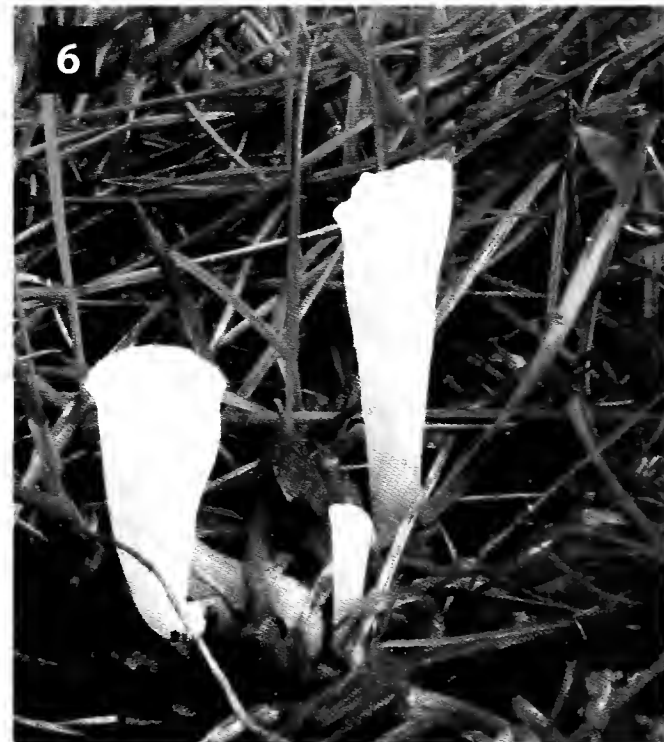
3. *Brachypalpoides lentus*. See p. 87.
Photo: Andy Gardiner.



4. *Agaricus bresadolanus*. Cley. See p. 100.

5. *Gloeophyllum abietinum*. Wittlingham. See p. 100.

6. *Yew Club Clavicornia taxophila*. Holt Hall. See p. 99.
Photos: Tony Leech.



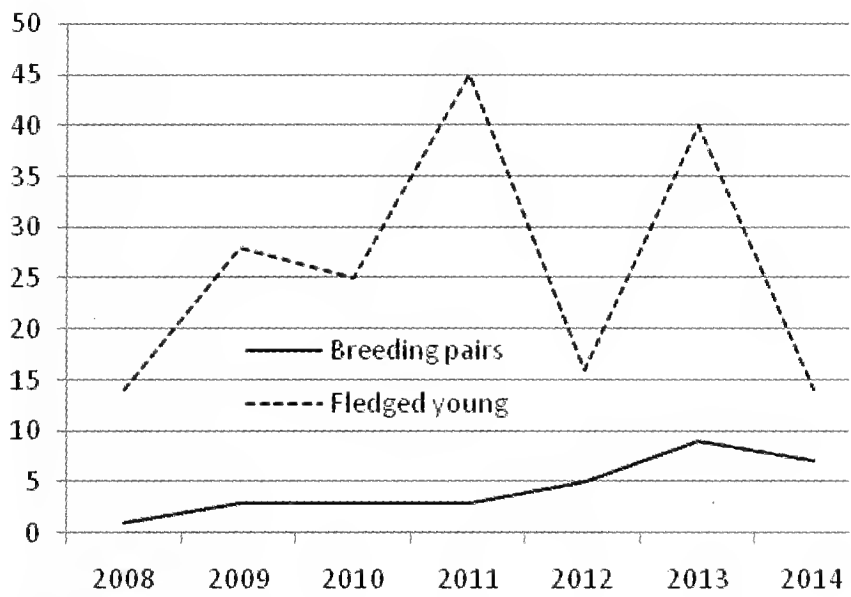


Figure 7. Grey Partridge breeding pairs and productivity 2008-2014.

namely Small Copper *Lycaena phlaeas* and Common Blue *Polyommatus icarus*. Fig. 8 shows the highest annual count of these and the two other commonest residents, Grayling *Thymallus thymallus* and Gatekeeper *Pyronia tithonus*, during a series of 6.5 km transects over the shingle ridge and dunes, undertaken by RFP throughout the spring and summer since 2002 (Nichols *et al.* 2013).

Leaving aside the counts in 2014, the highest counts correlate well with years with warm summers, notably 2003, 2006, 2013. A tidal surge in autumn 2007 probably prevented a recovery of numbers following the cold summer of 2007 as shingle was moved and deposited over many of the breeding areas of, notably, Small Copper and Common Blue.

This was the same scenario as that after the December 2013 surge with deep shingle

being deposited over the breeding areas of these two species, the numbers of which crashed by 90% and 70% respectively in 2014 from the 2013 population, despite 2014 being a warm summer.

The Small Copper and Common Blue have their main population on the vegetated areas of the shingle ridge. The food plants of their larvae were smothered by shingle as were nectar-producing flowers on which the adults feed. The populations of Grayling and Gatekeeper were much less reduced, probably reflecting the more dune-orientated distribution of Grayling and the higher areas with Brambles *Rubus fruticosus* in the case of the Gatekeeper.

Moths: Shingle moved by the tidal surge smothered, to a depth of about one metre, two ten-year old and well-established willow *Salix* (probably *S. caprea*) bushes growing on the shingle ridge near to the Long Hills (see Porter 2014). In August 2013 one of these bushes had at least five Eyed Hawk-moth *Smerinthus ocellatus* and one Elephant Hawk-moth *Deilephila elpenor* caterpillars feeding on the leaves. There was no sign of the bushes in 2014.

Numbers of White Satin moths *Leucoma salicis* which breed in the Plantation decreased from a peak of 100+ in July 2013 to just one in July 2014. Whether this can be attributed to the effects of the tidal surge would be speculation. However, Hornet Moths *Sesia apiformis*, which emerge from the base of the White Poplars in the

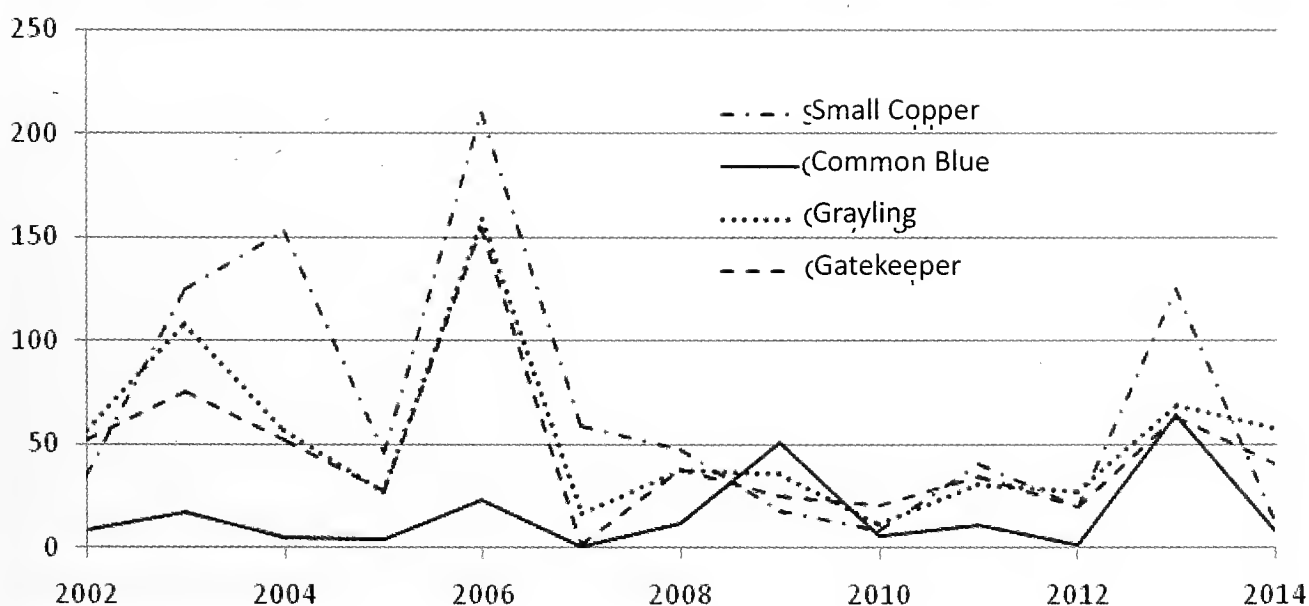


Figure 8. Highest annual count of four species of butterfly during 6.5 km transects on Blakeney Point, 2002-2014.

Plantation, all of which were flooded by the surge, appeared not to have been affected; two individuals were seen in June and July 2013, and four in June and July 2014.

Robinson Moth traps were operated on the Point throughout the season and produced the normal range and number of species: for example, nine Tawny Shears *Hadena perplexa* on 2 June 2013 and nine on 21 June 2014.

Plants

Following the tidal surge, the distribution and abundance of flowering plants was surveyed in summer 2014 and on the shingle ridge again in 2015 using the base-line data from 1999-2013 (Porter 2014) with the aim of recording notable changes. A total of 294 plant species or aggregates have been recorded on Blakeney Point since records were kept, of which c.200 can be described as comprising the main flora.

The 2014 and 2015 surveys, although not fully comprehensive, showed that the abundance and/or distribution of 40 species (i.e. 20% of the species that comprise the main flora) had changed adversely over that recorded during the plant atlas (Porter 2014). These are listed in the Appendix. Plants were affected by the tidal surge in two ways: smothering by shingle (noticeable examples being Sea Beet *Beta vulgaris maritima*, Shrubby Sea-blite, Sea Campion *Silene uniflora*, Curled Dock *Rumex crispus* ssp. *littoreus* and Common Bird's-foot Trefoil *Lotus corniculatus*) and inundation by salt water for 1-3 days (examples being the clovers *Trifolium* sp. and Hound's-tongue *Cynoglossum officinale*). By summer 2015 the abundance and distribution of many of the plants affected was returning to that typical of their pre-surge status, most notably Sea Campion and the clovers.

One species, the 'Red Listed' Prickly Saltwort *Salsola kali*, had spread and increased notably. Numbers of plants had increased in its core area of the sandy edges of Far and Middle Point and its

distribution had extended east, patchily, with some plants nearly reaching Cley Beach Car Park. This 'conservation success' was probably due to the greater extent of sandy areas and the easterly movement of seeds as a result of the surge. A study of the effects of the tidal surge on the flora of RSPB East Anglia coastal reserves also recorded a proliferation of Prickly Saltwort (James Cadbury *in litt.*).

It is possible that the tidal surge, through the deposition of sand and/or dispersal of seeds, also encouraged the spread of Sea Sandwort (see Plate 3.2, p. 50), Yellow Horned-poppy *Glaucium flavum* (see Plate 3.3 p. 50), Matted Sea-lavender *Limonium bellidifolium*, Rock Sea-lavender *L. binervosum*, Sea-heath *Frankenia laevis*, Sea Pea *Lathyrus japonica*, Sea Spurge *Euphorbia paralias*, Sticky Groundsel *Senecio viscosus* and Sea Couch *Elytrigia atherica*, all of which appeared to have spread in the two years since the pre-surge summer of 2013. It is interesting to note that James Cadbury (*in litt.*) thought that Matted Sea-lavender and Sea-heath may have benefitted from the tidal surge on coastal RSPB reserves he studied in 2014.

Twenty plant species that occur on Blakeney Point are of particular conservation importance as a result of (a) their Red List status, (b) Great Britain having >25% of the world population and (c) their National scarcity (Porter 2014). These are shown in Table 1, which also indicates the changes in their abundance and distribution noted in 2014, following the tidal surge.

Discussion/Summary

Because there is little documentation of the effects of tidal surges, we felt this summary of the biological situation in 2014 (and 2015), after the December 2013 surge would be helpful. At a simple level the surge had relatively little effect on Blakeney Point's wildlife. Certain habitats were affected, but not always adversely as in the case of the Sandwich Tern where changes to the

Table 1. Plants of special conservation concern on Blakeney Point with details of changes in status noted in 2014 & 2015 following the tidal surge of December 2013. Porter (2014) was used for baseline data.

Plant	Scientific name	Conservation status	Effect of surge
Frosted Orache	<i>Atriplex laciniata</i>	High % of world popn. in UK.	No obvious change in distribution or abundance.
Perennial Glasswort	<i>Sarcocornia perennis</i>	Nationally Scarce.	No obvious change in distribution or abundance.
One-flowered Glasswort	<i>Salicornia pusilla</i>	High % of world popn. in UK; Nationally Scarce.	Not studied in 2014/15.
Shrubby Sea-blite	<i>Suaeda vera</i>	Nationally Scarce.	c.75% growing on shingle ridge smothered by shingle.
Prickly Saltwort	<i>Salsola kali</i>	Red Listed: Vulnerable.	Increase in abundance and distribution.
Sea Mouse-ear	<i>Cerastium diffusum</i>	High % of world popn. in UK.	Abundance and distribution adversely affected.
Ray's Knotgrass	<i>Polygonum oxyspermum</i>	High % of world popn. in UK; Nationally Scarce.	Not observed in 2014 or 2015 – probably absent.
Lax-flowered Sea-lavender	<i>Limonium humile</i>	High % of world popn. in UK; Nationally Scarce.	Not observed in 2014 or 2015.
Matted Sea-lavender	<i>Limonium bellidifolium</i>	Nationally Rare.	Some evidence of an increase in distribution.
Rock Sea-lavender	<i>Limonium binervosum</i>	High % of world popn. in UK.	Some evidence of an increase in abundance and distribution.
Sea-heath	<i>Frankenia laevis</i>	High % of world popn. in UK; Nationally Scarce; Near Threatened	Some evidence of an increase in distribution.
Sea Pea	<i>Lathyrus japonica</i>	Nationally Scarce.	Some evidence of an increase in abundance and distribution.
Hound's-tongue	<i>Cynoglossum officinale</i>	Near Threatened.	Abundance and distribution adversely affected.
Smooth Cats-ear	<i>Hypochaeris glabra</i>	Red Listed: Vulnerable.	Abundance and distribution adversely affected.
Common Cudweed	<i>Filago vulgaris</i>	Near Threatened.	Abundance and distribution adversely affected.
Grey Hair-grass	<i>Corynephorus canescens</i>	Nationally Rare; Near Threatened.	No obvious change in distribution or abundance.
Heath Dog-violet	<i>Viola canina</i>	Near Threatened	No obvious change in distribution or abundance.
Eelgrass	<i>Zostera marina</i>	Near Threatened	Not studied in 2014/15.
Dwarf Eelgrass	<i>Zostera noltii</i>	Red Listed: Vulnerable; Nationally Scarce.	Not studied in 2014/15.
Curved Hard-grass	<i>Parapholis incurva</i>	Nationally Scarce.	Abundance and distribution adversely affected.

habitat are likely to be advantageous for future nesting. There was no effect on the breeding Grey Seals, that were pupping at the time of the surge, nor was there on any of the other mammals that occur on the Point, though the numbers of Brown Hares may have been lower in 2014.

Little Terns nested in an unsuitable area in 2014, which was almost certainly because of the surge's affect on the habitat profile and the productivity of Grey Partridges may have been lowered by the absence of invertebrates for the young. Two species of butterflies, Small Copper and Common

Blue, were seriously affected with the populations greatly reduced in the year post surge.

A number of plant species were smothered by shingle, or affected by salt water inundation. The signs, from 2015, are that the flora is quickly recovering as would be expected from a shingle and sand-based ecosystem that has to cope with the rigours of the North Sea.

Acknowledgements

We would like to thank Sarah Johnson, Graham Lubbock, Paul Nichols and Eddie Stubbings for help with bird and seal monitoring. Steve Hayman, Alan Dawson and Dick Newell helped in various ways and we are grateful to them. Victoria Egan gave us her full support. Andy Stoddart

read the entire paper and made a number of valuable comments and suggestions.

References

- NICHOLS, P., PORTER, R. & TEGALA, A. 2014. Butterflies and moths of Blakeney Point, Norfolk. *Transactions of the Norfolk & Norwich Naturalists' Society* 46(1): 90-91.
- PORTER, R. 2014. Natural evolution? The tidal surge in north Norfolk. *Brit. Birds* 107: 5 & 49.
- PORTER, R. 2014. The distribution and abundance of the plants of Blakeney Point, Norfolk. *Transactions of the Norfolk & Norwich Naturalists' Society* 46(1): 110-130.
- PORTER, R. 2014. The tidal surge in north Norfolk, December 2013. *Transactions of the Norfolk & Norwich Naturalists' Society* 46(1): 160-161.
- RF Porter. Kings Head Cottage, Cley next the Sea, Norfolk, NR25 7RX. RFPorter@talktalk.net
- AH Tegala, National Trust, Coastal Ranger Blakeney. Friary Farm, Blakeney, Norfolk, NR25 7NW. Ajay. Tegala@nationaltrust.org.uk

APPENDIX. Plants on Blakeney Point whose abundance and/or distribution in 2014 was considered to have been adversely affected as a result of the tidal surge of December 2013.

Likely cause: smothering by shingle

Sea Beet *Beta vulgaris maritima*
 Shrubby Sea-blite *Suaeda vera*
 Thyme-leaved Sandwort *Arenaria serpyllifolia*
 Lesser chickweed *Stellaria media*
 Sea Mouse-ear *Cerastium diffusum*
 Common Mouse-ear *Cerastium fontanum*
 Procumbent Pearlwort *Sagina procumbens*
 Sea Pearlwort *Sagina maritima*
 Sea Campion *Silene uniflora*
 Sheep's Sorrel *Rumex acetosella*
 Curled Dock *Rumex crispus* ssp. *littoreus*
 Thrift *Armeria maritima*
 Willow (probably *Salix cinerea*)
 Biting Stonecrop *Sedum acre*
 English Stonecrop *Sedum anglicum*
 Common Bird's-foot Trefoil *Lotus corniculatus*
 Lesser Trefoil *Trifolium dubium*

Great Willowherb *Epilobium hirsutum*
 Hoary Willowherb *Epilobium parviflorum*
 American Willowherb *Epilobium ciliatum*
 Rosebay Willowherb *Chamerion angustifolium*

Likely cause: saline unundation for 1-3 days

Bramble *Rubus fruticosus* agg.
 Knotted Clover *Trifolium striatum*
 Rough Clover *Trifolium scabrum*
 Bird's-foot Clover *Trifolium ornithopodioides*
 Hare's-foot Clover *Trifolium arvense*
 Dove's-foot Crane's-bill *Geranium molle*
 Bur Chervil *Anthriscus caucalis*
 Hound's-tongue *Cynoglossum officinale*
 Foxglove *Digitalis purpurea*
 Spear Thistle *Cirsium vulgare*

Weather Report 2014

Norman Brooks

Observations made with approved Meteorological Office instrumentation, and in accordance with standard Meteorological Office practice, at Old Costessey, Norfolk. Monthly summary figures are presented in Table 1.

Monthly accounts

January 2014 A month dominated by a seemingly endless procession of deep Atlantic depressions whose mild maritime air gave our region its mildest January since 2008. Winds were often strong but never reached gale-force inland. Thunder was heard on two days and a few random snowflakes were observed on the 27th. The county average of rainfall was 90.5 mm making it the wettest January since 1995.

Jan. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	0	0	4	2	3	10	6	0	6

February 2014 The most cyclonic month

in 142 years of records. Only two slight air frosts were recorded and there was a total absence of snow. It was the mildest February since 2002. Rainfall was generally excessive. The Aurora Borealis was widely observed on the evening of the 27th.

Feb. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	0	0	3	3	3	10	6	1	2

March 2014 The mildest March since 2002 and deficient in rainfall. With the county average only around 60% of normal, conditions were ideal for spring sowing. At Buxton there was no rain from the 3rd to the 17th.

On the 23rd, hailstones with a diameter in excess of 5 cm fell in some areas. No snowfall was reported. With mean soil temperature of 5.3°C at a depth of 10 cm, the threshold for plant growth was just reached.

Mar. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	2	3	3	3	3	8	5	1	3

Table 1 Monthly summaries for 2014

Month	Total rainfall (mm)	Percentage of mean rainfall	Days air frost	Days ground frost	Monthly mean temperature (°C)	Deviation from mean (°C)
January	82.7	143%	7	14	5.7	+1.7
February	77.8	181%	2	10	6.8	+3.0
March	22.8	49%	9	17	8.3	+2.4
April	20.4	42%	1	7	11.1	+3.5
May	131.8	290%	1	2	13.3	+2.0
June	56.5	105%	0	0	15.3	+1.0
July	61.4	109%	0	0	18.7	+2.2
August	87.6	171%	0	0	16.3	-0.1
September	18.2	33%	0	0	15.5	+1.2
October	88.7	153%	0	1	13.3	+2.3
November	101.7	167%	2	5	8.7	+2.0
December	60.0	99%	11	12	5.3	+0.5

April 2014 The month was mild with an average temperature more appropriate for May. It was dry throughout the county with a rainfall deficit of around 50%. Many localities noted only a single, slight air frost, allowing tender blossoms to escape any significant frost damage. The maximum of 20.5°C on the 1st was noteworthy. No snowfall was reported.

April wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	2	4	2	6	2	8	2	3	1

May 2014 Fears of a return to drought conditions were eliminated by excessive rains throughout the county, the average of 112.3 mm being about 250% of normal. In the Norwich area it was the second wettest May since at least 1836. Most of the excess accrued during a protracted downpour that began overnight on the 26th, continued throughout the 27th, and finally ceased early on the 28th after yielding totals around 50-60 mm with some consequent flooding. Thunder was heard on four days.

May wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	2	2	6	0	9	2	4	2	4

June 2014 A very average summer month whose maximum temperature of 25.4°C on the 28th was very modest. Thunder was heard on five days with a storm on the 27th producing hail large enough to shred vegetation at Lingwood.

June wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	5	0	0	2	3	6	4	5	5

July 2014 Very warm, the month's mean temperature of 18.7°C being over two degrees above average. The maximum of 28.1°C on the 18th was the highest of the year. Thunder was heard on four days with a storm on the 20th depositing 48.5 mm at Norwich Airport, 42.9 mm at North Thoripe and only 6.9 mm at Old Costessey.

July wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	0	3	1	3	0	10	5	7	2

August 2014 The only month in 2014 with a mean temperature below average, due

mainly to the period 17th to 31st experiencing conditions more akin to mid-autumn than late summer. Thunderstorms on four days caused most area of the county to record an excess of rainfall.

Aug. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	0	0	3	3	1	9	10	3	2

September 2014 Dominated by high pressure, the month was an extension of summer with a preponderance of fine, sunny, but often hazy, days. It was very dry throughout the county with the exception of East Harling which received 43.9 mm during a very localised thunderstorm on the 19th.

Sept. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	2	2	3	5	3	3	4	1	7

October 2014 The warmest locally since 2006, with a freak late-season heatwave causing the final day to attain a maximum of 21.1°C. No air frost was recorded, and only a single ground frost. There was a spectacular thunderstorm on the 11th which provided a magnificent display of vivid lightning and an exceptionally heavy fall of hail in the Longwater area of Costessey.

On the same day a funnel cloud was observed over Norwich Airport.

Oct. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	0	1	0	2	5	16	1	1	5

November 2014 Mild, with an unusually high maximum of 17.9°C on the 1st.

There were only two slight air frosts and there was no snowfall. Rain fell on 18 days with south Norfolk being particularly wet, but it was relatively dry in the north of the county.

Nov. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	1	0	4	6	2	3	5	0	9

December 2014 Mainly fairly mild, but colder conditions at the end of the month caused the average temperature to be only marginally above normal. The month's lowest temperature of -1.9°C was

unusually modest. The month was virtually snowless.

Dec. wind	N	NE	E	SE	S	SW	W	NW	Calm
Days	1	1	0	1	1	11	6	6	4

Annual summary 2014

Total rainfall	809.6mm
	125% of average
Wettest day	27 May, 39.1 mm
Days with rain recorded	185
Days with sleet or snow	1
Days with snow lying	0
Highest maximum temperature	28.1°C
	18 Jul
Lowest maximum temperature	3.5°C
	26 Dec
Highest minimum temperature	17.9°C
	19 Jul
Lowest minimum temperature	-3.6°C
	12 Jan
Lowest grass min. temperature	-6.5°C
	24 Mar
Air frosts	33
Ground frosts	68
Days with hail	7
Days with thunder	23
Days with gales	0
Longest period with no measurable rain	
	12 days (2 nd - 13 th Sep inclusive)
Mean cloud cover at 09.00 hrs	63%
Wind direction at 09.00 hrs (days):	
North	15
North-east	16
East	29
South-east	36
South	35
South-west	96
West	58
North-west	30
Calm	50
Annual mean maximum temp.	15.6°C
Annual mean minimum temp.	7.5°C
Annual mean temperature	11.5°C
	[Warmest year on record]

N. Brooks *Fellow Royal Meteorological Society* 1 The Croft, Old Costessey, Norwich NR8 5DT.

Dragonflies

Pam Taylor

The highlight of 2014 must be the number of migrant dragonflies that were reported. These included a wandering **Black Darter** *Sympetrum danae* found by Carl Chapman at Hickling Broad NNR in east Norfolk on 17 June. Three days later four individuals were reported from the same site by Stephen McWilliam. Generally speaking though, recording coverage continues to be a problem in Norfolk, with many nature reserves and individuals failing to submit records. This has resulted in only two reports for **Small Red Damselfly** *Ceriagrion tenellum* from its Scarning site in 2014 and no reports at all for **Common Hawker** *Aeshna juncea*.

Willow Emerald Damselfly *Chalcolestes viridis*. 2014 was the first really successful year in the county with reports coming from many new sites. The colonies at Cringleford and Strumpshaw Fen continued to thrive, with at least 62 pairs counted at Cringleford on 2 September. Evidence indicates that the species is also now established at Alderfen Broad, Burgh Common and Wheatfen. Beyond this there were reports from Knettishall Heath and Rockland St. Peter in west Norfolk, Regrave and Lopham Fen, Earsham and Dunburgh in south Norfolk and Upton Marshes, Filby Broad, Ormesby Little Broad and Hoveton Hall Gardens in the east. There were several sightings at Thorpe Marshes and ovipositing scars have been found there subsequently. Further ovipositing scars were found by Phil Heath at How Hill, East Ruston and Sparham Pools near Lyng. Further afield four adults were seen near Cow Tower in Norwich on 26 August and a single was found at Salthouse on 1 October.

This species could be seen anywhere in Norfolk now, so all emerald damselflies need careful identification before they are recorded.

Southern Emerald Damselfly *Lestes barbarus*. Less evident in 2014 than it had been the previous year. Sightings of single individuals were made at Winterton Dunes on both 2 August and 7 August, with the latter reported as a sub-adult by one observer. There were then no further reports until 3 September when David Hewitt found two females.

Scarce Emerald Damselfly *Lestes dryas*. Known from a small number of strongholds in the Brecks. Away from this area the newly found colony at Burnham Overy Marsh in north Norfolk produced conclusive proof of breeding when Andrew Bloomfield found an emergent individual as early as 26 May. It was a further month before any other reports came in, but then two more potential new colonies were discovered. The first was found by Jon Mee at Hempton Common in late June and the other at Briston by Bernard Dawson in mid-July in a new one kilometer square (TG 0531). Pairs were seen at both sites and ovipositing witnessed at the first, where at least six individuals were present by late July. Mark Clements reported a single sighting from Beeston Common on 14 August.

Scarce Blue-tailed Damselfly *Ischnura pumilio*. Recorded from private marshes at Hempstead (near Sea Palling) for the third year in a row. The first report on 23 May was of a single male and by 31 May there were three males present. This was reduced to two males the following day, but then sightings continued until 4

September when a single male was still present.

Norfolk Hawker *Aeshna isosceles*.

Another successful season at all its main sites in the Broads. Away from these Will Stewart reported singles from Mousehold Heath on 20 May, 30 May and 2 June. Andy Musgove discovered another wanderer on 1 June at Brooke Wood (TM 2798) and Mark Crossfield found one at Stanley Carrs (TM 4392) on the same day. At least five were present together at Thompson Water in the Brecks on 11 and 12 June. After the first sightings there in 2013, this is suggestive of a small colony establishing itself at the site.

Lesser Emperor *Anax parthenope*. After a seven-year absence from the county, this species was once again widely reported between mid-June and late July. Moss Taylor saw the first one at Felbrigg Lake on 12 June, while Ken Saul reported three from Filby Broad on the same day. Another was recorded at Horsey Mere by Tim Hodge and three were reported by Phil Heath from Ormesby Broad; again on 12 June. The following day a pair was observed ovipositing at Filby Broad and sightings there continued until at least 21 June. On 13 June David Bryant found a single at Gun Hill near Burnham Overy Staithe on the north coast and there were several reports of another individual from Hickling Broad between 21 June and 9 July. The final report of the season, a single adult, came on 31 July from Phil Heath at East Ruston, where two males had been seen a week before.

Downy Emerald *Cordulia aenea*. One well-established site in Norfolk on a private fishing lake near North Walsham. Away from this lake there are occasional sightings from other waterbodies in the area and 2014 was no exception. Dave Weaver found two males at Scottow Pond on 8 June and five days later Phil Heath found a single male at East Ruston.

Keeled Skimmer *Orthetrum coerulescens*.

Continues to be reported from established sites at Holt Lowes, Buxton Heath, Dersingham Bog, Roydon Common, Grimston Warren and Beeston Common. Elsewhere a single was seen by Ashley Saunders at Kelling Heath on 12 June.

Red-veined Darter *Sympetrum fonscolombii*.

Reported from no fewer than six sites in 2014, following its apparent absence from the county the previous year. A male was seen at Felbrigg Lake by Simon Chidwick on 25 May and this was followed by a female seen at Beeston Common by Francis Farrow on 8 June. Between 11 June and 7 August up to two males were present at Winterton Dunes. At Kelling Water Meadows the first individuals were seen by Miles Gough on 13 June when a pair and four other males were present. Eight adults were observed at the site a week later and the last single adult there was reported on 21 July. Two adults were seen at Hempstead Marshes on 21 June, where other single sightings were made between 8 July and 20 July. A single male was seen flying north through the dunes at North Denes, Great Yarmouth by Ken Saul on 7 June, indicative of recent arrival from the continent.

Dr P. Taylor. Decoy Farm, Decoy Road, Potter Heigham, Norfolk NR29 5LX

pamtaylor@british-dragonflies.org.uk

Orthoptera

David Richmond

The early months of 2013 were exceptionally cold, resulting in a delayed start to the season. The author did not see over-wintering **Slender Groundhoppers** *Tetrix subulata* until 21 April (compared with more typical dates from mid-March to mid-April), with **Common Groundhoppers** *T. undulata* not seen until 25 April (compared with March dates in good years). **Dark Bush-cricket** *Pholidoptera griseoptera* nymphs were not seen until 20 May (usually late April/early May) and **Speckled Bush-cricket** *Leptophyes punctatissima* nymphs were not seen until June, compared with the more usual May emergence. But as the weather warmed into summer it became clear that entomologists were going to enjoy one of their best seasons for a number of years. The first **Common Green Grasshoppers** *Omocestus viridulus* were heard on 11 June with **Mottled Grasshopper** *Myrmeleotettix maculatus* first heard stridulating on 16 June (both quite early dates).

2014 had a warmer start to the year giving more typical emergence dates with **Slender Groundhopper** seen on 23 March and **Common Groundhopper** on 3 April. Early summer temperatures were similar to 2013 but August was colder.

Highlights from two very good summers are given below. Unattributed records are those of the author.

Oak Bush-cricket *Meconema thalassinum*.

A female attracted to a sitting room light at Hunstanton (TF 64) represents a new 10 km square in the north-west of the county (E. Hammler, 2013).

Great Green Bush-cricket *Tettigonia viridissima*. Confirmed as still present in 2013 at the known site on waste ground

near Euston Bridge, Thetford (strictly Brettenham), but more exciting was the discovery by Andy Musgrove of three stridulating males on 6 October that year at Sea Palling, on either side of the track behind the dunes near the charity car park (TG4327). The author paid two late afternoon visits to the area in 2014 but was unable to secure any further records although the habitat seemed suitable. Further research is required to determine whether Andy's observations represent a newly established colony in the area or warm weather dispersal in a particularly hot summer, although such movement would be unusual as this species is rather sedentary.

Dark Bush-cricket *P. griseoptera*.

Recorded by Alec Bull in 2013 in scrub along the Buckenham Tofts lakeside in the Stanford Training Area, representing a new 10 km square for this species (TL89). In the west of the county in 2014 Ian Pritchard provided confirmatory sound recordings for a new 10 km square record at Gaywood Valley, King's Lynn (TF6421). There is potentially still a lot to learn about the distribution of this species in the King's Lynn area. Whilst active by day, it is often more obvious after dark when its brisk chirping can be heard in areas of bramble scrub or other tangled vegetation.

Bog Bush-cricket *Metrioptera brachyptera*.

Abundant in both wet and dry areas of Buxton Heath in both years and still present in the heath restoration area to the south of Cawston Heath. At Swannington (TG149180) very few were heard in 2014 because of scrub encroachment and Long-winged Conehead is becoming the dominant species here.

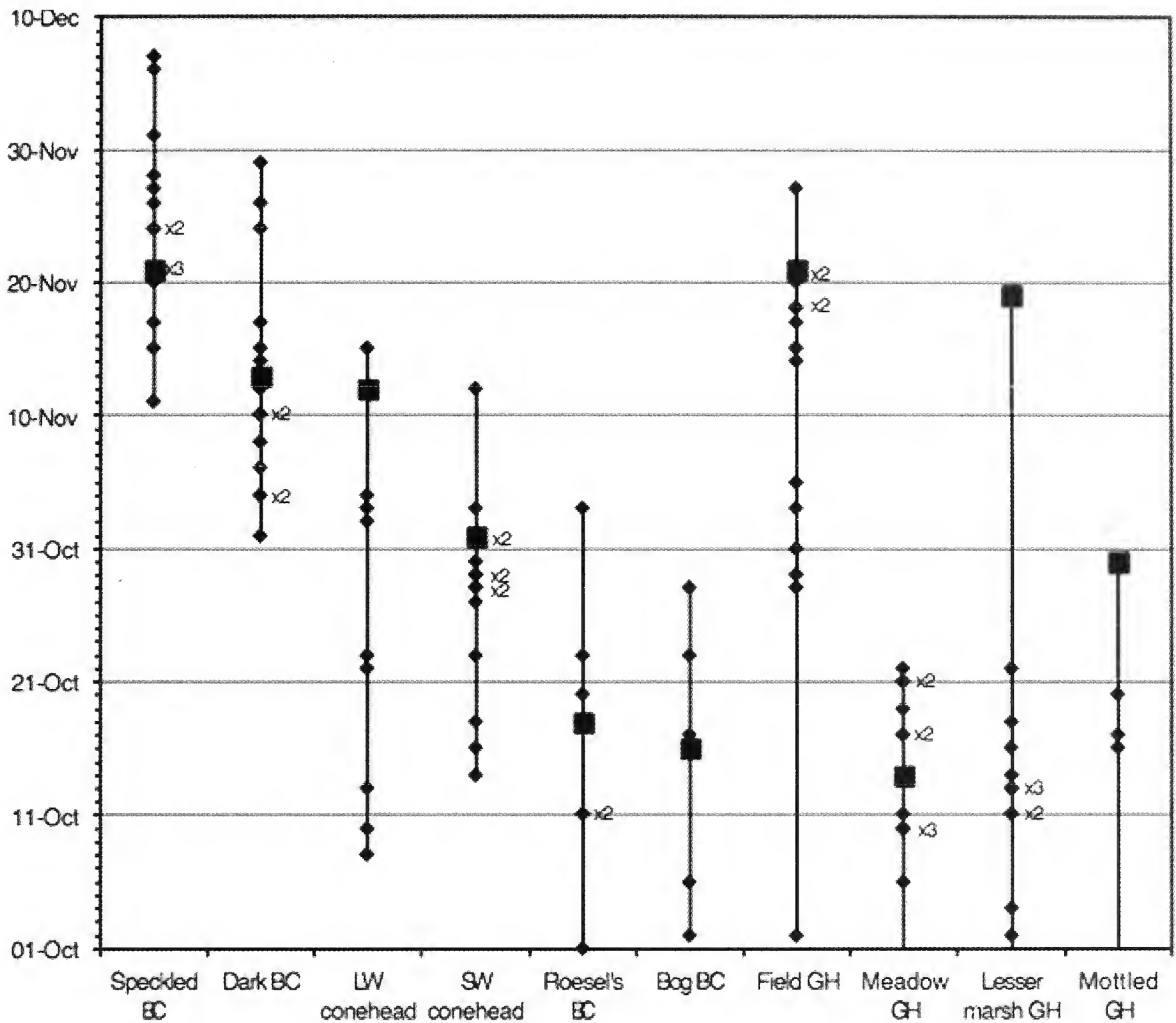


Figure 1. Latest dates each year for Norfolk species which regularly survive into October or November. Vertical bars show the range of dates recorded, with the individual dates represented by small diamonds. Large squares show the dates for the highlighted year (2014). Most data relate to the author's own observations in central and north Norfolk. The Speckled and Dark Bush-cricket series relate to a regularly walked transect along the Marriott's Way at Reepham.

Roesel's Bush-cricket *M. roeselii*. The most frequently reported orthopteran in 2014 with 56 records including 17 new tetrads. It has now been recorded from every 10 km square in the county apart from a few part squares around the county boundary. First recorded in Norfolk in 1997.

Long-winged Conehead *Conocephalus discolor*. Recorded from a cluster of four tetrads around Denver and Fordham, one in each of the four separate 10 km squares that meet there. Two of these 10 km squares were new (TF50 and TL69),

so like Roesel's Bush-cricket this species has now been found in all of the 10 km squares in the county except for a few part squares on the county border. First recorded in Norfolk in 2000.

Short-winged Conehead *C. dorsalis*. There were 2013 records from ditches alongside the disused railway near County School, North Elmham and from Guist Common, reflecting the continuing expansion of this species at inland sites. Both areas had been subject to previous, unsuccessful, targeted visits following the discovery

of coneheads at Sennowe Park in the late 20th century.

Stripe-winged Grasshopper *Stenobothrus lineatus* Discovered among short turf and heather at Bawdeswell Heath in 2013 and confirmed as still present in 2014. It was found on both sides of the 10 km square grid line which splits the site, the northern square (TG02) being a new 10 km square record. It was also confirmed to be still present at Alderford Common in 2013 where it was first recorded in 2011. In 2014 Andy Bloomfield checked out a number of old chalk pits and dry grassland sites in the north-west of the county and found this species at four new sites: Roydon Common (TF688219), Helhoughton (TF852274), Sculthorpe (TF852321) and Wells (TF9242). The last site was in an old chalk pit near the terminus of the Wells-Walsingham Light Railway and was a new 10 km square record. More surprisingly, it was also discovered in another new 10 km square at Sheringham Park (TG138418) during the Society's orthoptera workshop in August 2014.

Mottled Grasshopper *M. maculatus*. Confirmed as still present in 2013 on the small heathland sites at Hoe Rough, Bawdeswell Heath and Bryants Heath (Felmingham). Other small sites should be monitored regularly.

Late dates

The author has been recording the last dates for orthoptera throughout the 21st century, with particular emphasis on Field Grasshopper *Chorthippus brunneus* and Speckled and Dark Bush-crickets, walking daily transects at Reepham throughout November, often after dark with a bat detector. Figure 1 shows the results for those species that are common enough to be monitored reliably.

In 2013, Field Grasshopper was the only species of grasshopper to survive into November, being found until the 17th on

south-facing roadside banks at Reepham. An unprecedented five species of bush-crickets survived into November that year: Short-winged Conehead until 1 November at Buxton Heath; Long-winged Conehead and Roesel's Bush-cricket until 3 November in sheltered ditches at Salle. The last surviving Dark Bush-crickets were regularly monitored until 26 November when two females were seen sunning themselves on brambles along the south-facing disused station platform at Reepham, only to be eclipsed by a Speckled Bush-cricket heard with a bat detector on 27 November on the Marriott's Way behind the author's home.

In 2014 Andy Bloomfield had Mottled Grasshopper at Burnham Overy dunes on 30 October, while the author had his latest ever Lesser Marsh Grasshopper *Chorthippus albomarginatus* on a south-facing bank at Reepham on 19 November, followed by his second latest Field Grasshopper at the same site on 21 November. Four species of bush-cricket survived into November: Short-winged Conehead at Horsey on 1 November; Long-winged Conehead until 12 November at Reepham; Dark Bush-cricket until 13 November at Reepham Moor, and Speckled Bush-cricket until 21 November on the Marriott's Way, Reepham.

D.I. Richmond, 42 Richmond Rise, Reepham,
Norfolk, NR10 4LS

Bumblebees

David Richmond

Over 700 species records were received in 2013-14, relating to over 140 tetrads. Records of particular note are given below (ordered alphabetically by English name). Recorders' initials are given in brackets, with a key at the end of the report. Up-to-date distribution maps for all Norfolk bumblebees can be viewed on the NNNS website, under 'species guides'.

Barbut's Cuckoo Bumblebee *Bombus barbutellus* (cuckoo of *B. hortorum*). Despite the ubiquity of its host, there are few Norfolk records for this species. It was reported from Little Melton in 2013 (PK); and from six locations in 2014: Bayfield and Upton Fen (NO), Filby (KS), and Broadland Business Park, Caister High Ash Farm and Strumpshaw Fen (TS).

Buff-tailed Bumblebee *B. terrestris*. In the south of England, this species is being reported increasingly frequently in the winter months. Ken Saul saw active queens at Filby on 23 December 2012, 19 November 2013 and 7 January 2014. Nick Owens reported late workers nectaring on Mahonia at Weybourne on 18 November 2014 and on 2 December 2014 and on heathers on 21 December 2014. Tim Strudwick reported a queen at Brundall on 13 December 2014.

Field Cuckoo Bumblebee *B. campestris* (cuckoo of *B. pascuorum*). Again a common host species, but with only 24 records for the 21st century in the county database. It was reported from Little Melton (PK), Foulsham (RY), Foxley Wood (DR), Swanton Novers Great Wood (NO) and Blakeney Point (NO) in 2013; from Sheringham (GH), Caister (TS), Strumpshaw Fen (TS) and Acle rectory (MG) in 2014.

Four-coloured Cuckoo Bumblebee *B. sylvestris* (cuckoo of *B. pratorum*). This species is also said to parasitise *B. jonellus*, which was perhaps the case with the individuals identified by Nick Owens along Blakeney Point shingle ridge in 2013. It is one of the more easily identified cuckoo bees with over 100 database records in total, widely distributed across the county.

Gypsy Cuckoo Bumblebee *B. bohemicus* (cuckoo of *B. lucorum*). Sparsely distributed in Norfolk. There were 2013 records from Swanton Novers (NO), Buxton Great Wood (DR) and Beeston Regis Common (FF); and 2014 records from Osier Marsh, King's Lynn (TF647216, IP), Brundall (TS) and Upton Dyke (NO).

Heath Bumblebee *B. jonellus*. Recorded in June/July 2013 on Biting Stonecrop *Sedum acre* along the shingle ridge of Blakeney Point, near Halfway House (NO, DR). In 2014, however, following the December 2013 sea surge, this vegetation had been covered by shingle, eliminating foraging opportunities for this and the following species, neither of which was seen here in 2014 (DR). *B. jonellus* was, however, recorded from a water trap among heather and lichens at Winterton Dunes in 2014 (AI), a first record for that site.

Hill Cuckoo Bumblebee *B. rupestris* (cuckoo of *B. lapidarius*). This species has been reported increasingly often since 2007. There were records in 2013 from Middleton (PL – photo confirmed by NO), Hingham (NO), East Tuddenham (AB) and Blakeney Point (NO). In 2014 it was reported from Bayfield (NO), two tetrads at Kelling Heath (FF, MT) and at Beeston Regis Common (FF).

Large Garden Bumblebee *B. ruderatus*. This species is so similar to the ubiquitous *B. hortorum* that it is difficult to be confident of records submitted without supporting evidence. The only accepted records are from Nick Owens who collected three males at Welney Washes (TL543408, 31 August 2013) and captured a male in a water trap at Overstrand (TG251408, 4 August 2014). One of the Welney males was a black form with a dark brown tail.

Moss Carder Bumblebee *B. muscorum*. This species has been seen with increasing frequency along the North Norfolk coast in recent years. More unusually, Paul Cobb recorded it south of its usual range on two successive days at Heacham in September 2012 during strong north winds. In 2013 it was recorded along the shingle ridge of Blakeney Point, on stonecrop and sea-lavender *Limonium* sp, and at the Point itself on Sea Bindweed *Calystegia soldanella* (NO, DR). The only record in 2014 was a male at Beeston Regis Common (NO).

Red-shanked Carder Bumblebee *B. ruderarius*. This red-tailed bumblebee is similar to the much larger *B. lapidarius*, but may be distinguished by the red hairs of the pollen baskets in queens and workers. (*B. lapidarius* queens and workers have black hair; males of both species have red hairs on their legs so cannot be separated by this character.) Formerly common in south Norfolk, it is now only rarely encountered. The only records in the period were from the Gaywood Valley, King's Lynn (TF6420, IP, 5 May 2013), and Thorpe St Andrew's Business Park (TG280089, TS, 18 May 2014 and nearby on two other dates). The latter are particularly interesting because this was the site where the author recorded this species between 2000 and 2005; it was feared it might have been lost in subsequent years as the remaining areas of waste ground within the business park were developed.

Tree Bumblebee *B. hypnorum*. First recorded in Norfolk in 2008 and now widely distributed across the county with many references to nests in bird boxes. There were 42 records in 2013 and 33 in 2014.

Recording

I would like to thank everyone who submitted records for these two years, and particularly the following who secured the more interesting records featured in this report.

AB: A. Bull; FF: F. Farrow; GH: G. Hibberd; AI: A. Irwin; PK: P. Kitchener; PL: P. Lorber; NO: N. Owens; IP: I. Pritchard; DR: D. Richmond; KS: K. Saul; TS: T. Strudwick; MT: M. Taylor; RY: R. Yaxley.

D.I. Richmond 42 Richmond Rise, Reepham, Norfolk, NR10 4LS.

Solitary bees and aculeate wasps

Tim Strudwick

This report highlights some significant records of solitary bees and aculeate wasps from the years 2012-2014, and provides an update to the county lists of these insects that were published in *Transactions* 44 and 45 (Strudwick 2012, 2013). These records include a remarkable ten new additions to the county list and the rediscovery after many decades of several other species. Balancing these gains, two species have been deleted from the county list as a result of a review of past records. Four of the new species are of Dryinid and Bethyloid wasps, families that have been largely ignored by Norfolk's hymenopterists, including myself. These very small wasps tend to lurk in thick vegetation and litter and are not often found by traditional netting techniques or water traps. While these new discoveries can be explained by the recent increase in recording effort across the county, others are likely to reflect real changes in population and range.

Behind the well-publicised decline of wild bees is a much more complex picture of shifting populations and ranges among bee and wasp species. A general decline has taken place since the 19th century, with the most rapid phase of species extinctions linked to agricultural changes in the 1920s and 1930s (Ollerton *et al.* 2014). For some species this decline probably continues today, but for others there is evidence of a modest recovery in the past decade or two. Then there are a number of bee and wasp species with a southerly distribution, including some recent arrivals to the UK, that have extended their ranges northwards. It seems likely that, for most species, range expansions are driven by a trend towards warmer, drier springs and summers. However, there is evidence that,

for a few species at least, the restoration of semi-natural habitats, creation of new habitats through mineral extraction and the provision of nectar and pollen in the farmed countryside through agri-environment schemes are having a positive effect. Populations also change in response to the variation in weather between years, and many species will be still recovering from the cool, wet summer of 2012 and the very cold spring of 2013. It is the frequent surprises that come from this continuous flux of populations that makes recording bees and wasps exciting.

I am very grateful to the many recorders who have taken the trouble to send me their records. Other sources of records include the BWARS national recording scheme for which I am indebted to Mike Edwards, unpublished survey reports, and from trawling various web forums and photo-sharing sites. The records demonstrate the value of a diverse range of recording techniques from traditional hand-netting, various forms of trapping (water, pitfall and malaise) and, increasingly, digital photography.

Species are presented by family and then alphabetically within each family. Nomenclature and ordering of families follow Bees, Wasps & Ants Recording Society (2015). Conservation statuses, where given, are as listed in Falk (1991). These are now very out-of-date but remain useful in the absence of a more up-to-date comprehensive list.

Apidae (solitary bees)

Andrena alfkenella RDB3

Up to 2008 this very small bee was on the county list on the basis of a 1986 record from Foulden Common. Between 2009

and 2011 new records came from five west Norfolk sites. Nick Owens has now found *A. alfkenella* at two new sites: Abbey Farm, Flitcham, with 5 females at TF 743275 on 14 August 2013 (and on five subsequent dates) and three females at West Dereham TL 665997 on 31 August 2014. An additional old record near Holt (TG 074365) comes from the redetermination of a specimen originally identified as *A. falsifica* (BWARS data, see below). All Norfolk sites are on calcareous soils, which is typical of the species.

Andrena angustior

This small mining bee was recorded at Mousehold Heath in 1873 by John Bridgman but not subsequently until Nick Owens found several at Kelling Heath TG 097416 on 23 May 2012 and 13 June 2012. Nationally, *A. angustior* is widespread but rather local and it seems likely that it has been overlooked for 140 years.

Andrena argentata Na

When compiling the 2012 list of Norfolk's bees I overlooked the only modern record of this species. The record, of a male from Roydon Common on 22 July 1997 by Michael Archer, had been published in *Transactions* (Archer 2004). The only previous record was from E. A. Atmore who reported 'large colonies in a few restricted spots' near King's Lynn in 1910. It is quite possible that both records were from the same site.

Andrena falsifica Na [Deleted from the County List]

A southern species found on heathland edge. As discussed above under *A. alfkenella*, the two Norfolk records of *A. falsifica* from Holt and Foulden Common are now considered to have been misidentifications of that species.

Andrena fucata

With only three records between 1900 and 2000, this bee is either rare in Norfolk or very hard to find. Either way, Nick

Owens has done very well to find *A. fucata* at three new sites in the last three years: Beeston Common TG 165423 on 24 May 2012, Swanton Novers Great Wood on 14 June 2012 (TG 011317) and 6 May 2014 (TG0135307), and Weybourne TG 106422 on 15 July 2013.

Andrena minutuloides Na

This very small bee is very similar to the common *A. minutula* and was recorded in the late 19th century near Norwich. There are a number of records from the Suffolk Brecks but the only definite modern Norfolk record, which has recently come to light, is from STANTA TL 853974 on 21 August 1985 (BWARS data).

Andrena nigriceps Nb

Nick Owens recorded this scarce late summer bee at Weybourne Camp TG 103437 on 12 July, 26 July and 1 August 2013. These are the 2nd to 4th post-2000 records.

Andrena trimmerana Nb [New to Norfolk]

This double-brooded species is one of very few large *Andrena* species with some red on the abdomen and is largely confined to SE and SW England and south Wales. There are old Norfolk records but surviving specimens show these to be *A. carantonica*, with which this species was lumped until the 1930s. I netted a female on Fennel *Foeniculum vulgare* in my Brundall garden TG 323083 on 17 August 2013 and another 400 m away (TG 327081) on Bramble *Rubus fruticosus* the next day. This bee may be a new arrival in Norfolk and as a generalist it seems likely it will be found more widely in the future.

Colletes hederæ [New to Norfolk]

The 'Ivy Bee' was first recognised as a species as recently as 1993. Following a dramatic expansion of its range on the continent it was first recorded in the UK in Dorset in 2001. Since then it has been steadily spreading northwards from the

south coast and its arrival in Norfolk was expected. The first Norfolk record was reported to the BWARS "hotline" from Hunstanton in October 2013. Then on 24 September 2014 Tom Ings found *C. hederæ* nesting at Morston and a female on ivy at Sheringham Common TG 163423. Alerted to these records, Francis Farrow found two females at Sheringham Common on 9 October 2014 and Nick Owens found four females on ivy at Weybourne TG 111429 on 14 October 2014. This bee is active in early autumn when most solitary bees are not, and is a large, distinctive species. It nests in sandy soil, often in built-up areas and frequently in large numbers, so it tends to get noticed and its colonisation has been and will continue to be well-documented. Photo: Plate 16.3, p. 55 (Vol. 47).

Colletes marginatus Na

This bee occurs widely in the Brecks, where it is often found collecting pollen from Wild Mignonette *Reseda lutea*, and is also found at Winterton Dunes. Nick Owens found a new site with records at Weybourne on 4 August 2012 (TG 127436) and nearby at Weybourne Camp 2 August 2013 (TG 101436)

Heriades truncorum RDBK [New to Norfolk]

I observed a small colony of this bee nesting in a dead pine stump and foraging nearby on Common Ragwort *Senecio jacobaea*, at Middle Harling Heath TL 982831 on 10 August 2012 and again on 28 August. The colony was revisited on 7 August 2014 and found to be still going strong. Up till then the closest records of this southern species were in Essex.

Lasioglossum brevicorne RDB3

This rare bee is known from several Breckland sites. I netted a male at Winterton Dunes TG 4920 on 24 August 2014, the first record away from the Brecks and the first for East Norfolk (VC27).

Lasioglossum puncticolle Nb [New to Norfolk]

This scarce bee has a poorly understood ecology, occurring in diverse habitats including brownfield sites, flower-rich grasslands, sea walls and saltmarsh edge, usually on clay soils. It is mainly found in the SE corner of England with just a handful of records north of London. I netted a female at East Winch Common TF 699158 on 24 July 2012. *Sphecodes spinulosus* RDB2 [New to Norfolk]

Nick Owens found a female of this cleptoparasitic bee at Abbey Farm, Flitcham, TF 736266 on 7 July 2013. Its host, *Lasioglossum xanthopus*, is on the Norfolk list on the basis of an old record from Caister-on-Sea but has been recorded recently at Lakenheath Airbase in Suffolk. It seems likely that the host is present at Flitcham and possibly other West Norfolk calcareous sites. Nick has found a remarkable assemblage of rare bees and wasps at Abbey Farm, demonstrating the value and success of the ambitious work of farmer Ed Cross to recreate chalk grassland habitat.

Melitta tricincta Nb

This bee, which collects pollen only from Red Bartsia *Odonites verna*, was found at Bowthorpe (TG 1808, TG 1809) in July 2013, by both Peter Harvey and Geoff Nobes, during separate invertebrate surveys commissioned by developers of the Threescore site. These are the fourth and fifth county records and the first outside Breckland.

Macropis europaea Na

This wetland specialist is dependent on Yellow Loosestrife *Lysimachia vulgaris* for pollen and in Norfolk is rarely recorded away from the Broads or the west Norfolk fens. A female found at Beeston Common TG 165425 by Nick Owens on 12 August 2012 represents a new location and appears to be the most northerly UK record of this species.

Nomada argentata RDB3

A female of this rare parasite of *Andrena marginata* was found by Nick Owens at Weybourne Camp TG 10184380 on 31 July 2014. This was the first county record away from the Brecks and only the second post-2000 record.

Nomada ferruginata RDB1

This nationally rare parasite of *Andrena praecox* is fairly frequent in the Norwich area but rarely encountered elsewhere in the county. A male taken in a water trap at Ditchingham TM 324915 on 29 March 2014 by Dorothy Cheyne and identified by Nick Owens, extends the known range.

Nomada signata RDB2

A male of this very rare parasite of the common *Andrena fulva* was identified from a photo taken by John Furse at Walsey Hills TG 060440 on 13 April 2014. This was the first recent county record away from the Brecks.

Osmia aurulenta [Deleted from the County List]

Two of the three Norfolk records have been withdrawn by the observer, and the third, from Burnham Overy Dunes, in the absence of supporting information, has been re-evaluated as a likely error. This bee is found mostly along the south and west coasts with the nearest records from Kent.

Bethylidae

Epyris niger [New to Norfolk]

Nick Owens found this southern species at Weybourne Camp TG 103437 on 13 August 2013 and at Abbey Farm, Flitcham, TF 74412634 on 23 July 2014.

Goniozus claripennis [New to Norfolk]

This parasitoid of Tortricidae moth larvae was found at Winterton TG 29052090 on 29 May 2014 by Tony Irwin (det. J.T. Burn).

Dryinidae

Anteon jurineanum [New to Norfolk]

A female of this tiny wasp, a parasitoid

of leafhoppers, was collected in May 2014 from a malaise trap operated by Tony Irwin at Winterton TG 29052090 and determined by J.T. Burn (the man responsible for most UK Dryinid records).

Lonchodryinus ruficornis [New to Norfolk]

Again from Winterton, collected by Tony Irwin and determined by J.T. Burn, a male was collected on 12 July 2014 (TG 486209) and a female on 9 August 2014 (TG 491209), demonstrating the value of malaise traps in finding the smaller hymenoptera.

Chrysididae (jewel wasps)

Chrysura radians Na

Allan Drewitt photographed this scarce parasitoid of mason bees at Courtyard Farm, Ringstead, TF 7240 on 5 August 2012 and Andy Musgrove found one at Thetford Nunnery TL 8782 on 4 July 2013. These are the first county records away from the Norwich area.

Cleptes semiauratus Nb

Tracy Money found a specimen of this parasitoid of the common currant sawfly *Nematus ribesi* indoors at Wymondham College TM 075984 in July 2013. This is only the third Norfolk record since 1950 and the first since 2000. This species seems to have been fairly common in Victorian times and the host is still common so it is a mystery why it has become rare.

Hedychrum niemelai RDB3

As with many aculeate hymenoptera, the UK range of this parasitoid of *Cerceris quinquefasciata* reaches its northern limit in Norfolk. These recent records (mostly from water traps) extend the Norfolk and UK distribution a little further to the north: I found a female at Hillingdon TF 723246 on 8 September 2012, and Nick Owens found several at Abbey Farm, Flitcham, TF 743275 on 17 July 2013 (and later dates) and at Weybourne TG 03436 on 26 July 2013 (and later dates).

Pompilidae (spider-hunting wasps)

Anoplius caviventris Nb

This all-black wasp is widespread nationally but very infrequently recorded; it may be rare or just very hard to find. It usually occurs close to water, is known to nest in reed stems and the three previous county records were all from Broadland. It took me seven years of searching at Strumpshaw Fen to find *A. caviventris*: three females in a water trap on 23 July 2012 during a Bioblitz event (TG 339063). Tony Irwin collected another from a malaise trap at Winterton Dunes TG 485215 on 5 July 2014. These are the fourth and fifth county records.

Arachnospila wesmaeli Nb

Nick Owens caught a female of this scarce wasp at Blakeney Point TF 997459 on 29 August 2013. This is the third county record.

Auplopus carbonarius Nb [New to Norfolk]

This all-black spider-hunting wasp is typically found in clay woodlands and builds nest cells of mud daubed on a vertical surface. Reports from Blakeney Point and Scolt Head in the 1950s are presumed to be errors in view of the atypical habitat and the absence of supporting specimens. I found a female in a yellow pan trap in a woodland glade at Strumpshaw Fen TG341064 on 26 June 2012, with a second female at the same site on 10 June 2014, providing evidence of a breeding population rather than vagrancy. The nearest records prior to 2012 had been no nearer than north Essex, but a spate of records further north in 2013 and 2014 suggest a northwards expansion is underway.

Priocnemis schioedtei Nb

One of several very similar red and black wasps, *P. schioedtei* has been on the Norfolk list since the 1980s on the basis of two records at Santon Warren. In August

2012 Doreen Wells' pitfall traps produced three records: Lyndford on 10 August (TL 829908) and 13 August (TL 847898), and Grimes Graves (TL 819901). By coincidence, I also collected a male on 10 August 2012 at Middle Harling Heath TL 984832. These are the third to sixth county records.

Priocnemis confusor Nb

A male of this black and red wasp (until recently known as *P. gracilis*) was found at Kelling Heath TG 098417 on 19 July 2013 by Nick Owens. This is the sixth county record.

Vespidae (social, potter and mason wasps)

Gymnomerus laevipes

This stem-nesting mason wasp is probably very under-recorded, with only eight Norfolk records up to 2011. There has been a flurry of new records since, including four from new sites: Andy Beaumont found female at Catfield TG 374204 on 16 July 2013, I found males at Hall Road, Norwich TG 224054 on 31 May and 21 June 2014 and a female at Thorpe St. Andrew TG 282090 on 12 July 2014, and Tim Hodge photographed one at Horsey TG 4523 on 9 June 2014.

Microdynerus exilis Nb

Two new sites have been found for the smallest UK mason wasp. A belated record from Beachamwell TF 749047 on 24 July 1999 has come to light (BWARS data), and a female was found nesting in a rotten picnic bench at Walsey Hills TG 061440 on 12 July 2014 by David Bratt and photographed by John Furse, followed by a male the next day. The latter site is easily the most northerly site in the UK for this species.

Symmorphus gracilis

This mason wasp mainly hunts *Cionus* weevil larvae from figworts *Scrophularia* spp. and has been recorded at surprisingly

few places in Norfolk. Records from Heacham TF 6737 by Paul Cobb on 2 July 2014 and Holt Country Park TG 0837 by Andy Musgrove on 25 July 2014 provide two new locations.

Vespula rufa

The red wasp has been widely recorded from heathy places in the county but there has been a recent shortage of records. It is easily overlooked, with many individuals lacking obvious red colouration of the abdomen and resembling the common wasp. I netted a male at Winterton TG 4920 on 24 August 2014 which was the first that I had seen in Norfolk.

Crabronidae (digger wasps)

Argogorytes fargeii Na

This black and yellow wasp has declined nationally since the 1950s but may have recovered a little since the 1990s. Records have come from three new locations: Elizabeth Grimes photographed one at Cringleford TG 1906 on 5 June 2012, I found a female at Gorleston TG 531017 on 1 July 2012 and Tim Hodge photographed one at Horsey TG4523 on 9 June and 16 June 2014.

Cerceris ruficornis

This weevil-hunting species is normally associated with *Calluna* heath but in Norfolk it appears to *do different*, occurring on calcareous grassland as well. Nick Owens found it at four new calcareous sites: Muckleburgh TG 098435 on 3 August 2012, Warham Camp TF 944408 on 11 July 2013, Weybourne Camp TG 103436 on 27 July 2013 and Abbey Farm, Flitcham, TF 745263 on 23 July 2014.

Cerceris quinquefasciata RDB3

Norfolk is a stronghold for this nationally rare weevil-hunting wasp with most records clustered around the Brecks and Norwich. Recent records from a number of new sites extend the known range to the north coast and south-east of the county. I found *C. quinquefasciata* at Narborough

Railway Embankment TF 751115 on 26 July 2012, Barrow Common TF 790429 on 21 August 2012, Broome Heath TM 343912 and Stanley Hills TM 434931 on 24 August 2012, and Nick Owens found it at Muckleburgh TG 098435 on 2 August 2012, Warham camp TF 945408 on 5 August 2012, Abbey Farm, Flitcham, TF 7427 on 17 July 2013 and Weybourne TG 103436 on 26 July 2013.

Dryudella pinguis

This small black and red wasp likes warm, sandy places and has previously been recorded in the Brecks and once at Winterton. Records from three new sites significantly extend the known distribution. Nick Owens found it at Blakeney Point TG 017462 on 28 June 2012, and I found several in a water trap at Great Plumstead TG 285096 on 20 July 2014.

Ectemnius ruficornis Nb

This large black and yellow wasp is the most elusive of the nine *Ectemnius* species found in Norfolk. I found a female investigating a dead birch stump at Buxton Heath TG 170216 on 5 July 2013 and another nesting in a fallen tree trunk at Santon Warren TL 821878 on 31 August 2014. These are the third and fourth county records.

Mimesa bicolor RDB2

This slender black and red wasp has been recorded in only 11 10km squares in the UK since 2000. I found two females on Hogweed *Heracleum sphondylium* at Bowthorpe TG 185092 on 15 July 2013, the second record from this site, and Nick Owens found two males at Abbey Farm, Flitcham, TF 743275 on 17 July 2015 with a female there on 19 August 2013. These are the fourth to sixth county records.

Mimesa bruxellensis Na

I found a second record of this southern species in Brundall TG 324087 on 18 August 2013, just 500 m from the site of the

first Norfolk record in 2010, suggesting an established population is present.

Nysson interruptus RDB2

This very rare cleptoparasitic wasp lays its eggs in the nests of the *Argogorytes fargeii*. It was first recorded in Norfolk at Buckenham in 2008, and then at Overstrand since 2010, but outside Norfolk the only recent UK records are from Isle of Wight. Targeted searches at new sites have extended the known range: I found a male and female on 17 June 2012 and five females on 1 July 2012 at Gorleston Cliffs TG 531017 and a male on 3 June 2013 at Brundall TG 324088. Nick Owens found a female at Weybourne Cliffs TG 112437 on 19 June 2012 and others nearby on several subsequent dates.

What next?

There are undoubtedly more species of bees and wasps to be discovered, or re-found, in Norfolk, though the rate of 10 in three years is unlikely to be sustained. Other than the under-recorded Dryinidae and Bethyridae there are not many very obvious candidates. Nevertheless, it is fun to speculate so I will suggest a few that I will be looking for. The RDB3 mason wasp *Symmorphus crassicornis* was found on the south bank of the Little Ouse at Lakenheath in 2014, a few metres from the county boundary, and ought to occur in damp wooded habitats along the west Norfolk fenland margins. Two *Andrena* species that occur in Suffolk might turn up in the south of the county: *A. proxima*, which is associated with Hogweed and other umbellifers, and *A. fulvago* which visits yellow Asteraceae. The cleptoparasitic *Nomada* species are remarkably good at finding isolated populations of their hosts, and *Nomada integra* could well appear among the strong populations of *Andrena humilis* in the Norwich area or Brecks. Another likely species, the mining bee *Colletes cunicularius*, has (in April 2015) just been found and will be reported in a later volume. On a less positive note, there

are a few species that may be at risk of being lost from Norfolk. An example is the small mining bee *Andrena coitana* which has undergone a national decline and has been recorded very infrequently in Norfolk over the past 40 years. While finding new species is exciting, targeting fieldwork at species like this will be equally important in providing a clear picture of the status of our bees and wasps.

References

- ARCHER, M. 2004. The wasps and Bees (Hymenoptera: Aculeata) of Roydon Common in Watsonian West Norfolk. *Trans. Norfolk Norwich Nat. Soc.* **37**: 32-45.
- BEEES, WASPS & ANTS RECORDING SOCIETY, 2015. Species Accounts. http://www.bwars.com/index.php?q=species_gallery. 15th May 2015.
- FALK, S. 1991. A review of the scarce and threatened bees, wasps and ants of Great Britain. *Research and Survey in Nature Conservation* 35. Nature Conservancy Council.
- OLLERTON, J., ERENLER, H., EDWARDS, M. & CROCKETT, R. 2014. Extinctions of aculeate pollinators in Britain and the role of large-scale agricultural changes. *Science*. **346**: 1360-1362.
- STRUDWICK, T. 2012. The bees of Norfolk: a provisional county list. *Trans. Norfolk Norwich Nat. Soc.* **44**: 34-57.
- STRUDWICK, T. 2013. The aculeate wasps of Norfolk: a provisional county list. *Trans. Norfolk Norwich Nat. Soc.* **45**: 21-46.
- T. Strudwick. 16, Beech Way, Brundall, Norwich, NR13 5ND timstrud@tiscali.co.uk

Butterflies

Andy Brazil

2014 was notable for both the early spring emergences and the addition of a new species to the county list. It also saw the return to the list of a species missing for over 30 years, an exceptional number of Clouded Yellows, several interesting aberrations and a rarely seen vagrant. Nationally, we saw an unprecedented number of continental species breeding in the UK.

We received 15,639 records (15,345) covering 566 tetrads (498) and representing 5,302 site reports (5,581). (The figure following in parentheses is the comparable 2013 result, while the initials in square bracket are those of the recorder. Refer to the list of recorders for full names.)

Dingy Skipper *Erynnis tages*. Recorded from 15 squares (9). Earliest sighting 23 April [ADy] (16 May), last 21 June [SW] (8 June). Highest count 46 on the BC survey of 21 May at a new site at Lynford Lake TL 89H. This site also produced the second highest count of 31 on 15 May [CG]. Sadly, over-zealous winter scrub clearance may have damaged the larval population at what could have been an important site. We await this year's results anxiously. Pleasingly, a total of 6 new tetrads reported sightings, and reports from Suffolk confirm a general expansion of populations into adjoining squares from core populations.

Grizzled Skipper *Pyrgus malvae*. Although it was recorded from 7 tetrads (4), this represents just three sites: Leziate/Bawsey, Foulden Common and the Cut-Off Channel. Highest count was 29 at the channel on 21 May [ADy]. Recorded between 14 April (3 May) [ADy] and a very late 21 June [SW] (8 June).

Large Skipper *Ochlodes sylvanus*. First seen on the 13 May [ABl] (14 May), last on 20 August [MD] (29 August). Recorded from 131 tetrads (120). Highest count 40 on 8 July [FJ/PB].

Small Skipper *Thymelicus sylvestris*. Recorded from 137 tetrads (125). First seen 9 June [ADa] (17 June), last 15 August [MCl, MC/AB] (1 September). Highest count 60 on 21 July [CW].

Essex Skipper *T. lineola*. Recorded from 75 Tetrads (75). First seen 12 June [MC/AB] (17 June), then 20 [MC/AB] and 22 June [FF], but regular sightings did not begin until 30 June [many]. Last 21 August [MC] (1 September). Highest count 103 on 31 July [SB].

Swallowtail *Papilio machaon*. First seen 13 May [PT] (16 May), last 9 August [PT] (20 September). As is usual these days, there is no clear break between generations, with records for every week in the flight period. However, sightings were noticeably scarcer after 4 July, either because people were elsewhere, or the butterflies were scarcer. Maximum count 13 from Hickling on 21 June [AS], recorded from 21 tetrads (18). Much was made nationally of successful breeding of the European subspecies in Kent, but as yet it poses no threat to our indigenous subspecies. Apart from anything else, Kent is a long way away as the butterfly flies.

Brimstone *Gonepteryx rhamni*. First seen 16 Feb [AB] (1 March), this species was exceptionally early out of hibernation this year with 17 reports in February. Last 28 October [MC/AB] (17 December). The emergence of the year's new brood appears to have been in the last two weeks

of July, but sightings were scarce for the rest of the year. Nevertheless, recorded from 242 squares (165).

Large White *Pieris brassicae*. A remarkable series of records of larvae seen in January and February [MGr] match sightings in other parts of the country. A recent paper (Bowles 2015) suggests there might be a survival advantage of avoiding parasites in such late broods despite the reduced chance of successful pupation. Of adults, first seen on 7 March [KS] (21 March), last on 30 October [FF] (1 November); recorded from 301 tetrads (272). Highest count 72 on 18 July [CS]. Interestingly, few records of migration this year.

Small White *P. rapae*. Also observed as larvae in January and February [MGr]. Adults first seen 16 March [AS] (29 March), last 16 October [MC] (24 October). Recorded from 258 squares (258). Highest count 58 on 26 July [GU].

Green-veined White *P. napi*. 259 (202) squares, 1 April [many] (19 April) until 30 September [MCl] (8 October). Highest count 58 on 24 July at Pensthorpe [AR].

Orangetip *Anthocharis cardamines*. A freshly deceased individual was found on February 17 [RW]. Presumably it had experienced temperatures that convinced it to emerge, only to be hit by either a cold spell or a lack of food. Similar 'pulses' of unseasonably warm weather in the first two months of the year, followed by a return to normal cold temperatures, might in future pose a threat to spring species if it convinces more insects to follow this example. More conventional emergence began 21 March [TM] (24 March), last seen on 21 June [ABu] (19 August). No second brood sightings this year. Recorded from 218 squares (151). There is some suggestion this species has declined in the Broads over the last few years, and this warrants monitoring.

Small Copper *Lycaena phlaeas*. Recorded from 116 tetrads (118). Surprisingly, no

exceptionally early sighting this year, but this may be a lack of recorders at suitable sites. First 30 March [ADy] (5 March), last 4 November [SP] (4 November). Highest count 16 on 5 May at Holme [LB].

Holly Blue *Celastrina argiolus*. Recorded from 113 tetrads (96). The first on 16 March [AS] (21 April) was not followed until 30 March [many] but then seen regularly until last 3 October [JF] (13 September). The second brood overlapped with the first, probably as a result of the early emergence.

Common Blue. *Polyommatus icarus*. Photographs of three similar aberrations received [AB], [DB], [SP]. Each were of females with the orange spots on the upperwings mostly or completely absent, with the wings noticeably bluer and with more black than usual. Such abnormalities are frequently associated with high temperatures during pupation. First 4 May [BCo] (14 May), last 7 October [ADy] (27 September). Recorded from 156 squares (156), highest count 100 plus at Abbey Farm on 6 June [EY].

Chalkhill Blue *P. coridon*. Recorded from 4 tetrads (6). The situation here is unclear; apart from the well-known colony at Warham Camp, it was again recorded from a number of other sites – as in 2013. Some sightings in both years could be explained by males wandering from the main colony, but sightings in the south of the county are more puzzling. They might be from the known site at Newmarket, or the result of artificial introductions. It was found at Middle Harling Heath for the first time [RP]. Apart from Warham, the only site where it was seen in both years in any numbers was Ringstead Downs, where it is possible that a small colony now exists. First seen 7 July [KMc] (18 July), last 23 August [FJ] (2 September). The BC annual count at Warham this year was 2,765 – far fewer than last year's 6,500. There are plans by a local estate to create

suitable habitat close to the Warham site in the hope that it will be colonised.

Silver-studded Blue *Plebejus argus*. First seen 6 June [many] (27 May), last 17 August [JD] (4 August). Highest count 324 (560) from Kelling Heath on 20 June [JW], this site now being the main stronghold of the species. There are just four sites in the county: Buxton Heath, Cawston Common, East Ruston Common and Kelling Heath, and this is unlikely to change in the near future.

Brown Argus *Aricia agestis*. First seen 15 April [ADy] (19 May), one other report in April on the 19 [ADy], then regular from 1 May to 13 June. Second brood 3 July to 21 August, and either a third brood or stragglers seen 30 August to 4 October [MC/AB] (5 November). Recorded from 61 tetrads (53).

Green Hairstreak *Callophrys rubi*. Recorded from 33 squares (23). First seen 13 April [NE] (16 April), last 18 June [EY] (19 July). Highest count 13 at Cawston on 18 May [MW].

Purple Hairstreak *Favonius quercus*. Recorded from 31 Tetrads (54). First seen 20 June [MC/AB] (19 June); last 24 August [MC] (8 September). Highest count 6 on 15 July at Beeston [FF]. As 2013 was such a good year for this species, populations were likely to decline and this was reflected in the records. I speculate that many sites go unrecorded unless populations reach a critical mass.

White-letter Hairstreak *Satyrrium w-album*. Recorded from 19 squares (29). First seen 20 June [MC/AB] (26 June), last 4 August [AB] (19 August). While it is possible that the scarcity of records reflects the absence of recorders, I suspect it may genuinely reflect a decline in numbers in this species, as reports from its stronghold at Holkham were much reduced this year.

White Admiral *Limenitis camilla*. Recorded from 47 tetrads (39). First 13 June [JD] (19

June), last of that brood 4 August [MR] (28 August). Then, surprisingly, a second brood seen 21 September to 17 October [SC]. Highest count 22 on 25 June at Bacton Wood. Six tetrads had not previously had the species recorded, indicating that expansion continues, but all six were adjacent to existing populations – suggesting a slower pace of expansion than in previous years.

Red Admiral *Vanessa atalanta*. Recorded from 321 Tetrads (150) reflecting a much improved population this year. First seen 8 January [WS] (24 January), last 26 December [MC] (19 December). Highest count 225 at Blakeney Point on 4 September [RPO]. Sightings increased markedly from mid May, probably representing inward migration, while the high coastal counts in September may represent outward movement back to the continent.

Small Tortoiseshell *Aglais urticae*. First 13 January [SW] (17 February), last 4 November [AR] (28 December). Recorded from 376 tetrads (295). Highest count 148 on 1 July at Hillfield Nursery [AW]. A large number of reports in March suggest a high survival rate in over-wintering individuals. (I received 36 reports on 9 March alone!)

Peacock *A. io*. First 4 January [JB] (6 January), last 23 December [RJ] (30 December). Recorded from 564 Tetrads (275). Again, good survival rates over winter produced a healthy brood in summer. However sightings dropped abruptly in mid August as individuals appear to have hibernated early. Highest count 109 on 23 July at Catfield dyke [PT].

Painted Lady *Vanessa cardui*. The first sightings on 9 April [MCI] and 5 May [ADy] were followed by regular sightings from 21 May [PN, AS] (20 May) to 17 June [MR]. A second peak from 29 June [AT] might represent a native brood or further migration. Sightings in September

probably native-bred; last seen 27 October [SW] (26 October). The high count of 20 from Blakeney Point on September 4 [PN] might suggest migration back to the continent. Recorded from 147 Tetrads (124). No major migration this year.

Comma *Polygonia c-album*. The first on 2 January [MPg] was just tempted out of hibernation – the main emergence began on 22 February [GH] (5 March), with the first brood 13 June, then constant until 31 October. Last report 3 December [AR] (15 November): Reported from 222 squares (124); many counts of 10 plus.

Dark Green Fritillary *Argynnis aglaja*. Recorded from just 13 squares (15). Bizarrely this is now our most endangered fritillary, with the colonies at Horsey/Winterton and on the north coast between Scolt Head and Blakeney Point being the only reliable locations. The first on 23 May [DB] was exceptional, and the main sightings began 8 June [ADy] (10 June), with the last on 24 August [PT] (23 August). Highest count 112 on 2 July at Horsey Gap [PT]. Low numbers on the north coast may reflect damage done by the tidal surges over the winter, and we should hope therefore for an eventual recovery. A fascinating record of two individuals photographed at Drymere in the Brecks on 7 August [SP] was probably late-season movement from the coast, but I cannot rule out the possibility of an as-yet-undiscovered colony somewhere in the area. Certainly, if woodland areas are now suitable for Silver-washed Fritillary they ought to be suitable for recolonization by Dark Green Fritillary.

Silver-washed Fritillary *A. paphia*. Recorded from 19 Tetrads (18). The species continues to spread; 9 tetrads had not had sightings before (but all were of single individuals), while we now have records from 53 tetrads this century. The core populations (that we know of) are around Holt, particularly Holt Country

Park, and at Foxley, Cawston, Drymere and Cockley Cley. However, I am certain that there are populations not yet discovered. I suspect they are in Ken Hill Woods near Snettisham, the Ringland Hills near Norwich and logically every suitable bit of woodland between Holt and Ringland. First seen 21 June [MPg] (6 July), last 12 August [SP] (2 September). Highest count an estimated 50 plus flying at Holt CP during July. At least one female of the form *valesina* recorded.

Speckled Wood *Pararge aegeria*. Recorded from 284 tetrads (212). First sighting an astonishing 24 February [MC]. Normal emergence began 30 March [SH] (20 April) then regular until 31 October, with a very late record on 24 November [TM] (4 November). Highest count 50 on 13 August [PMg], but several reports of 30 plus. Much improved on last year, which was rather poor for this species.

Wall Brown *Lasiommata megera*. Recorded from 79 tetrads (59). First seen 22 April [KS] (27 May), the first brood ended 9 June. Second brood 16 July to 30 August, third brood 18 September to 12 October [DL] (4 September). A recent paper (Van Dyck *et al.* 2015) suggests that climate change has led to an increasing number of second brood offspring attempting a (failed) third brood – leading to population declines. If the hypothesis is true, it would suggest that coastal areas, being colder, are less likely to induce a third brood, hence the survival of populations in those locations. It is interesting to note, therefore, that reports after August split two to one in favour of coastal locations. My impression is that the species did better this year, with the highest count an estimate of 100 plus at Horsey on 23 May [DB]; put into context, in some recent years no first brood count has gone into double figures.

Grayling *Hipparchia semele*. The first on 20 June [MH] (13 July) was an outlier,

the next sighting was 28 [PDw] then regular until 12 September [RS] (30 September). Recorded from 25 tetrads (39). Populations appear healthy, with the highest count 100 plus at Winterton on 25 July [ADy]. The welcome confirmation was received that the population at Sculthorpe airfield remains healthy. This is probably the largest 'inland' colony, albeit within 15 km of the coast. Apart from small populations in the Brecks, all records this year were also within 20 km of the coast.

Gatekeeper *Pyronia tithonus*. The first on 8 June [MGh/BE] (17 June) was an outlier, as was another on 10 June [MD]. Emergence proper began on 30 June [many], then recorded until 5 September [MCI] (1 October). Recorded from 234 tetrads (216). With many three-figure counts, populations were clearly healthy.

Meadow Brown *Maniola jurtina*. The first on 20 May [MT] was an outlier, and the main emergence began on 31 May [MR] (29 May), with records until 10 September [MC] (21 September). Recorded from 288 squares (270). My impression is that numbers were down this year: only 10 recorders felt they had seen numbers in excess of a hundred, whereas in previous years a report of 'hundreds' was seen quite frequently. It was, nevertheless, still Norfolk's commonest butterfly.

Ringlet *Aphantopus hyperantus*. First 7 June [TM] (30 May, last 18 August [MC/AB] (3 September). Recorded from 228 tetrads (195). An estimated 500 at Haveringland Great Wood on 8 July [PMg] was the highest count. A short season this year, and although many recorders reported high counts, I felt it struggled in some areas.

Small Heath *Coenonympha pamphilus*. The first reports on 2 April [RJ] and 15 April [ADy] were outliers. The main records started 5 May [many] (23 May) and continued until 7 October [ADy] (30

September). Recorded from 44 tetrads (60). A poor year; away from the coast it struggled to get into double figures at most sites. East Ruston Common, Horsey and Holkham were the best sites

Incidentals and migrants

Clouded Yellow *Colias croceus*. An exceptional year by modern standards, and following on from a good year – normally Clouded Yellow years are followed by a sharp decline in sightings the following year. First report 14 May [SP], nothing then until 6 June [i] (20 June), then regular until 23 August. A further 11 sightings between 4 September and 6 November [ABl] (4 November). Recorded from 47 tetrads (61). Highest count of 25 from Choseley [i] on 7 August almost certainly represented local breeding, as did reports from Queens Hills [MC/AB].

Marbled White *Melanargia galathea*. Two reports have been accepted: 15 June [CWi] on Pedders Way near Ringstead, and 2 July [IG] at Felbrigg Hall.

¹ **Yellow-Legged Tortoiseshell** *Nymphalis xanthomelas*. And so we come to the most astonishing week in modern British butterflying. It began with a report of a Yellow-legged Tortoiseshell at Queens Hills Estate at Costessey on 13 July [MC/AB]. Then several others were found in Norfolk and throughout the east coast of England, a Purple Emperor turned up in Sheringham, then a High Brown Fritillary *Argynnis adippe* in Suffolk. We also received reports of a mysterious Hairstreak (possibly an Ilex Hairstreak *Satyrium ilicis*) on 12 July [MGw] – although this could not be confirmed to species. Clearly a quantity of unusual Continental butterflies were about the countryside, although we also know of

¹ The name 'Scarce Tortoiseshell' is often used for this species, however it is preferable to use the name Yellow-legged Tortoiseshell as this draws attention to the identification feature necessary to correctly identify it.

at least one release of captive butterflies during the period.

At about the same time, starting on the 10 July, Holland was also experiencing a major invasion of the 'Eastern Fox' (*Oostelijke vos* as *Nymphalis xanthomelas* is known there). The invasion of Holland followed recent migration into Scandinavia and eastern Europe during the period 2009-13 (Ref. 3). In Holland, the adults seem to have to gone into hibernation almost immediately, sightings dropping markedly after July 20, but several reports of hibernating adults in bat boxes were subsequently received. Again a report from Denmark stated several hundred were seen between July 8 and July 11, but reports dropped markedly after that.

It would seem therefore that it is quite likely that the short-lived nature of the 2014 sightings is to be expected, with migrating adults going into hibernation almost immediately upon arrival. Indeed, on September 11 one was disturbed "from the cupboard under the TV - where the Sky and BluRay boxes are kept." [GE]. This is clear evidence of an attempt at hibernation, the first for the UK. (Reports of two Yellow-legged Tortoiseshells have been received for March 2015 – showing successful over-wintering.)

Following publicity in the local and national press, several other reports were submitted in the months that followed. Table 1 shows date of sighting, not report. Where recorder shows 'web' it means that no formal report was received, but sufficient individuals claimed on-line to have seen it to make the report probable.

It is likely that more insects were present but unrecorded. However, given the size of the county, unless the females were already mated, it is unlikely that they will have laid eggs. If Yellow-legged Tortoiseshell succeeds, however, in forming a viable population in the

Table 1. Reports of Yellow-legged Tortoiseshell.

Date	Location	Recorder	Status
12 July	Weybourne	MMp	Definite
13 to 16 July	Queens Hills	AB/MC	Definite
14 to 15 July	Burgh Castle	PF	Definite
15 July	Letheringsett	PL	Probable
16 July	Wells	AR	Definite
16 July	Hoveton	DS	Definite
17 July	Sheringham	web	Probable
17 to 18 July	Great Ryburgh	MHu	Definite
18 July	Thetford	JW	Definite
18 July	Weybourne	MBg	Definite
19 July	Holme Dunes	web	Probable
21 July	Kelling Water Meadows	web	Possible
25 July	Herringby	PA	Definite
11 Sept	Hempnall	GE	Definite

Netherlands, it is possible that it will become a regular migrant in the future.

Purple Emperor *Apatura iris*.

Photographed in a garden in Sheringham on 17 July [JH]. The garden in question is about 100 m from the coast and the report coincided with a Yellow-legged Tortoiseshell nearby. In view of this, and the complete absence of any records of Purple Emperor from the Sheringham area in the last two hundred years, I find on-line speculation of an undiscovered colony in Pretty Corner to be both bizarre and unfounded. I consider it most likely that this insect was of continental origin, although we cannot completely eliminate the possibility of a deliberate release.

References

- BOWLES, N. 2015. An observation of reduced parasitism in the Large White *Pieris brassicae* suggests a compelling reason to invest in additional broods [Online]. Available from <http://www.dispar.org/reference.php?id=98>

VAN DYCK, H., BONTE, D., PULS, R., GOTTHARD, K. AND MAES, D. 2015. The lost generation hypothesis: could climate change drive ectotherms into a developmental trap?. *Oikos*, 124: 54–61. doi: 10.1111/oik.02066 Available online at <http://dx.doi.org> October.1111/oik.02066

Ref. 3. http://www.phegea.org/Dagvlinders/Documenten/VVE_WG_DV_Manil_Cuvelier%202014_L%C3%A9pidopt%C3%A8res_58_p_69-74_N_xanthomelas_expansion_English_version.pdf

Records were received from the following:

P. Allard [PA], G. Allen, B. & Y. Anderson, Appleton, A. Arak, M. Arber, L. Bacon, J. Baker, D. Balcombe, R. Barnett, S. Barnett, J. Barrett, S. Bashforth [SB], S. Baylis, J. Bennett, P. Benson [PB], A. Bloomfield [ABl], P. Bonham, L. Bovey [LB], P. Boyes, A. Brazil, K. Brett, D. Brice [DB], R. Briscoe, A. Broadmeadow, A. Brown [AB], S. Brown, M. Bruce, D. Bryant [DB], A. Buckel, J. Bull [JB], A. Burkin [ABu], H. Burnett, R. Burrell, R. Bushell, T. Butler-Stoney, A. & B. Carpenter, M. Casey [MC], P. Cawley, M. Chapman, S. Chapman, M. Chittenden, B. Christie, A. Clarke, K. & M. Claydon [KMc], M. Clements [MCl], P. Cobb, B. Cobbold [BCo], S. Cockaday [SC], R. Cole, S. Davey, A. Davis, C. Davison, A. Dawson [ADa], J. Dossetor, P. Douch, M. Dowland, M. Duddy [MD], A. & A. Duff, J. & G. Dunmore [JD], C. Durdin, A. Dyball [ADy], R. Dykes, J. Ebbage, G. Edden [GE], N. Edwards, B. Ellis [BE], J. Ellis, N. Elsey [NE], J. Emerson, S. Evans, D. Fairhead, R. Fairhead, P. Fairman [PF], C. Falvey, F. Farrow [FF], M. Ferris, G. Fletcher, K. Flowerday, A. Freeman, J. Frew [JFr], J. Furse [JF], N. Furtek, G. Fyfe, T. Gabriel, C. Gambrill [CG], S. Garten, K. Gay, M. Ghullam [MGh], R. Gibson, Gill, M. & P. Gluth [MPg], R. Goff, H. Goody, E. Goodyear, I. Gordon [IG], M. & B. Gough [MBg], A. Gray, D. Green, M. Greenland [MGr], M. Gwilliam [MGw], A. Haines, J. Halls, N. Hancox, M. Harcup [MH], M. Harvey, S. Hathaway, S. Heal [SH], S. Hearle, H. Hepburn, R. Hoe, J. Hogg, L. Hogg, S. Holland, M. Holmes, R. Holmes, R. Holt, C. Hood, G. Hooton [GH], D. Horsley, D. Housden, M. Hughes [MHu], J. & J. Hurst [JH], C. Jacobs, P. James, S. Johnson, F. Joliffe [FJ], D. Jones, R. Jones [RJ], T. Kemp, A. Kerr, P. Kirby [PK], D. Knight [DK], M. Lacey, V. Lea, D. & J. Leak, D. Leech, P. Leeder, S. Levene, B. Lewis, J. Lines, P. Lindsey [PL], C. Littlewood, A. Livingstone, S. Locker, D. Longden, D. Longe [DL], K. Lovatt, I. Lovering, B. Lund, A. Maguire, J. Mathews, M. McCarthy, T. McKie [TM], A. McLennan, R. McQueen, S. McWilliam, J. Mee, J. Metcalf, A. Middleton, A. Miles, P. Millard, C. Miller, G. Miller, F. Mitchell, D. Moss, C. Murray, A. Musgrave, P. Nichols [PN], D. Nobbs, B. Osborne, N. Owens, B. Palmer, P. Palmer, P. Parker, R. Parker [RP], J. Peek, S. Pennell [SP], T. Phillips, R. Porter [RPo], J. Powley, T. Prater, M. & M. Preston [MMp], I. Pritchard, P. Redmond, M. Riches [MR], A. Riley [AR], R. Rogers, M. Rowe, N. Rye, I. Saggars, K. Sales [KS], A. Saunders [AS], H. Sayer, R. Scrafield, E.

Smith, R. Smith [RS], C. Spinks [CS], D. Stagg [DS], T. Stevens, C. Stevenson, S. Steward, R. Stewart, W. Stewart [WS], E. Stocker, A. Stoddart, M. Stolworthy, F. Storrar, K. Stuart-Clarke, E. Stubbings, M. Taylor [MT], P. Taylor [PT], A. Tegala [AT], G. Upton [GU], J. Wagstaff [JW], M. Wallis, C. Ward [CW], I. Ward, J. Warham, G. Warne, M. Webster, J. Wells, I. West, D. Westlake, R. Wheeler [RW], J. Whiting [JW], R. Wike, P. & D. Wileman [PDw], C. Willow [CWi], L. Wilshaw, A. Winnington, T. Wood, M. Woodcock, A. Woodrow [AW], P. Woolnough, M. Wright [MW], S. Wright [SW], E. Yeomans [EY]

Records were also received from BC Field trips, BADCOG, Bug Alert, the iRecord App, BC MigrantWatch, BTO Garden Birdwatch, NBIS and the Norfolk Flora Group. Reports were also abstracted from postings and blogs on the following websites: BirdForum, Rare Bird Alert, UK Butterflies, and the websites of the NNNS, NWT and RSPB. Where posters real names could not be ascertained they are shown as [i] in the report.

In conclusion it remains for me to thank all the recorders for their efforts; none of this would be possible without their hard work.

Andy Brazil. 47, Cavell Road, Lakenham, Norwich NR1 2LL recorder@norfolkbutterflies.co.uk

Moths

Jim Wheeler

Over 127,641 records of 1,326 species of moth were logged in 2014, the most moth data ever recorded for Norfolk. Below and in Table 1 is a selection of notable records taken from the 2014 data, including ten (possibly 12) species new for Norfolk, plus two new for vice-county 28 (West Norfolk) and five new for vice-county 27 (East Norfolk). The list also includes several species recorded this year that were last listed by C.G. Barrett in Victorian times.

Amphisbatis incongruella A plain-looking small moth, the males flying on sunny days. The first post-Victorian Norfolk record was a male taken at Dersingham on 1 April (gen. det. R. Jones).

Scarlet Tiger *Callimorpha dominula* A spectacular adult moth was bred from a single caterpillar found on 9 April in a ladies lavatory at Martham (D. Holman, C. Stean). The first post-Victorian Norfolk record, but how it got there remains a mystery.

Psychoides verhuella New for Norfolk. Several specimens were collected from Hart's-tongue Fern *Phyllitis scolopendrium* in a Heacham garden (P. Cobb, collected 10 April, emerged 13 May; (gen. det. (male and female) J. Wheeler) Adult moths are day-flying and similar to the other fern-feeding Psychoid, *P. filicivora*, but show a violet tinge and lack the white tornal spot.

Lampronia luzella Found very locally in woodland throughout Britain, a specimen was netted at Ashwellthorpe VC27 by A. Musgrove on 10 May. The first post-Victorian Norfolk record.

Diplopseustis perieresalis New for Norfolk. Recorded at Bawdeswell on 10 June (D. Appleton) possibly originating from

the garden centre half a mile away? The first record of this species in Britain was from Tresco, Isles of Scilly, in 2001. All UK specimens are thought to be either migrants or introduced through accidental importation of plants from Asia. There is no evidence of breeding in the UK.

Stigmella magdalenae New for Norfolk and possibly the first known occurrence in eastern England. Leaf mines on Rowan *Sorbus aucuparia* were found at Holt Country Park on 5 July (S. Wright).

Endothenia ustulana New for Norfolk? Recorded at Repps-with-Bastwick on 18 July (S. Wright). Victorian records are thoroughly confused, and historic distribution maps show an unknown VC28 reference but this may refer to *E. pullana*.

Silvery Gem *Eucarta virgo* The first for Norfolk and second UK specimen was trapped at Weybourne on 23 July (R. Eagling). The third UK record was at Blythburgh, Suffolk (VC25), on 24 July 2014. Photo: Plate 5.2. p 54.

Metalampra italica New for Norfolk. Three of these rare migrant Italian moths have been trapped in Norfolk this year. Provisionally recorded at RSPB Titchwell VC28 on 29 July with a confirmed female recorded at Bawdeswell VC27 on 1 August (D. Appleton, gen. det. J. Clifton). A third specimen was trapped at North Elmham on 27 August (D. Appleton).

Epinotia cinereana New for Norfolk? Wheatfen, 16 August (K. Saul - NMS, gen. det. D. Hipperson). Regarded as a distinct species in 1914, but treated as a greyish form of *E. nisella* (f. *cinereana*) from 1972 until 2012. Currently regarded as a distinct species.

Pammene spiniana Methwold VC28 on 4 September (G. Geen, gen. det. J Clifton). The first post-Victorian Norfolk record. Mainly a day-flying species showing a distinctive triangular white dorsal blotch.

Bryotropha basaltinella New for Norfolk. North Elmham VC28 on 2 September (D. Appleton, gen. det. J. Clifton). A moss-feeding gelechid, often found in urban areas and near old buildings, mainly in southern England, but scattered northwards to Northumberland.

Crimson Speckled *Utetheisa pulchella* New for Norfolk. Rare migrant from the Mediterranean and North Africa, with around 100 UK records in the last century. An adult moth was flushed from some sandy turf at Burnham Overy Dunes in October. (J. Lowen, T. Stuart, 18/10/14). Photo: Plate 5.1. p. 54.

Epermenia aequidentellus New for Norfolk. Recorded at Burgh St Peter VC27 on 30 October (B. Jones, gen. det. J Clifton). Nationally Scarce (Na), found in southern England, Wales and the West Country, at predominantly coastal locations. This may be the first occurrence in Eastern England.

Full details and photos of these and other records can be found on the website www.norfolkmoths.co.uk, along with various methods to submit your own records if you have not yet done so, including the *Online Recorder*.

NB Gen. det. = determined by examination of genitalia.

Jim Wheeler. Iveygreen, Town Street, Upwell, Wisbech PE14 9AD jim@norfolkmoths.org.uk

Table 1. County and vice-county Norfolk records 2014 (listed by date recorded)

Date 2014	Taxon	No.	VC	Location	Recorder	Stage	Comment
14/03	Dotted Chestnut <i>Conistra rubiginea</i>	1	27	Norwich	Alan Dawson	Adult	New VC27
17/03	<i>Pammene giganteana</i>	1	27	Crosthwait Heath	Mick A'Court	Adult	Post-Vic VC27
30/03	<i>Mompha jurassicella</i>	1	28	Dersingham	Dick Jones	Adult	Post-Vic VC28
01/04	<i>Amphisbatis incongruella</i>	1	28	Dersingham	Dick Jones	Adult	Post-Vic Norfolk
09/04	Scarlet Tiger <i>Callimorpha dominula</i>	1	27	Martham	Dave Holman	Larva	Post-Vic Norfolk
10/04	<i>Psychoides verhuella</i>	0	28	Heacham	Paul Cobb (det. J Wheeler)	Larvae	New Norfolk
30/04	<i>Clepsis senecionana</i>	1	27	Catfield Fen	Mick A'Court	Adult	Post-Vic VC27
10/05	<i>Lampronia luzella</i>	1	27	Ashwellthorpe	Andy Musgrove	Adult	Post-Vic Norfolk
18/05	<i>Scythris potentillella</i>	1	28	East Wretham	Stella Beavan	Larva	New Norfolk
03/06	Rosy Marbled <i>Elaphria venustula</i>	1	27	Eccles	Neil Bowman	Adult	New VC27
09/06	<i>Hellinsia carphodactyla</i>	1	27	Glandford	Greg Bond	Adult	New VC27
10/06	<i>Diploseustis perieresalis</i>	1	27	Bawdeswell	Dave Appleton	Adult	New Norfolk
05/07	<i>Stigmella magdalenae</i>	1	27	Holt	Stewart Wright (det. R Edmunds)	Mine	New Norfolk
12/07	<i>Oncocera semirubella</i>	1	28	Flitcham	Dick Jones, Jim Swalwell	Adult	New VC28

continued on next page

Date 2014	Taxon	No.	VC	Location	Recorder	Stage	Comment
18/07	<i>Endothenia ustulana</i>	1	27	Repps-with-Bastwick	Stewart Wright (det. D Hipperson)	Adult	New Norfolk(?)
23/07	Silvery Gem <i>Eucarta virgo</i>	1	27	Weybourne	Richard Eagling	Adult	New Norfolk
26/07	<i>Stigmella sakhalinella</i>	1	27	Upton Fen	NMS (det. R Edmunds)	Mine	New VC27
29/07	<i>Metalampra italica</i>	1	28	Titchwell	RSPB Staff (det. J Clifton)	Adult	New Norfolk
01/08	<i>Metalampra italica</i>	1	27	Bawdeswell	Dave Appleton (det. J Clifton)	Adult	New VC27
16/08	<i>Epinotia cinereana</i>	1	27	Wheatfen	Ken Saul (det. D Hipperson)	Adult	New Norfolk(?)
02/09	<i>Bryotropha basaltinella</i>	1	28	North Elmham	Dave Appleton (det. J Clifton)	Adult	New Norfolk
04/09	<i>Pammene spiniana</i>	1	28	Methwold	Graham Geen (det. J Clifton)	Adult	Post-Vic Norfolk
10/10	<i>Bacotia claustrilla</i>	2	28	Thompson Water	Stephen Youngs (Bred)	Larvae	New Norfolk
11/10	<i>Bedellia somnulentella</i>	1	28	Betty's Fen	John Langmaid, Brian Elliott NMS	Larva	New VC28
18/10	Crimson Speckled <i>Utetheisa pulchella</i>	1	28	Burnham Overy Dunes	James Lowan Tom Stuart	Adult	New Norfolk
30/10	<i>Epermenia aequidentellus</i>	1	27	Burgh St Peter	Brian Jones (det. J Clifton)	Adult	New Norfolk

Hoverflies

Stuart Paston

During 2014 Roger Morris and Stuart Ball, organisers of the national Hoverfly Recording Scheme, paid two visits to Norfolk to undertake courses for experienced recorders who wanted to improve their skills. Both courses were much appreciated by the trainees and we now have a nucleus of dedicated and enthusiastic recorders prepared to tackle the more difficult genera. The effect of this was apparent from the datasets received, with a high number of less common species amid an overall tally of 123 species for the year, including three additions to the Norfolk list.

The National Status, where given below, follows Ball & Morris (2014).

Species new to Norfolk

Callicera rufa. A female of this Nationally Scarce hoverfly was discovered at Holme Dunes NWT reserve, TF717450, on 13 July 2014 by Robert Smith, who encountered it resting on a wooden structure close to the coastal footpath in the vicinity of pines. It was identified by Joan Childs and Roger Morris from a photograph forwarded to the UK-hoverflies website. Formerly confined to the Caledonian pinewoods of Scotland, where it was considered a rarity, this species has expanded its range into England in recent years. Other reports from Bedfordshire, Nottinghamshire, Shropshire and Staffordshire suggest that it is likely to be widespread. Recorders visiting pinewoods in Norfolk should be aware of the possible occurrence of this species and keep a lookout for adults, which may be found basking on trunks. The larva develops in water-filled rot holes in pines and the intention is to create artificial cavities in pine stumps at Holme in order to expand breeding sites

for the species and enable monitoring.

Cheilosia psilophthalma. Whilst on a visit to the Stanford Training Area (STANTA) on 23 April 2014 Nick Owens netted two male *Cheilosia* that were seen flying about a flowering gorse bush near Frog Hill, TL863911. They were subsequently identified as *Cheilosia psilophthalma* and confirmed as such by the author. The National Status of this relatively recent addition to the British list (Falk 2002) is Data Deficient, as there is doubt over the validity of some of the post-1980 records on the national database (Ball & Morris 2014). It is a species of unimproved grassland, the larva feeding on the aerial parts of Mouse-ear Hawkweed *Hieracium pilosella*; it is likely to occur more widely in STANTA and probably beyond in Breckland.

Heringia senilis. On 27 July 2014 a male of this species was swept from late-flowering sallow at Beeston Common, TG165426, by Nick Owens. The author confirmed the identification. This is currently considered a rare species nationally with few records since its addition to the British list (Jones 2001); its discovery at this site, well-studied entomologically over recent decades, provides further evidence of Beeston Common's importance to hoverflies. The larva of *senilis* are known to occur in poplar leaf galls created by the aphid *Pemphigus spirothecae* and poplars occur at Beeston not far from the capture area.

Other rare and Nationally Scarce species

Cheilosia cynocephala. A female of this Nationally Scarce species was found visiting Dandelion *Taraxacum officinale* in

early April 2014 at Abbey Track, North Creake, by Dave Brice. It was determined by Tony Irwin. East Anglia is one of the strongholds of this species but there have been rather few recent records from Norfolk. Most records are from calcareous localities which support the main foodplant, Musk Thistle *Carduus nutans*.

Cheilosia pubera. This Nationally Scarce species tends to occur around the scrubby edges of fens and wet pasture with most records from West Norfolk. However in Lincolnshire it has been found in woodland sites where the larval foodplant Wood Avens *Geum rivale* occurs (Roger Morris pers.comm) and may well be present in such sites in Norfolk. The only 2014 record received came from Beeston Common (Nick Owens).

Cheilosia velutina. This Nationally Scarce species was recorded by Dave Brice at two sites in North Creake in 2014. It is widespread in the UK but relatively few records are received each year (Ball & Morris 2014) and these are mostly from calcareous localities which support the main food plant, Musk Thistle *Carduus nutans*.

Eupeodes goeldlini. A female *Eupeodes* found about Cow Parsley *Anthriscus sylvestris* and bramble *Rubus* sp. at Meadow Gate, Sculthorpe Moor, TF900304, on 19 June 2014 was subsequently determined as *Eupeodes goeldlini* by Roger Morris. Confirmation of the species in Britain (Speight *et al.* 2007) refers to a specimen taken at Upton, Norfolk, on 18 July 1983 by W. Erwin which was later identified as *goeldlini* by D. Levy. There have been no further Norfolk records in the intervening years but as this species is only subtly different from *E. bucculatus* checking specimens of that species in collections could produce further records. Nationally this is a rare species with the few records coming from in southern England.

Triglyphus primus. Dave Brice recorded this small, Nationally Scarce fly at two sites in North Creake, at one of which, Abbey Track, it was seen frequently at umbellifer flowers in the latter half of July. He also found it at West Acre layby. The larvae are believed to be dependent on the aphid *Cryptosiphon artemisiae* which creates galls on Mugwort *Artemisia vulgaris*. This is an infrequently recorded species in Norfolk with data mainly from the western side of the county.

Xylota xanthocnema. Dave Brice discovered a male of this Nationally Scarce species on a bramble leaf at The Walks, North Creake, TF859381, on 22 June 2014. This woodland species is widely spread across the southern half of England but the only other county record in recent times is from East Norfolk.

Xylota abiens. A male of this Nationally Scarce species was found on 8 June at Upton Fen, TG3813, by Tracy Money and Andy Gardiner. There are scattered records for Norfolk with the most recent from the Broads.

Further noteworthy records

Brachypalpoides lentus. On 23 May Andy Gardiner and Tracy Money found and photographed a mating pair of this striking species in the grounds of Wymondham College, TG 075985. The larva develops in the decaying heartwood of trees, often in decaying roots, with a seeming preference for Beech *Fagus sylvatica*, but veteran oaks, which are a component of this site, are also likely to be used. It has a strong association with ancient woodland and is not infrequent nationally but there are very few Norfolk records. Photo: Plate 5.3. p. 54.

Cheilosia grossa. This early spring hoverfly is poorly recorded in Norfolk with mostly pre-1985 records on the Hoverfly Recording Scheme database. Evidence that this gives a manifestly false

impression of the species as very scarce was provided by the receipt of records from widely separated areas of the county in 2014. Records supplied by Nick Owens from Swanton Novers, Weybourne and Wiveton were of particular interest as they arose from the bycatch of yellow water traps used to target aculeates in the vicinity of willows *Salix* spp. The adults can be found visiting Sallow, Coltsfoot *Tussilago farfara* and Dandelion, hence the attraction of yellow traps, but they have also been reported at Blackthorn *Prunus spinosa*, so white traps are likely to be a productive lure too. The area of north Norfolk covered by these records has seemingly lacked any reported occurrence of the species in the past. The same recorder also found it at Earsham whilst Andy Musgrove succeeded in netting both sexes from sites at Shotesham. It doubtless awaits discovery at many thistle-rich sites around the county and it is suggested (Falk, Flickr hoverflies) that Spear Thistle *Cirsium vulgare* in particular may be a significant food plant.

Cheilosia lasiopa. This local species was recorded at Sheringham Park Meadow (a female; water trap) and Weybourne by Nick Owens.

Cheilosia latifrons. A male of this species, infrequently recorded in Norfolk, was discovered on 21 April by Tracy Money and Andy Gardiner at Hethersett, TG1405. The site is an area of damp grassland near a lake.

Cheilosia scutellata. The author discovered a female at Hogweed *Heracleum sphondylium* at Catton Park, Norwich, on 4 July. The only other record received was of a female in a beet field at Weybourne on 3 September (Nick Owens). The larvae develop in fungi with records from *Amanita*, *Lactarius*, *Russula* and many boletes (Chandler, 2010), so there is certainly scope for finding this species widely in Norfolk. There have been few records from this century.

Cheilosia soror. Records were received from North Creake (Dave Brice), and from Natural Surroundings (Bayfield) and Weybourne (Nick Owens). It is a widespread but local species of calcareous grassland, scrub and woodland rides.

Cheilosia urbana. Found at four locations in STANTA in April by Nick Owens. This extensive area is likely to support a large population of this local species.

Criorhina berberina. One record from Damgate Wood, Acle (Martin Greenland).

Criorhina floccosa. Records came from Beeston Regis (Francis Farrow), Horsey Corner (Tim Hodge) and Felbrigg Park and Thorpe Great Heath STANTA (Nick Owens).

Criorhina ranunculi. Nick Owens supplied records from Blickling, Swanton Novers Great Wood and Thorpe Great Heath, STANTA. In exceptional circumstances this species can occur in very large numbers about Sallow blossom and Cherry Laurel *Prunus laurocerasus* and undoubtedly other spring flowering shrubs, and such observations elsewhere in the UK in 2014 indicated it had a very good year.

Didea fasciata. Recorded in October at Sheringham (Francis Farrow) and two sites in Weybourne (Nick Owens) where Hogweed flowers and Ivy blossom were the attraction. Appears to be a scarce species in Norfolk.

Orthonevra nobilis. A male was found on Upright Hedge-Parsley *Torilis japonica* at Roadhills, North Creake, in early August by Dave Brice. Individuals of this species are prone to wandering a long distance from their wetland breeding sites. The only record of this genus received.

Pipiza notata. A male was discovered at Woodbastwick Fen by Andy Musgrove. Past records are few but indicate it is widespread in the county.

Platycheirus ambiguus. This spring species was discovered at Langford and Stanford (STANTA) by Nick Owens. Current data suggests it is very scarce in Norfolk but like other species with an early flight period it may be significantly under recorded.

Portevinia maculata. Knowledge of the Norfolk distribution of this species was considerably enhanced following a targeted survey undertaken in 2014. Recorders visiting woodland supporting the food plant Ramsons *Allium ursinum* found eight new sites, extending the distribution to five new 10 km squares. More potential sites remain to be checked. Full details can be found in *Natterjack*, August 2014.

Scaeva selenitica. Tracy Money recorded a male of this species in her Hethersett garden on 2 August. This is a distinctive hoverfly but records for Norfolk are rather few.

Volucella bombylans. On 17 June John Furse photographed an apparently all black male *Volucella* at Holt Country Park which led to some head scratching and debate on social media before it was pronounced an unusual form of *V. bombylans* by Roger Morris. The presence of a few ginger hairs at the tip of the abdomen, visible under closer inspection, gave support to this, indicating it was an aberrant specimen of the widespread form which mimics the Red-tailed Bumblebee *Bombus lapidarius*.

Volucella inflata. Among records of this species received from eight sites was a photograph of a mating pair at Strumpshaw Fen where the observer, Rob Coleman, also witnessed several round a sap-run on a tree near Tower Hide in early June. The other records were from Damgate Wood, Acle (Martin Greenland), Ashwellthorpe (John Furse), Holt Country Park (JF), two sites in North Creake (Dave Brice), Sheringham Park (RC) and Swanton Novers Great Wood

(Nick Owens). There is clear evidence from these widely scattered records that *inflata* is expanding its range in the county.

Xanthandrus comtus. The author found a female of this species at Hogweed in Earlham Cemetery, Norwich, on 26 June, a new record for the site. Other records were supplied by Dave Brice who encountered it frequently at North Creake in June and July and also at Sculthorpe Moor in late July, and Nick Owens who found it at flowering Sallow in late July at Beeston Common. These widely scattered records indicate that this migratory species had a strong presence in Norfolk in 2014.

Concluding remarks

Whilst the above summary gives some indication of the wealth of species that could be found in the county in 2014, the overall picture is far from heartening: some of our commoner species were reported in diminishing numbers in gardens by long-term monitors despite predominantly good weather and this is undoubtedly true of the situation in the wider countryside outside hotspots.

Although this report focuses on species found by a limited number of recorders I would like to assure everyone who contributed data that their records are very much appreciated; please keep sending them in. In the words of Roger Morris "It looks like Norfolk is growing to be a major centre of recording".

Acknowledgements

I would like to thank Andy Gardiner for permitting his photograph of *Brachypalpoidea lentus* to accompany this report.

References

- BALL, S.G. & MORRIS, R.K.A. 2013. *Britain's Hoverflies: an introduction to the hoverflies of Britain*. Princeton University Press. Woodstock, Oxfordshire. 297 pp.

- BALL, S.G. & MORRIS, R.K.A. 2014. A review of the scarce and threatened flies of Great Britain: Part 6: Syrphidae. *Species Status* 9: 1-130. Joint Nature Conservation Committee. Peterborough.
- BALL, S.G., MORRIS, R.K.A., ROTHERAY, G.E. & WATT, K.R. 2011. *Atlas of the Hoverflies of Great Britain (Diptera, Syrphidae)*. Biological Records Centre. Wallingford.
- CHANDLER, P. 2010. Associations with Fungi and Mycetozoa. In: Chandler, P. (Ed.) *A Dipterist's Handbook*. The Amateur Entomologist 15: 438. Orpington. Kent.
- FALK, S.J. 2002. *Cheilosia psilophthalma* Becker, 1894 (Diptera, Syrphidae) confirmed as present in Britain. *Dipterists Digest* 9: 87-93.
- FALK, S.J. Flickr hoverflies. <http://www.flickr.com/photos/63075200@NO7/collections/7215629600153789/>
- Hoverfly Recording Scheme. www.hoverfly.org.uk/portal.php
- JONES, R.A. 2001. *Heringia senilis* Sack (Diptera, Syrphidae): a hoverfly new to Britain. *British Journal of Entomology and Natural History* 14: 185-194.
- SPEIGHT, M., SARTHOU, J-P. & LEVY, D. 2007. *Eupeodes goeldlini* (Diptera, Syrphidae) new to Britain, France and Ireland, with a key to separate it from related species. *Entomologist's Record and Journal of Variation* 119: 213-219.
- UK-Hoverflies. <http://tech.groups.yahoo.com/group/UK-Hoverflies>

Stuart Paston. stuartpaston@yahoo.co.uk

Beetles

Martin Collier

This summary deals mainly with records from 2013 and 2014. Eighteen species were added to the county list in 2013, a remarkable total, and a further ten were discovered in 2014. There were also a few new vice-county records and some species were re-discovered after intervals of over 100 years (see Table 1). Species are listed in alphabetical order by family and species using the nomenclature of Duff (2012). More detailed accounts for many of the records are given in Collier and Lane (2013 & 2015).

Several beetles are added to the British list each year, mostly it seems after being found in the London area or the extreme south-east of England. Sometimes these are recognised as being something new at first sight, or when the specimen is identified properly shortly afterwards, but in other cases it is not until much later that a beetle's true identity becomes apparent. This is what happened when Andrew Duff re-examined a specimen he had previously assumed to be *Tanysphyrus lemnae*, a common weevil feeding on duckweeds, and realised that it did not quite match his other specimens. Further investigation established that this specimen, found at Thompson Common in 2011, was actually *Tanysphyrus ater*, a similar species associated with aquatic liverworts and not previously recorded from the British Isles. Other species whose discovery in Norfolk was of particular interest or surprise include: *Carabus arvensis* (Plate 4.1, p. 51), a large ground beetle found in numbers at two west Norfolk sites, for which there are no other modern county records; *Panagaeus cruxmajor* (Plate 4.2, p. 51), a strikingly-coloured Red Data Book ground beetle not seen in Norfolk for over 100 years; *Elater ferrugineus* (Plate 4.3, p. 51), a large red click beetle formerly considered to be very rare and restricted to a few British sites but recently shown to be more widespread

by the use of a synthetic female pheromone. Other species have been expanding their range in Britain, sometimes after arriving relatively recently, and a number of these have now reached Norfolk. These include the ladybird *Rhyzobius lophanthea*, the weevils *Magdalis memnonia* (on pines *Pinus*) and *Rhinocyllus conicus* (Plate 4.4, p. 51, on thistles *Cirsium* and *Carduus*), the rove beetle *Philonthus spinipes* (in dung) and the pollen beetles *Meligethes haemorrhoidalis* (on White Dead-nettle *Labium album*) and *M. matronalis* (on Dame's Violet *Hesperis matronalis*).

Although some of these records are undoubtedly associated with real changes in the distribution or abundance of species within the county, it is also very clear that most of the recent discoveries are a direct result of the incredible amount of field work being done by Steve Lane, who has been recording beetles at an astonishing rate since moving to Norfolk in 2013. Steve has produced many thousands of records in this time – about twice as many as all other visiting and resident recorders combined in the same period. As well as finding many rarities, Steve has given equal recording attention to the common species and has bravely targeted some of the 'agricultural deserts' in the poorly-recorded 10km squares in the far west of the county. This remarkable level of productivity is extremely valuable in developing a more accurate picture of the distribution of the beetles in the county, especially in VC 28.

Correction: A 2011 record for *Euplectus infirmus* was reported as being the first for the county in Collier (2013) but two earlier records have subsequently been received from Peter Hammond, who identified the relevant specimens: Cromer, [TG 24], August 1949, H.R. Last; South Wootton, [TF 62], April 1978, M.I. Russell.

Table 1. New county and other significant beetle records in 2013 & 2014.

Species	Locality	Grid ref.	Date	Recorder	Norfolk status
<i>Omonadus bifasciatus</i>	Brockdish	TM2080	11.vii.2013	MJC	1 st county ¹
	Bawsey	TF6919	24.x.2013	SAL	1 st VC 28
<i>Squamapion cineraceum</i>	Cranwich Heath	TL7794	24.ix.2013	SAL	1 st county
<i>Trachys troglodytes</i>	Cranwich Heath	TL7893	22-27. vi.2013	MJC	1 st county ²
<i>Cantharis fusca</i>	North Norfolk ³	TG04	25.v.2014	GN	1 st county
<i>Carabus arvensis</i>	Shouldham Warren	TF6810	10.iii-18. iv.2014	SAL	1 st modern
	E. Winch Common NR	TF7015	17.iii-12. iv.2014	SAL	
<i>Dyschirius angustatus</i>	Brecks [confidential]	TL78	10- 23.v.2014	SAL	1 st county
<i>Panagaeus cruxmajor</i>	Holme NR	TF7144	1.x.2014	SAL	1 st modern and 1 st VC 28
<i>Zabrus tenebrioides</i>	Thetford	TL8686	7.viii.2014	SAL/MGT	2 nd modern
<i>Chaetocnema confusa</i>	Litcham Common	TF8817	5.iii.2014	SAL	1 st county
<i>Longitarsus fowleri</i>	Snettisham Country Park	TF63	8.iii.2013	MJC/ AGD/BLS	1 st county
<i>Rhyzobius lophanthae</i>	Blickling Park	TG1729	3.ix.2014	AJA	1 st county
	Hunstanton and Holme areas	TF64/74	xi-xii.2014	SAL	1 st VC 28
<i>Cicones undatus</i>	Frost's Common	TL9493	23.x.2014	SAL	2 nd county
<i>Anoplus roboris</i>	Foxley Wood NR	TG0522	21.v.2014	MJC/SAL	2 nd modern
<i>Calosirus terminatus</i>	East Winch sand pit	TF6917	16.iii.2014	SAL	1 st modern
<i>Datonychus urticae</i>	Cockleycley Wood	TF7705	iv.2014	SAL	1 st county
<i>Glocianus pilosellus</i>	Cranwich Heath	TL7893	19.vi.2013	MJC	1 st county
<i>Magdalis memnonia</i>	Methwold	TL7594	29.vi.2013	AGD	1 st county
<i>Rhinocyllus conicus</i>	Nar Valley Fisheries (Middleton Pits)	TF6812	28.viii.2013	MJC	1 st county
<i>Rhinusa collina</i>	Cranwich Heath	TL7893	27.vi-11. vii.2013	MJC	1 st county
<i>Romualdius bifoveolatus</i>	West Runton & Beeston Regis	TG1743	vi-ix.2014	MJC	1 st county? ⁴
<i>Elater ferrugineus</i>	Stanford Training Area	TL8392 & TL8496	5.viii.2013	MJC	1 st county
	Attleborough	TM0594			

Continued on next page

Species	Locality	Grid ref.	Date	Recorder	Norfolk status
<i>Prokraerus tibialis</i>	Oxburgh Hall	TF7400	7-27. vi.2013	MJC	1 st county
<i>Tanysphyrus ater</i>	Thompson Common	TL9396	26.vi.2011 ⁵	AGD	1 st county
<i>Eucinetus meridionalis</i>	Cockleycley Wood	TF7705	2.x.2013	MJC	1 st county
<i>Hylis olexai</i>	Holme NR	TF7243	28.vii.2014	SAL	2 nd county
<i>Helophorus longitarsis</i>	Holme NR	TF7043	7.vii.2014	SAL	1 st since 1970s and 1 st VC 28
<i>Atholus bimaculatus</i>	Tattersett	TF8430	22.ix.2013	SAL	1 st modern
<i>Choleva lederiana</i>	Wiggenhall St. Germans	TF5914	19.x-20. xii.2013	SAL	1 st county ⁶
<i>Mordellistena secreta</i>	Larling	TL9789	15.vi.2013	MJC (det. BL)	1 st county
<i>Mordellistena acuticollis</i>	Brecks [confidential]	TL78	12.vi.2014	SAL	1 st county
<i>Meligethes haemorrhoidalis</i>	Barton Bendish Methwold Severals	TF7306 TF6697	2.iv.2014	SAL	2 nd county
<i>Meligethes matronalis</i>	Barnham Broom	TG0707	11.vi.2013	AGD (det.RGB)	1 st county
<i>Aphodius coenosus</i>	Roydon Common NR	TF6822	1.v.2013	SAL	1 st modern
<i>Aphodius porcus</i>	Hoe Rough NR	TF9716	9.x.2014	MJC	1 st modern
<i>Anotylus insecatus</i>	King's Lynn	TF6118	30.iv.2014	SAL/AJA	2 nd county
<i>Anotylus nitidulus</i>	Oxburgh Hall	TF7400	11.viii-5. ix.2013	MJC	1 st modern
<i>Bisnius pseudoparcus</i>	Wolferton	TF6627	30.ix.2013	SAL	1 st county ⁷
<i>Dropephylla gracilicornis</i>	Derby Fen	TF7020	24.x.2013	SAL	1 st county
<i>Gabrius keysianus</i>	East Wretham Heath NR	TL9088	5.viii.2014	SAL	1 st county
<i>Oxytelus piceus</i>	East Winch	TF6916	5.ix.2014	SAL	1 st county ⁸
<i>Philonthus spinipes</i>	Gayton	TF7318	9.ix.2013	SAL	2 nd county
<i>Quedius fulgidus</i>	Holme NR	TF7144	14.vii.2014	SAL	1 st modern
<i>Quedius lyszkowskii</i>	Stanford Training Area	TL8895	30.iii-13. iv.2014	BLS	1st county
<i>Scydmaenus rufus</i>	Roydon Common NR	TF6822	1.x.2013	SAL	2 nd county
<i>Stenus geniculatus</i>	Roydon Common NR	TF6821	1.xii.2013	SAL	1 st county
<i>Xanthomus pallidus</i>	Snettisham	TF6432	5.ix.2013	SAL	1 st since 1969
<i>Myrmechixenus vaporariorum</i>	Oxburgh Hall	TF7401	2.x.2013	MJC	1 st county

Footnotes on next page.

Initials in Table 1 represent the following recorders: AGD = Andrew Duff; AJA = Tony Allen; BL = Brian Levey; BLS = Bryan Sage; GN = Geoff Nobes; MGT = Mark Telfer; MJC = Martin Collier; RGB = Roger Booth; SAL = Steve Lane.

Footnotes

¹A previous published Norfolk record (Telnov 2010) should be disregarded as it was based on an incorrectly identified specimen of doubtful origin (MJC).

²Previous Norfolk records for '*troglydites*' have been shown (or are assumed) to be for *T. subglaber*, a very similar and more widespread species only recently recognised.

³Full details awaiting publication in *The Coleopterist*.

⁴Previous Norfolk records for '*bifoveolatus*' probably refer to *R. angustisetulus*, a similar and much more common species only recently recognised.

⁵Included in this review because only recently recognised and published as a new British species (Duff 2014).

⁶Older specimens may exist as this species has only recently been separated from *C. agilis*.

⁷Older specimens may exist; *parcus*, *pseudoparcus* and *sordidus* can only be reliably separated by examination of the aedeagus.

⁸A record for Thompson Common in the Invertebrate Site Register (Foster 1987) is considered to be erroneous as there is no supporting specimen or journal entry (A.B. Drane pers. comm.).

References

- COLLIER, M. 2013. Wildlife Report 2011: Beetles. *Transactions of the Norfolk & Norwich Naturalists' Society* 45 (2012): 108-114.
- COLLIER, M.J. & LANE, S. 2013. Recent Norfolk beetle records, including 29 additions to the county list and a few corrections. *The Coleopterist* 22: 89-98.
- COLLIER, M.J. & LANE, S. 2015. Recent Norfolk beetle records, including twelve additions to the county list. *The Coleopterist* 23: 46-52.
- DUFF, A.G. (ed.) 2012. *Checklist of Beetles of the British Isles*. 2nd edition. Iver: Pemberley Books, 174 pp.
- DUFF, A.G. 2014. *Tanysphyrus ater* Blatchley, 1928 (Eirrhinidae) new to the British Isles. *The Coleopterist* 23: 49-50.
- FOSTER, A. 1987. *Review of invertebrate sites in England, Norfolk Breckland and South Norfolk*. Invertebrate Site Register, Report No. 94, Parts 1 & 2. Peterborough: Nature Conservancy Council.
- TELNOV, D. 2010. Ant-like flower beetles (Coleoptera: Anthicidae) of the UK, Ireland and Channel Isles. *British Journal of Entomology and Natural History* 23(2): 99-117.
- Martin J. Collier.** Four Winds, Church Close, West Runton, Norfolk NR27 9QY
norfolk.beetles@gmail.com

Freshwater Invertebrates

Dan Hoare

2013

As this is my first report as county recorder for freshwater invertebrates, I acknowledge that the contents of this brief report for 2013 and 2014 are all records collected and submitted by others. As such, this report is a collation of novel and interesting records from around the county. The records cover a wide range of invertebrate taxa found in freshwaters that are not in groups covered by other county recorders, e.g. beetles and dragonflies. The taxonomic groups covered by this report include aquatic bugs (Heteroptera); freshwater crustaceans (Malacostraca); aquatic molluscs (Gastropoda & Bivalvia); aquatic arthropods; aquatic life stages of mayflies (Ephemeroptera) and caddis flies (Trichoptera); plus others. I also recognise the weighting of reports from the Broads area, but hopefully this will stimulate submission of more freshwater records from the rest of the county. Appreciation must go to Robert Yaxley and Andy Musgrove, who have both been very diligent and submitted records from their local area of aquatic species, rare and common alike.

Since the first Norfolk record at Barton Broad in March 2012 by Environment Agency staff, the non-native gammarid shrimp *Dikerogammarus villosus* has been found throughout the northern Broads river system. At the start of 2013, *D. villosus* was known to occur along the River Ant from Wayford Bridge down to the confluence with the River Bure; along the River Bure from Wroxham Broad down to St Benet's Abbey, and up the River Thurne as far as Potter Heigham. The initial intensive sampling of c. 280 locations to establish the distribution of *D. villosus* within the Broads was co-ordinated by the GB Non-Native Species Secretariat, involving staff from

the statutory conservation organisations. By May 2013, *D. villosus* had spread further downstream on the River Bure to Acle Dyke and was found at many more locations within the Bure and Ant river system. By August 2013 further specimens were found upstream on the River Ant to Dilham. A campaign of promoting water users to 'Check, Clean, Dry' all equipment after use to prevent the spread of this potentially ecologically damaging species was initiated. Reports were received of *D. villosus* being found attached to floating vegetation and debris in the River Bure, potentially allowing it to move upstream with the tide.

Work by Paul Lee during the Broads Authority funded Broads Turf Pond Survey in July 2013 provided many valuable records for seldom-recorded wetland sites (Lee, 2014). Highlights included the Lesser Water Boatman *Sigara iactans* from turf ponds at Barton Turf and Catfield. This corixid is infrequent nationally and appears to have a marked East Anglian distribution, though this may change as further confirmed records emerge. *Sigara semistriata*, a corixid with a distribution focused in Norfolk within the Broads, was also found at How Hill. Records of other more frequent heteropteran bugs, molluscs, leeches and mayflies were also generated during these surveys.

A visit by Dr Bernard Nau, surveying for the Aquatic Heteroptera National Recording Scheme, to Upton Great Broad in April 2013 produced 13 species of Corixidae, including *Cymatia bonndorffii*, and five *Sigara* species.

2014

In spring 2014, monthly 'Freshwater Study Group' meetings were held at the Wheatfen Study Centre, Surlingham. Informal

surveys were carried out at the pond at the Bergh Apton Conservation Trust site in Bergh Apton, in a small pond on Chedgrave Common and in ponds on the marshes at Claxton. Whilst species lists were produced, the main aim for attendees was to explore the identification of different taxonomic groups. Some interesting invertebrate communities were discovered in the ponds at Bergh Apton and Chedgrave. The Bergh Apton site has apparently undergone some periods of anoxia due to local enrichment from an old tip site. The faunal community was suggestive of this, as the Cladoceran zooplankton *Daphnia pulex* was abundant in open water and the benthic invertebrate community had a very low diversity, being completely dominated by *Asellus aquaticus* and Chironomidae larvae. The Chedgrave pond contained no obligate aquatic invertebrate taxa, with only the aquatic stages of insect species able to fly to the pond being present, suggesting regular periods of desiccation (later confirmed). The value of aquatic invertebrates in monitoring environmental condition is apparent even from relatively quick and simple investigations. Please contact me if you would like to come along to the Freshwater Study Group events.

Other records of note obtained in 2014 through the Biological Records Centre's online recording system iRecord (www.brc.ac.uk/irecord) included Chinese Mitten Crab *Eriocheir sinensis* from Glandford Mill on the River Glaven. The Chinese Mitten Crab spends most of its life in freshwaters, migrating to brackish/estuarine water to breed. Signal Crayfish *Pacifastacus leniusculus* was recorded from Mundesley Beck, with pictures of the specimens submitted online. **These records demonstrate the great potential that these non-native, invasive crustaceans have to reach otherwise isolated rivers.** iRecord is an easy-to-use online recording system for casual records and structured surveys alike, with in-built aids to verification.

References

- LEE, P. 2014. *Turf Pond Invertebrate Survey, 2013*.
Report for the Broads Authority, Norwich, UK.
Dr D. Hoare. daniel.j.hoare@gmail.com

Bryophytes

Mary Ghullam & Robin Stevenson

Amazingly, after so many years of recording, new vice-county and county records continue to be made; gratifyingly, some by relative beginners. Some equally important re-discoveries have also been made, of species thought to be extinct. The bulk of the records presented below, however, simply represent range extensions for species still deemed to be noteworthy. These additions have, in some instances (e.g. *Cololejeunea minutissima*), almost reached the point where they are no longer noteworthy.

Additions to the county are prefixed by two asterisks **; new vice county records are preceded by a single asterisk.

Nomenclature follows Hill *et al.* 2008.

2013

Acaulon muticum This very tiny arable moss, found only in east Norfolk, and, so far, only when fruiting, was recorded in a new 10km square on the edge of a field in Colby (TG 224304), 14 December 2013, MG.

Calypogeia arguta This small leafy liverwort was first recorded in 1967 during a British Bryological Society meeting in the county. There have been no records since then from west Norfolk, although it has been found in the east of the county. This year, however, it was re-found in the west, growing in wet *Molinia*-dominated woodland at White Hills Wood, Castle Rising (TF 68862490), 8 April 2013, CRS, and again on Dersingham Fen (TF 6822529709), where it was commonest on the sides of *Molinia* tussocks that had been affected by fire, 5 June 2013, JM & CRS.

Cirriphyllum crassinervium Also highlighted in our last report (Stevenson &

Ghullam 2013) this species was found growing on the chalky sides of an Iron Age hillfort (situated at the soaring height of 10 m). It was accompanied by other comparatively rare species such as *Porella platyphylla* and *Anomodon viticulosus*. Narborough Hall (TF 7520313058), 8 February 2013, CRS.

Cololejeunea minutissima This tiny leafy liverwort has been spreading steadily eastwards in the country over the last few years. This year it was found as an epiphyte on oak at Hudson's Fen, Pott Row (TF 6985922728), 28 February 2013, CRS.

Dicranella staphylina This is an extremely common weed of arable fields. It reproduces exclusively by means of rhizoidal gemmae and any expression of sexuality is very rare. On this occasion female plants, with large perichaetial leaves, were found at Titchwell RSBP Reserve (TF 7543), 13 February 2013, CRS & JD

Ephemerum recurvifolium A tiny moss of disturbed soil in arable fields. The capsule is much more conspicuous than the leaves and because of its small size it is probably somewhat under-recorded. Hunstanston Park (TF 6942), 6 January 2013, RJF.

Frullania tamarisci The first record for more than 20 years, when it was found growing epiphytically on sallow in Cranberry Rough in the early 1990s. The recent find was also on willow, at Bawsey Country Park (TF 6789019383), 15 March 2013, CRS; this further emphasises the importance of this site for bryophytes.

Leptobarbula berica The only previous record for this species in west Norfolk dates back to 1967, when it was found

growing on damp brickwork on the side of the Corn Exchange in King's Lynn. This second find was at the base of the north wall of Tatterford Parish church (TF 868265), 15 February 2013, MOH.

Microbryum rectum Another species of disturbed chalky arable soils, this was found growing with *Ephemerum recurvifolium* in the same field. Hunstanton Park (TF 6942), 6 January 2013, RJF.

*****Pallavicinia lyellii*** The translucent male thallii of this liverwort, initially thought to be *Moerckia*, were unexpectedly found by Jo Lester growing through a *Sphagnum* hummock during a Crested Bucker Fern *Dryopteris cristata* survey on a hover island in Barton Broad. This species, virtually unknown in East Anglia, is new to the county and was growing in an unusual habitat. Barton Broad (TG 35972155), 26 November 2013, JL.

*****Plagiothecium laetum*** New to east Norfolk, and the county as a whole. This species was growing on a rotting tree stump near water, in Marsham (aka Buxton) Great Wood (TG 17542271), 23 February 2013, CRS.

Pogonatum nanum A new 10km record and only the fourth for county and vice county since the *Flora*, this species was growing on the edge of ruts in forestry tracks in Burnt Plantation, Marsham (TG 178232), 23 February 2013, NBG.

Polytrichum strictum This plant, which is sensitive to high levels of nitrogen deposition, is probably decreasing. A small colony was found on East Winch Common (TF 6916), 8 February 2013, CRS.

Racomitrium aciculare Known previously only from a grave in Rosary Cemetery, Norwich, this plant was found growing on a concrete road in the middle of Hockering Wood (TG 0714), 14 February 2013, RJF.

Riccardia latifrons This is a species with a very restricted habitat - amongst

Sphagnum in bogs - so it is never going to be common in the county. Found during a survey of Dersingham Bog NNR (TF 6717028752), 5 July 2013, CRS & JM.

Sarmenthypnum exannulatum A rather undistinguished looking plant which is easily overlooked as either *Warnstorfia fluitans* or *Drepanocladus aduncus*. Derby Fen, Pott Row (TF 6920), 11 April 2013, CRS.

Seligeria calycina A specialist plant of chalk lumps found on the flanks of the hill fort in the grounds of Narborough Hall (TF 7520313058), 8 February 2013, CRS.

****Sphagnum teres*** The vegetation of Roydon Common is well recorded so this species came as a bit of a surprise. *S. teres* occurs in slightly less acid conditions than most of the species in the genus. Roydon Common (TF 688225), 24 April 2013, CRS; species such as *Plagiomnium elatum* occurred nearby.

Tomentypnum nitens A 'glacial relict' species, *Tomentypnum* was formerly known from several sites in East Anglia. Although searched for on several occasions it has not been seen on Roydon Common for many years and was considered probably extinct. This find, by Julia Masson, was - with Jo Lester's find of *Pallavicinia lyellii* (above) - one of the most exciting finds of recent years. Roydon Common (TF 6822), 27 March 2013, JM.

2014

Acaulon muticum Found again twice in 2014, in tiny amounts, not far from previously known sites. Both were on earth banks, the first by a stream on Felbrigg Hall Estate, Aylmerton (TG 189392), 6 January 2014, MG and the second on a roadside at Worstead (TG 296256), 28 December 2014, MG.

Barbilophozia attenuata This species was first recorded from Dersingham Bog NNR in 1967, when the late Eric Swann organised a British Bryological Society

meeting to west Norfolk. It persisted into the early 1990s but was then apparently lost when path widening and other conservation work took place. It was therefore a pleasant surprise when several strong colonies were re-discovered. Dersingham Bog NNR (TF 6789029257), 22 April 2014, CRS.

Cololejeunea minutissima As noted above this is a species 'on the move'. A large healthy colony on willow, Ling Common, North Wootton (TF 6528123878), 29 January 2014, CRS.

Ephemerum recurvirostrum The Fens remain a seriously underworked part of the county and as recording efforts increase it is likely that more of this stubble-field species will turn up. Finding it is, however, both hard on the knees and demanding of the eyesight. The searching process does serve to both amaze and amuse the denizens of the Fens. Stow Bardolph Fen (TF 5204), 11 December 2014, CRS.

**Fossombronia incurva* Long suspected as being in east Norfolk, but impossible to identify without fruiting material, this tiny lettuce-like liverwort was found twice within three days in two different parts of the vice county. Found first on a sandy track on Winterton Dunes NNR (growing with Allseed *Radiola linoides*), this specimen with immature capsules had to be grown on to maturity. Winterton (TG 48772105), 7 September 2014, MG. Before the capsules were ripe, another population was found with mature capsules, growing with *Pohlia annotina* and the tiny leafy liverwort *Cephaloziella hampeana* on a gravelly track in Weybourne Woods (TG 12374181), 10 September 2014, MG.

Leiocolea turbinata It was good to find this tiny leafy liverwort still growing on a bare chalky bank round the edge of a pond at Alderford Common, its only east Norfolk site, where it has been known

since 1974 (Swann 1975). (TG 128182), 29 June 2014, MG.

**Leucobryum juniperoideum* New to east Norfolk and the county as a whole, this was an unexpected find, growing in Febrigg Great Wood, where *Leucobryum glaucum* has been known for many years. Smaller and spikier than the latter, this species was growing in abundance up the bole of a mature Sweet Chestnut on the Felbrigg Hall estate, Aylmerton (TG 19544056), 26 November 2014, MG.

Lophozia capitata Sand and gravel pits in west Norfolk are some of the main areas in the UK where this plant is found. Unfortunately 'restoration work' and the growth of other vegetation has destroyed many of its habitats, so it was good to find a sizeable colony at a new site on a trampled path beside a lake. Blackborough End (TF 667148), 13 May 2014, CRS.

Nardia scalaris A small patch of this small leafy liverwort, with its clam-like leaves, was found close to the site of the *Fossombronia* (see above), growing with the same assemblage of bryophytes in the same habitat. This is a new 10 km record and only the third for east Norfolk. Weybourne Woods (TG 12504188), 10 September 2014, MG.

Orthotrichum speciosum Another epiphytic species that is re-invading areas previously subject to heavy air pollution; growing on a young oak on Ling Common, North Wootton (TF 6524523911), 29 January 2014, CRS.

Phascum cuspidatum var. *papillosum*. The second county record for this distinctive variety. Brancaster (TF 769424), 2 January 2014, JD.

Plagiomnium cuspidatum There are only a handful of records for this species, scattered across the county as a whole. This was only the second for west Norfolk. Pentney Common (TF 73721416), 19 December 2014, CRS & KR.

Pohlia bulbifera This species is only known in Norfolk from pond edges on Winterton Dunes, where it was recorded in 1995 by David Strauss. After such a long period it was good to find it still growing there in the same habitat, as well as on a sandy track with *Fossombronia* (see above). Winterton Dunes NNR at TG 49082084, 7 April 2014, MG & RWE; TG 48672136, 16 May 2014, MG.

*****Racomitrium heterosticum*** Found growing on the lid of a box tomb in St Martin's churchyard, this atypical specimen, new for east Norfolk as well as the county, was determined by the moss referee as *R. heterosticum* in its *R. obtusum* form. New Buckenham (TM 0890), 20 May 2014, RJF.

Tortula schimperi Only the second record for east Norfolk and the fifth for the county as a whole. This species has only recently been raised from subspecies to species status and is probably under-recorded as a result. Found on a roadside bank by Greshams' School on Boxing

Day. Holt (TG 092393), 26 December 2014, JD.

Recorders: CRS - Robin Stevenson; JD - Jim Dunsmuir; JM - Julia Masson; JP - Jo Lester; KR - Keith Redhead; MG - Mary Ghullam; MOH - Mark Hill; NBG - Norfolk Bryology Group; RJF - Richard Fisk; RWE - Bob Ellis.

References

- BECKETT, G., BULL, A. & STEVENSON, R. 1999. *A Flora of Norfolk*. Privately printed.
- HILL, M.O., BLACKSTOCK, T.H., LONG, D.G. & ROTHERO, G.P. 2008. *A Checklist and Census Catalogue of British and Irish Bryophytes*. Middlewich: British Bryological Society.
- STEVENSON, R. & GHULLAM, M. 2013. Bryophytes (Wildlife Report). *Transactions of the Norfolk and Norwich Naturalists' Society*, 46: 75-79.
- SWANN, E.L. 1975. *Supplement to the Flora of Norfolk*. Norwich: F. Crowe & Sons.

C.R. Stevenson. 111, Wootton Road, King's Lynn, Norfolk PE30 3DJ crs111@talktalk.net

M. Ghullam. 5, Beech Drive, North Walsham, Norfolk NR28 0BZ mylia@btinternet.com

Wildlife Report 2014

Fungi

Tony Leech

Rarities at Earlham Cemetery

Many fungi require specialist literature for critical identification but the Yew Club *Clavicornia taxophila* almost identifies itself - a pale cream spindle fungus with an obliquely truncate tip, growing under Yew *Taxus baccata*. The problem is finding it because it is small (10-20 mm tall) and very rare (with fewer than twenty British records). Ian Senior, however, did find it at Earlham Cemetery [TG 2108]. Remarkably, Ian was present a couple of months later, when Emma Harris, a participant on a

fungus identification workshop at Holt Hall [TG 0739], found it for the second time in Norfolk. Photo: Plate 5.6, p. 54.

For several years Ian has been assiduously recording fungi at Earlham Cemetery and his collection of the earthtongue *Geoglossum elongatum* has added another species to the Norfolk list. This species has scarcely a dozen British records and, like the Yew Club, is listed as endangered on the current Red Data List. The identity of an Earthtongue does, however, need confirming by an expert, in this case by Paul Cannon (RBG

Kew). Ian's tally for the cemetery has now reached 180 species, including *Sowerbyella radiculata* var. *radiculata*, a large yellow cup fungus found by Alex Prendergast in 2013, and ten species of waxcap.

Another poisonous mushroom

The word mushroom means different things to different people. Increasingly it is being used for all agarics (fungi with gills) and even for all fungi, following American usage. Mycologists, however, generally restrict the term to members of the genus *Agaricus*, 42 species of which are known in Britain (including 25 from Norfolk). Although the genus contains some excellent edible species, it is well known that the three species in which the flesh flushes bright yellow when broken can cause severe gastrointestinal upset when eaten. This account demonstrates that an additional *Agaricus* species, which does not turn yellow and occurs in Norfolk, is equally poisonous.

The story begins in November 2009 when hours after consuming a meal of mushrooms, collected from a garden lawn, a couple from North Norfolk felt distinctly ill. The symptoms experienced by the two, and the timecourse these followed, differed somewhat. Initially the woman had an uncomfortable feeling in her stomach which grew steadily to a dull but severe pain. About four hours later she vomited, after which the symptoms subsided and she felt relatively well by the next day. Her husband also had severe abdominal pain but did not vomit; his symptoms came in waves of decreasing frequency for three days. Neither suffered from dizziness or loss of balance but were understandably frightened by their experience.

After they had recovered, I was brought fresh specimens to see if I could identify them. Some possessed white rhizomorphs, root-like extensions from the base of the stem. This, and other characteristics, initially suggested that the culprit could

be either *A. bresadolanus* or *A. romagnesii*, species which are now synonymised (as *A. bresadolanus*) in the British Checklist (Legon & Henrici 2005). However, the lack of brown scales on the cap cast some doubt on this identification. In 2013, Anne Edwards (John Innes Centre) was able to confirm that the species responsible was indeed *A. bresadolanus* from molecular evidence (Edwards & Leech 2014)¹. *A. bresadolanus* is uncommon in Britain, and reported mostly from the Midlands and south-east England, often in parks and gardens. It was first recorded in Norfolk at Dersingham in 2009 (S. Rees) – and subsequently at Bayfield 2013 (foray) and Bunwell 2014 (Anthony Anson). Photo: Plate 5.4, p. 54.

The advice that 'true' mushrooms that do not turn strongly yellow on bruising, and that do not smell 'phenolic', are edible, must be revised. With a lack of brown scales on the cap, very slight reddening flesh in the cut stipe and no sign of yellowing, it is of concern that these Norfolk specimens would not have been assigned to *A. bresadolanus* using Kibby's (2011) synoptic key, or illustrations in Cortecuisse & Duhem (1995) or Buczacki (2012). The photograph in Phillips (2006) is closer but the text states that cheilocystidia are absent (although they can be present, as here).

A second rare *Gloeophyllum* sp. at Whitlingham

Of the four *Gloeophyllum* species in Britain, Conifer Mazegill *Gloeophyllum sepiarium* is the only one with an English name. It is common in the north and west of Britain but scarce in the south and east. There are only three records for Norfolk (Sea Mere,

¹ The experiments to identify the fungus were carried out at the John Innes Centre by visiting school students Phoebe Ellwood and Sophie Royal during a practical session of the Year 10 Science Camp, an educational outreach scheme which provides an experience of life as a scientist at Norwich Bioscience Institutes. Funding for the scheme was provided by the John Innes Centre, The Institute of Food Research, The Genome Analysis Centre and The Sainsbury Laboratory.

Table 1. New county records of fungi (excluding those referred to in the text).

Species	Place	Collector [Identifier if different]	Habitat
Agarics			
<i>Leucoagaricus pilatianus</i>	Lynford Arboretum TL 8294	Jonathan Revett (foray)	
<i>Parasola kuehneri</i>	Holt Hall TG 0739	Tony Leech	Woodchip mulch
<i>Pholiota lubrica</i>	Lynford Arboretum TL 8294	Jonathan Revett	Mixed woodchips
Bracket fungi			
<i>Antrodia sinuosa</i>	Welney TL 5394	Jonathan Revett	Rotting softwood planks
Discomycetes (cup fungi)			
<i>Saccobolus beckii</i>	Watermill Broad, Cranwich TL 7795	Tony Leech	Deer dung. Previously only recorded from five sites in Scotland.
<i>Scutellinia cejpai</i>	Dersingham Bog NNR	Keith Fox [Mal Greaves]	

1976, Reg Evans; East Harling, 1978, Reg Evans; Reffley Wood, 2014, Anne Crotty) Rather unusually, *Gloeophyllum* spp. prefer dry exposed wood so are quite often found on worked timber. In 2010 Anne Crotty found *Gloeophyllum trabaenum* on a bench at Whitlingham Country Park (Leech 2012). This was only the 5th British record since 1970 (with about a dozen earlier records). Contrast this with about 700 records nationally for *G. sepiarium*. In 2012 James Emerson found a second specimen at a different location at Whitlingham.

At a bioblitz at Whitlingham Country Park organised by the Broads Authority, James Emerson (again!) drew attention to a small brown bracket growing profusely on a log which had been carved into a seat near the visitor centre. Photo: Plate 5.5, p.54. Our suspicions that it might be *G. abietinum* were confirmed by Martyn Ainsworth (RBG Kew). As part of his investigation he redetermined specimens of *G. abietinum* in the Kew fungarium and concluded that it was rarer than thought, with only three confirmed previous British records. James still has to find the common *Gloeophyllum* species at Whitlingham!

References

BUCZACKI, S. 2012. *Collins Fungi Guide*. HarperCollins, London.

COURTECUISSÉ, R. & DUHEM, B. 1995. *Collins Field Guide Mushrooms & Toadstools of Britain and Europe*. HarperCollins, London.

EDWARDS, A. & LEECH, T. 2014. *Agaricus bresadolanus* - a toxic mushroom. *Field Mycol.* 15: 113-114.

KIBBY, G. 2011. *The genus Agaricus in Britain*. Privately published.

LEGON, N.W. & HENRICI, A. 2005. *Checklist of the British and Irish Basidiomycota*. Royal Botanic Gardens, Kew.

A.R. Leech 3, Eccles Road, Holt, Norfolk NR25 6HJ. tonyleech3@gmail.com

CONTENTS

Volume 47 2014

Vegetation development in the Broadland fens	Jo Parmenter	1
Marine algae (seaweeds) in Norfolk including species new to the county and a compilation of county records	Dawn Watson	25
The Antlion <i>Euroleon nostras</i> at Holkham, Norfolk	Andrew Bloomfield	44
The Great Tachinid <i>Tachina grossa</i> in Norfolk	Francis Farrow	52
Some preliminary observations of insect visitors to Broad-leaved Helleborine <i>Epipactis helleborine</i> and Marsh Helleborine <i>Epipactis palustris</i> orchids in Norfolk	N.W. Owens	56

WEATHER & WILDLIFE REPORTS 2013

Weather	Norman Brooks	67
Dragonflies	Pam Taylor	70
Moths	Jim Wheeler	72
Hoverflies	Stuart Paston	76
Fungi	Tony Leech	78

Volume 48 2015

The moths of the Dersingham area	R E Jones	2
Three new galls from Norfolk induced by species of <i>Mayetiola</i> (Diptera, Cecidomyiidae)	Robert Maidstone	28
Obituaries: Paul Banham and Lil Evans		32
Nail Fungus <i>Poronia punctata</i> in Norfolk, and possible factors affecting its appearance at Hockwold Heath and Cranwich Camp	Nicola Edwards, Tony Leech & Doug Warner	34
A brief account of the wildlife and history of the North Walsham & Dilham Canal	Jo Parmenter	40
The effect of the December 2013 tidal surge on the wildlife of Blakeney Point, Norfolk	Richard Porter & Ajay Tegala	45

WEATHER & WILDLIFE REPORTS 2014

Weather	Norman Brooks	59
Dragonflies	Pam Taylor	62
Orthoptera	David Richmond	64
Bumblebees	David Richmond	67
Solitary bees and aculeate wasps	Tim Strudwick	69
Butterflies	Andy Brazil	76
Moths	Jim Wheeler	83
Hoverflies	Stuart Paston	86
Beetles	Martin Collier	91
Freshwater	Dan Hoare	95
Bryophytes	Robin Stevenson & Mary Ghullam	97
Fungi	Tony Leech	100