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Editor - IK Morgan, c/o CCW, 56 Rhosmaen Street, Llandeilo, Dyfed, SA19 6HA

Editorial

First, my apologies to readers for the gigantean delay in the appearance of this issue, which was originally scheduled for the autumn of 1992 - domestic and professional pressures have necessitated this. As compensation, two issues are to appear simultaneously and these will be distributed to those members who have forwarded their subscriptions or who have given a firm indication that they wish to continue to receive the Newsletter. To reduce the cost - and the workload - future issues will only be sent to those who have sent their subscriptions in advance ie four 1st class stamps for the one or two issues that will be issued approximately annually - subject to the receipt of contributions. No Newsletters will be sent to those who have not paid and in future there can be no photocopying of back-issues once the required number are produced; all queries should be accompanied by a SAE.

There is still a limited stockpile of articles/papers for Carmarthenshire and Ceredigion, though any contributions for those two vice-counties will be welcomed. It would, however, be particularly satisfying to receive any draft papers from the remaining county of Dyfed - Pembrokeshire.

Finally, may I offer my sincere thanks and best wishes to the former Editor - Adrian Fowles, who established the DIG Newsletter in 1986 and who has since done about 99% of the work associated with its production - typing, photocopying, distribution, and the badgering of reluctant authors. Readers will be pleased to know that he has settled in at his post as Invertebrate Ecologist at CCW Headquarters, Bangor and that he has offered various future papers for this Newsletter.

My gratitude also goes to both the authors of the papers in these issues and to the compilers of the annual summaries of invertebrate recording.

THE BEETLES OF DINEFWR CASTLE ESTATE - K.N.A. ALEXANDER AND P.M. PAVETT

INTRODUCTION

The potential interest of Dinefwr Park for old parkland beetles, and specifically those dependent on dead and decaying timber, was first highlighted in Harding (1976), but the deadwood beetle fauna was first investigated by KNAA in 1986, with the help of Ian Morgan and Adrian Fowles. There has been much work subsequently, primarily by PMP and a Coleopterist's Meeting held during 1989, and a total of 209 species have been reported to date. The 1986 visit resulted in the suggestion that Dinefwr was the best Dyfed site for deadwood invertebrates DIG 4:13. To date, there has been little serious challenge to this claim, and indeed further recording has shown that it is possibly the best in Wales.

The land presently in the ownership of the National Trust, and the Dyfed Wildlife Trust comprises a wide range of habitat types, including many of considerable nature conservation interest. The old deer park (47ha) remains the focus of interest, but the DWT Reserve of Castle Woods (25ha), and the adjacent flood plain of the River Tywi (96ha), with its river shingles and old ox-bow lakes also provide habitats of major importance to beetles. As can be anticipated for a site with both a diverse epiphytic lichen flora and acid deadwood invertebrate fauna, there has been a long continuum of tree cover at Dinefwr. Indeed, in the Middle Ages, Geraldus Cambrensis remarked (of Dinefwr Castle) that it was "surrounded by woods" (Description of Wales, c.1194). Additional parkland (52ha - the Inner and Outer Cowparks, landscaped from the late 18th Century) appears never to have been examined for beetles. The deer park not only has old trees, but also a large expanse of old pasture with bracken, deer lawns, and a small spring-fed stream. Dinefwr Deer Park, Castle Wood and the ox-bow lakes have been designated as an SSSI since 1973, initially for the epiphytic lichen communities and the vascular flora of Castle Wood and the ox-bows, but the invertebrate communities have also subsequently been recognised by NCC (now Countryside Council for Wales) as being of SSSI quality. NCR (Nature Conservation Review) status has also been awarded to the site.

The National Trust organised a survey of the estate over 1987-88 and the following site description is largely based on their report.

The parkland is developed over an undulating plateau, rising to the east. It is drained by four streams, the largest of which flows through a valley between Castle Hill ridge (maximum altitude 95m) and Rookery Ridge (to 100m). To the east, Penlan Fawr overlooks Llandeilo from 91m. To the south-east, a steep slope falls to the floodplain which forms the park's boundary. The floodplain pastures include old ox-bow lakes and are bounded by a 4km meandering stretch of the River Tywi. The pastures lie below 30m and are prone to flooding.

The deer park is dominated by mature and overmature oaks, with a few sycamore, ash, horse and sweet chestnuts, beech, hazel and hawthorn. Castle Wood is a more mixed oak, ash, hazel stand with sycamores and a few wych elm. Alder carr and reedswamp are associated with the ox-bows, while old hawthorns and a few scattered mature oak and ash occur on the floodplain pastures.

The deer park was created in its present form by enclosure in 1660. The earlier history of the site remains unclear, but both the epiphytic lichen flora and the invertebrate fauna strongly suggest a very long history of old trees on the site.

THE SPECIALIST FAUNA OF DEAD AND DECAYING TIMBER

The deadwood fauna has received the greatest attention to date and 82 specialist saproxylic species have been identified from the site. 23 of these have been identified (in Harding and Rose 1986) as being particularly characteristic of old pasture woodlands in the British Isles. It is highly likely that many of the other 59 species are also more or less confined to such sites in Dyfed. Some preliminary work has been carried out to identify the specialist saproxylics of old woodlands in Ceredigion (Boyce, 1988), but the Carmarthenshire fauna has received little attention.

A list of 23 Harding & Rose species is exceptional for Wales, where notably few sites have been found which exceed even ten of these species. However, the use of this national listing in Wales is perhaps inappropriate. A regional list needs to be developed, along the lines proposed by Garland (1983) for the Sheffield area. Boyce (loc.cit.) has examined the Garland list in the context of Ceredigion, and it is also of some relevance to Carmarthenshire. The larger proportion of Harding & Rose species have a southern and eastern distribution in the British Isles, and this explains the absence from Wales of so many of the species. The Garland list has, however, been developed for use in a part of the British Isles which is relatively cooler and wetter than SE England. Although the local climate at Dinefwr isn't directly comparable with that of

Sheffield, it nonetheless is significantly cooler and wetter than SE England. Examination of the Garland list highlights 19 further Dinefwr species, bringing the total of specialist saproxylic beetles of old woodlands to 42.

Not surprisingly, the Dinefwr fauna has a distinct western feel, with Acrulia inflata, Thymalus limbatus, Judolia cerambyciformis, Mesites tardii and Xyloterus signatus. But one of the more remarkable features of the site is the range of species which are more characteristic of central and eastern Britain, and which are accordingly very rare in the west: Abraeus globosus. Stenagostus rhombeus, Prionychus ater and Xyleborus dryographus. All four occur in Gwent, and Stenagostus has recently been found at two Ceredigion sites (Fowles, pers. comm.), but Dinefwr appears to be the only Dyfed locality for each of the other three.

The details of the more important species found at Dinefwr are as follows:

Abraeus globosus - one in oak stump, Castle Woods, KNAA; one in dry crumbling wood of standing tree, PMP

Scaphidium quadrimaculatum - one in fallen oak bough, KNAA; not uncommon in fungi, PMP

Scaphisoma agaricinum - fairly common under bark, PMP

Scaphisoma boleti - found by M. Darby

Phloeostiba plana - common on fungi, PM Pavett

Siagonium quadricorne - in small numbers under bark, PMP

Quedius scitus - one, RS Key - new to Wales

Trichophya pilicornis - in moss, EW Aubrook - probably first Welsh record.

Sinodendron cylindricum - not uncommon in certain trees, PMP; also KNAA, RSK & I.K Morgan.

Ampedus balteatus - one in red rot of oak, PMP

Stenagostus rhombeus - larvae common, one pupa & one adult, KNAA & PMP

Selatosomus bipustulatus - two under loose bark, PMP

Ctesias serra - larvae common beneath loose bark on trunks of older trees in deer park, one adult, KNAA, APF & PMP

Thymalus limbatus - sporadically and in small numbers, KNAA & PMP; also APF, RS Key & IKM.

Thanasimus formicarius - one on dead oak, PMP; another caught on the Rookery Ridge, IKM.

Rhizophagus ferrugineus - one under bark, PMP

Pediacus dermestoides - farily common under bark, KNAA & PMP

Biphyllus lunatus - one under bark, PMP

Triplax aenea - once, but commonly, in fungi, PMP

Cerylon ferrugineum - common under bark, KNAA, APF & PMP

C. histeroides - one in fallen oak bough, KNAA; fairly common under bark, PMP

Cis festivus - in small numbers in fungi, PMP

C. nitidus - in small numbers in fungi, PMP

Litargus connexus - one under bark, PMP

Mycetophagus piceus - on beech sap-run, IKM

M. quadripustulatus - only one tree, but commonly there, PMP

Bitoma crenata - uncommon; few found on hard dry barkless tree, PMP

Eledona agricola - few found in fungi. Large numbers in evening on fallen oak, PMP

Prionychus ater - larvae found in collapsed old oak by M. Darby.

Orchesia micans - larvae in some numbers in dead wood of ash, reared out, PMP

O. undulata - one under bark on fallen oak bough, south side of The Bog, KNAA; one under bark, PMP; under bark, also APF & IKM.

Melandrya caraboides - two found in dry dead wood, PMP; one on fallen oak, IKM.

Conopalpus testaceus - one, PMP, one DC Boyce.

Prionus coriarius - one, T. Davies et al

Stenochorus meridianus - one off hawthorn blossom, Castle Wood, J. Cooter, KNAA, IKM.

Alosterna tabacicolor - common on hawthorn, KNAA & PMP

Judolia cerambyciformis - small numbers on hawthorn, PMP, IKM.

Strangalia quadrifasciata - one on Umbelliferae, PMP.

Leiopus nebulosus - one on tree branch, PMP; one, IKM.

Mesites tardii - one in dead beech, PMP.

Scolytus intricatus - in bark of fallen oak boughs, KNAA

Dryocoetes villosus - common in thick dead bark of old oaks, KNAA & PMP

Xyloterus signatum - not uncommon in dead oak, PMP

Xyleborus dryographus - not uncommon in the bark of dead oaks, PMP

Platypus cylindrus - one in bark of dead oak, PMP

DINEFWR'S WETLAND HABITATS

The flood plain on the Tywi has been much less investigated for beetles, but has nonetheless generated some remarkable records. The river shingles in particular support populations of the specialist click beetles Fleutiauxellus maritimus and Negastrius sabulicola, the ladybird Coccinella 5-punctata and the rove beetle Deleaster dichrous. H. sabulicola and C. 5-punctata are both Red Data Book species; the ladybird is now known from a number of sites along the Tywi and elsewhere in Dyfed, while Dinefwr is the only Dyfed locality for N. sabulicola. The other two species are quite widespread on Dyfed's river shingles. Another national rarity, the ground beetle Agonum scitulum, was found on the seasonally flooded pastures, and appears to be the only record for South Wales.

FULL LIST OF COLEOPTERA RECORDED AT DINEFWR, WITH SOURCES & INFORMATION ON STATUS

Sources

1. J. Cooter 4.13.vi.1983
2. KNA Alexander 19.vi.1986
3. IK Morgan 1986
4. T. Davies 17.viii.1986

5. DIG Meeting, 13.vi.1987 (DIG 6:14)
6. PM Pavett, 1988-90
7. IK Morgan 1988
8. IK Morgan 1989
9. KNA Alexander 14.iv.1989
10. M. Darby 14.iv.1989
11. RS Key 14.iv.1989
12. EW Aubrook 14.iv.1989
13. IK Morgan 1990-92

Status information is based on Hyman (1992) & Hyman (in press).
Saproxylic Status: species listed in Harding and Rose (1986) or Garland (1983) as specialist species of old woodlands.

	Source	GB Status	Saproxylic
CARABIDAE			
Leistes rufomarginatus (Duftschmid)	13		
Nebria brevicollis (F.)	3		
Agonum fuliginosum (Panzer)	7		
A. vidium (Panzer)	7		
Amara aenea (Degeer)	8		
Pterostichus versicolor (Sturm)	8		
Elaphrus cupreus Duftschmid	11		
E. riparius (L.)	7,11		
Clivina Fossor (L.)	6		
Bembidion tibiale (Duftschmid)	11		
Pterostichus madidus (F.)	5,9,11,14		
P. niger (Schaller)	9,11		
Abax parallelepipedus (Pill.& Mitt.)	3,5,6		
Calathus piceus (Marsham)	6,11		
Laemostenus terricola (Herbst)	6		
Agonum albipes (F.)	9		
A. assimile (Paykull)	6,9,11		
A. dorsale (Pontoppidan)	6		
A. scitulum Dejean	9	Na	
Dromius agilis (F.)	6		S
D. quadrinotatus (Zenker)	6,9		S
NOTERIDAE			
Noterus clavicornis (Degeer)	8		
DYTISCIDAE			
Hydroporus palustris (L.)	8,9		
H. tessellatus Drapiez	11		
Laccophilus minutus (L.)	8		
HYDROPHILIDAE			
Sphaeridium scarabaeoides (L.)	10		
Cercyon atomarius (F.)	10		
Megasternum obscurum (Marsham)	10		
Cryptopleurum crenatum (Kugelann)	10	Nb	
Laccobius bipunctatus (F.)	8,11		
Chaetarthria seminulum (Herbst)	6	Nb	
HISTERIDAE			
Abraeus globosus (Hoffman, J)	2,6		S G
PTILIIDAE			
Ptinella cavelli (Broun)	10		S
Acrotrichis grandicollis (Mannerheim)	10		
A. intermedia (Gillmeister)	10		
SILPHIDAE			
Silpha atrata L.	9,11		
SCYDMAENIDAE			

Cephennium gallicum Ganglbauer	12		
Stenichnus collaris (Mull. & Kunze)	10		
SCAPHIDIIDAE			
Scaphidium quadrimaculatum Olivier	2,3,6		S G
Scaphisoma agaricinum (L.)	6		S G
S. boleti (Panzer)	10	Nb	S G
STAPHYLINIDAE			
Megarthrus depressus (Paykull)	6		S
Acrulia inflata (Gyllenhal)	9		S
Phloeonomus punctipennis Thomson, C.G.	10		S
P. pusillus (Gravenhorst)	6		S
Phloeostiba plana (Paykull)	6		S
Siagonium quadricorne Kirby, W.	6		S G
Deleaster dichrous (Gravenhorst)	6	Nb	
Stenus ater Mannerheim	6	Nb	
S. bimaculatus Gyllenhal	6		
S. brunnipes Stephens	6		
S. clavicornis (Scopoli)	6,11		
S. impressus Germar	10		
S. juno (Paykull)	6		
S. rogeri Kraatz	12		
Dianous coerulescens Gyllenhal	13		
Philonthus decorus (Gravenhorst)	3		
Lathrobium brunnipes (F.)	12		
L. geminum Kraatz	12		
Atrecus affinis (Paykull)	6,11		S
Gabrius splendidulus (Gravenhorst)	11		
Platydracus stercorarius (Oliver)	6		
Quedius molochinus (Gravenhorst)	6		
Q. scitus (Gravenhorst)	11	Nb	S H&R
Trichophya pilicornis (Gyllenhal)	12	Nb	S
Tachyporus obtusus (L.)	1		
Tachinus humeralis Gravenhorst	6		
T. signatus Gravenhorst	6,11		
Tachyusa leucopus (Marsham)	12		
Oxypoda elongatula Aube	12		
LUCANIDAE			
Sinodendron cylindricum (L.)	2,6,9,11		S H&R
SCARABAEIDAE			
Aphodius ater (Degeer)	6,7,12,13		
A. contaminatus (Herbst)	12		
A. depressus (Kugelann)	6,13		
A. equestris (Panzer)	6,13		
A. erraticus (L.)	6,13		
A. fimetarius (L.)	10,12,13		
A. fossor (L.)	3,6,13		
A. haemorrhoidalis (L.)	6,13		
A. sphacelatus (Panzer)	8,12		
Onthophagus similis (Scriba)	6,13		
SCIRTIDAE			
Elodes marginata (F.)	6		
E. minuta (L.)	2		
Scirtes hemisphaericus (L.)	6		
ELATERIDAE			
Ampedus balteatus (L.)	6		S G
Fleutiauxellus maritimus (Curtis)	8	Na	
Negastrius sabulicola (Boheman)	8	RDB3	
Melanotus erythropus (Gmelin)	2,6,7,9,11		S
Stenagostus rhombeus (Olivier)	2,6,9		S H&R
Athous haemorrhoidalis (F.)	1,3,6		
Selatosomus bipustulatus (L.)	6	Nb	S H&R
Prosternum tessellatum (L.)	6,8		
Agriotes obscurus (L.)	6,7		

A. pallidulus (Illiger)	6,8		
A. sputator (L.)	1,6		
Denticollis linearis (L.)	2,3,9		S
CANTHARIDAE			
Cantharis cryptica Ashe	2		
C. decipiens Baudi	2		
C. nigricans (Muller, O.F.)	2,3,6		
C. pallida Goeze	6		
C. pellucida F.	1,6		
C. rufa L.	5		
C. rustica Fallen	1,2,3,6		
Rhagonycha femoralis (Brulle)	1,2,3,6		
R. fulva (Scopoli)	6,14		
R. lignosa (Muller, O.F.)	6		
Malthodes marginatus (Latreille)	2		S
DERMESTIDAE			
Ctesias serra (F.)	2,5,6	Nb	S H&R
ANOBIIDAE			
Ptilinus pectinicornis (L.)	6		S
PELTIDAE			
Thymalus limbatus (F.)	3,6,7,9,11,14	Nb	S H&R
CLERIDAE			
Thanasimus formicarius (L.)	6,7		S H&R
Necrobia violacea (L.)	6		
MELYRIDAE			
Dasytes aeratus Stephens	2		S
Malachius bipustulatus (L.)	3,6		S
NITIDULIDAE			
Brachypterus urticae (F.)	6		
RHIZOPHAGIDAE			
Rhizophagus bipustulatus (F.)	6		S
R. dispar (Paykull)	5,6,9		S
R. ferrugineus (Paykull)	6		
CUCUJIDAE			
Pediacus dermestoides (F.)	2,6,9		S H&R
CRYPTOPHAGIDAE			
Cryptophagus dentatus (Herbst)	6		S
BIPHYLLIDAE			
Biphyllus lunatus (F.)	6,9		S H&R
BYTURIDAE			
Byturus tomentosus (Degeer)	1		
EROTYLIDAE			
Triplax aenea (Schaller)	6		S H&R
Dacne bipustulata (Thunberg)	6		S
CERYLONIDAE			
Cerylon ferrugineum Stephens	2,5,6,9,14		S G
C. histeroides (F.)	2,6,9		S G
COCCINELLIDAE			
Adalia bipunctata (L.)	6,7		
Coccinella 7-punctata L.	6,14		
C. 5-punctata L.	8	RDB3	
Calvia 14-punctata (L.)	6,7		
C. 14-guttata (L.)	6		
Halyzia 16-guttata (L.)	8		

LATHRIDIIDAE			
Lathridius anthracinus Mannerheim	6		
CISIDAE			
Octotemnus glabriculus (Gyllenhal)	6		S
Cis boleti (Scopoli)	5,6,11		S
C. festivus (Panzer)	6	Nb	S
C. nitidus (F.)	6		S G
MYCETOPHAGIDAE			
Litargus connexus (Fourcroy)	6,9		S G
Mycetophagus piceus (F.)	7	Nb	S H&R
M. quadripustulatus (L.)	6		S G
COLYDIIDAE			
Bitoma crenata (F.)	6,9		S H&R
TENEBRIONIDAE			
Eledona agricola (Herbst)	6	Nb	S H&R
Cylindrinotus laevioctostriatus (Goeze)	6		S G
Prionychus ater (F.)	10	Nb	S H&R
SALPINGIDAE			
Rhinosimus planirostris (F.)	6		S
PYROCHROIDAE			
Pyrochroa serraticornis (Scopoli)	2,3,5,6		S
MELANDRYIDAE			
Orchesia micans (Panzer)	6,9	Nb	S
O. undulata Kraatz	2,6,7,9,14		S H&R
Melandrya caraboides (L.)	6,7	Nb	S H&R
Conopalpus testaceus (Olivier)	5	Nb	S H&R
SCRAPTIIDAE			
Anaspis maculata Fourcroy	1,6		S
A. regimbarti Schilsky	6		S
A. rufilabris (Gyllenhal)	1,6		S
MORDELLIDAE			
Mordellistena pumilio (F.)	7		S
OEDEMERIDAE			
Oedemera nobilis (Scopoli)	2,3,5		
CERAMBYCIDAE			
Prionus coriarius (L.)	4	Na	S H&R
Rhagium bifasciatum F.	2		S
R. mordax (Degeer)	3,5		S
Stenocorus meridianus (L.)	1,2,3		S G
Grammoptera ruficornis (F.)	6		S
Alosterna tabacicolor (Degger)	2,6		S G
Judolia cerambyciformis (Schrank)	5,6		S G
Strangalia maculata (Poda)			S
S. quadrifasciata (L.)	6		S H&R
Clytus arietis (L.)	6		S
Leiopus nebulosus (L.)	6,7		S G
CHRYSOMELIDAE			
Donacia simplex	7		
D. vulgaris Zschach	7		
Derocrepis rufipes	7		
Plateumaris sericea (L.)	6		
Lema cyanella (L.)	12		
Oulema lichenis Voet	11		
Chrysolina polita (L.)	3,5		
Gastrophysa viridula (Degeer)	6		
Phaedon armoraciae (L.)	6		
Hydrothassa glabra (Herbst)	6		

Prasocuris phellandrii (L.)	6		
Galerucella sagittariae (Gyllenhal)	8		
Lochmaea crataegi (Forster)	2		
Crepidodera transversa (Marsham)	6		
Cassida viridis Linnaeus	6		
APIONIDAE			
Apion curtirostre Germar	9		
CURCULIONIDAE			
Otiorhynchus singularis (L.)	6		
Phyllobius calcaratus (F.)	1		
P. pomaceus Gyllenhal	6		
P. pyri (L.)	6		
Euophryum confine (Broun)	6,8,9		S
Mesites tardii (Curtis)	6	Nb	S H&R
Acalles ptinoides (Marsham)	8	Nb	
Cidnorhinus quadrimaculatus (L.)	6		
Anthonomus pedicularius (L.)	6,13		
Barynotes moerens (F.)	3		
Sitona lineatus (L.)	3		
Polydrusus pterygonalis Boheman	13		
Rhynchaenus fagi (L.)	1,6,11		
R. quercus (L.)	11		
SCOLYTIDAE			
Scolytus intricatus (Ratzeburg)	9		S G
Hylesinus crenatus (F.)	6		S
H. oleiperda (F.)	6		S
Leperesinus varius (F.)	6		S
Dryocoetinus villosus (F.)	2,6,9		S G
Xyloterus signatus (F.)	6	Na	S H&R
Xyleborus dryographus (Ratzeburg)	6	Nb	S H&R
PLATYPODIDAE			
Platypus cylindrus (F.)	6	Nb	S H&R

RECORDING OF OTHER INVERTEBRATES AT DINEFWR PARK & CASTLE WOODS - I.K. Morgan

Concurrent with the survey of beetles in Dinefwr Park and Castle Woods, other invertebrate groups have been examined, most notably the syrphids (hoverflies), but also the stratiomyiids (soldier-flies), and tabanids (horseflies). The craneflies are seemingly poorly recorded though three wood boring species are reported by P.M. Pavett (pers comm, 1989). The Odonata of the old oxbows have been amply recorded in the recent past (see Coker & Fox, 1985) and the spiders have been the subject of a paper by Merrett (1987) and are consequently not discussed in this present brief summary. It may be worth pointing out here that some rare spiders are associated with ancient parkland and also the possibility of the pseudoscorpion Dendrochernes cyrneus occurring should not be ignored; more critical recording of these groups needs to be undertaken. The myriapods (millipedes and centipedes) have been well worked by the author though no noteworthy species are present and the Mollusca have similarly received adequate coverage. Additionally there has been some casual recording of other invertebrate groups: these are mentioned later in the text.

The continual presence, over a considerable period, of an abundance of mature and senile oaks have ensured that, as with the Coleoptera, there is a rich fauna of specialist deadwood syrphids. Broadly speaking, these would include Callicera aenea, Brachypalpus laphriformis, Xylota xanthocnema and three species of Criorhina. Brachyopa insensilis occurs on a beech sap run and the normally elusive Rhyngia rostrata (though not a "deadwood" species) has been recorded in most recent years. Further details of the local, notable or rare hoverflies recorded at Dinefwr Park and Castle Woods are given below:

Xanthandrus comtus Once only - Castle Woods 22/609219, 3.8.1987 (G.W. Hopkins).

Callicera aenea Once - on blossom at the edge of a small pond below Castle Woods 22/612216 14.8.1986 (G.W. Hopkins).

Ferdinandea cuprea Castle Woods and Dinefwr Park - regular.

Portevinia maculata Regular on Allium on slopes to N of Dinefwr Castle.

Rhyngia rostrata Castle Woods 22/610218 and Llandyfeisant Church 22/622222. One of the few regular sites for this species in Britain. (GWH, PMP).

Brachyopa insensilis On a beech sap-run, Dinefwr Park 22/613224 June 1988 (and subsequent dates) IKM.

Neoascia obliqua Once (19.5.1987) near Llandyfeisant 22/626221, 19.5.1987.

Helophilus trivittatus Dinefwr oxbows 22/619217, 1988 (GWH).

Myathropa florea Regular - both Dinefwr Park and Castle Woods.

Arctophila fulva Regular - " " "

Brachypalpoides lenta Regular - " " " , often noted on elder blossom.

Brachypalpus laphriformis Dinefwr Park, first recorded 1989; regular in small numbers, usually noted basking on old logs or sometimes observed egg-laying in oak bark crevices.

Chalcosyrphus nemorum Castle Woods - regular, fond of resting on fallen timber.

Criorhina berberina Castle Woods & Dinefwr Park.

C. floccosa Dinefwr Park 22/613221, 4.6.1992 (IKM).

C. ranunculi Castle Woods, probably regular.

Xylota florum Castle Woods - regular.

X. xanthocnema Once only in Dinefwr Park 22/608225. P..M. Pavett, 17.6.1988.

The often-attractive soldier flies have been subject to ad hoc sampling with for example, Stratiomys potamida captured in the "Bog Wood" 22/612220 on 19 June 1986 and Oxycera nigricornis recorded (PMP, July 1989) together with O. rara (A.P. Fowles, 25.7.1988) around the tufa springs in the NW of the Deer Park. The nationally uncommon Tabanus cordiger has been collected in Castle Woods 22/609219 (13.6.1987, IKM) and the small bee-fly Bombylius canescens was once noted in Llandyfeisant churchyard 22/622222 (17.6.1988, G.W.H.); B. major is, of course, regular in Castle Woods in the spring. Xylophagus ater (which could be said to superficially resemble a small cranefly) was caught by S.J. Falk in Castle Woods 22/609225 (1988) and larvae have been found under bark on other occasions (eg Alexander, 1986). The tipulid genus Ctenophora comprise a number of spectacular-looking species (often brightly coloured with long ovipositors on the females) and Mark Pavett reports the capture of three species: Ctenophora bimaculata, C. pecticornis and C. atrata.

Coker and Fox (1985) list eleven species of Odonata from the oxbows below the Castle Woods bluff at 22/608223: Calopteryx virgo, C. splendens, Lestes sponsa, Pyrrhosoma nymphula, Ischnura elegans, Enallagma cyathigerum, Coenagrion puella, Libulella depressa, Svmpetrum striolatum, Brachytron pratense and Aeshna juncea. C. virgo is presumably a wanderer from the adjacent Deer Park streams but B. pratense is unusual for an inland locality in SW Wales. Cordulegaster boltoni has subsequently also been seen hunting over the oxbows. It is likely that the elusive Gomphus vulagtissimus occurs on those stretches of the R. Tywi below Castle Woods and the Deer Park for this dragonfly has been recorded not far downstream. Anodonta anatina, a large bivalve mollusc which is very localised in Wales, occurs in the Dinefwr Oxbows, and amongst the species of terrestrial molluscs recorded in Dinefwr Castle Woods the slug Limax cinereoniger is worthy of mention. This species,

with its distinctive black and white striped sole, is normally confined to sites with a long history of tree cover.

Oak bush crickets Meconema thalassimum can be beaten in late summer from foliage in Castle Woods and the small groundhopper Tetrix undulata is regular on sparsely-vegetated ground around the Dinefwr Oxbows and Gwaith Go-bach Pond 22/619220. Panorpa cognata, by far the most local of the British scorpion flies, has been recorded (September 1985} in Church Woods.

In 1988, a group of aculeate specialists visited Dinefwr Park to record the bees and wasps. Most unfortunately, pouring rain prevented any serious collecting, though A. P. Fowles captured a notable sphecid wasp Crossocerus binotatus on hogweed in the Deer Park (at 22/606226, 25.7.1988). It is a highly localised species associated with dead wood and with a scattered British distribution (Falk, 1991). Earlier (in May 1983), Jonathan Cooter took three rather common solitary bees in Castle Woods (22/614218) - Andrena angustior, A. scotica and A. haemorrhoa. The present writer has noted the more local A. cineraria at Castle Woods on several occasions, and the wasp-like Nomada gooderiana and N. ruficornis which are "cuckoos" in the nests of Andrena spp. More recently, Mark Pavett has recorded Crossocerus megacephalus, Ectemnius cavifrons, E. continuus and Psen dahlbomi in the Deer Park, all of which utilise deadwood for nesting purposes. He has also taken Rhopalum coarcatum and Pemphredon lugubris which breed in hollow stems.

Steve Lucas, the present warden of the Dyfed Wildlife Trust reserve at Castle Woods, embarked in 1992 on a moth trapping survey. As expected, a diverse range of woodland moths have been noted including a Brussels lace Cleorodes lichenaria, double line Mythimna turca and the rather exciting capture of a leopard moth Zeuzera pyrina (30 June 1992), a species which is rarely recorded in west Wales. The author has carried out some cursory recording of Hemiptera, but no noteworthy species have, to date, been recorded; it goes without saying that more work could be done on this diverse order, and indeed many other groups of invertebrate at this extraordinary site.

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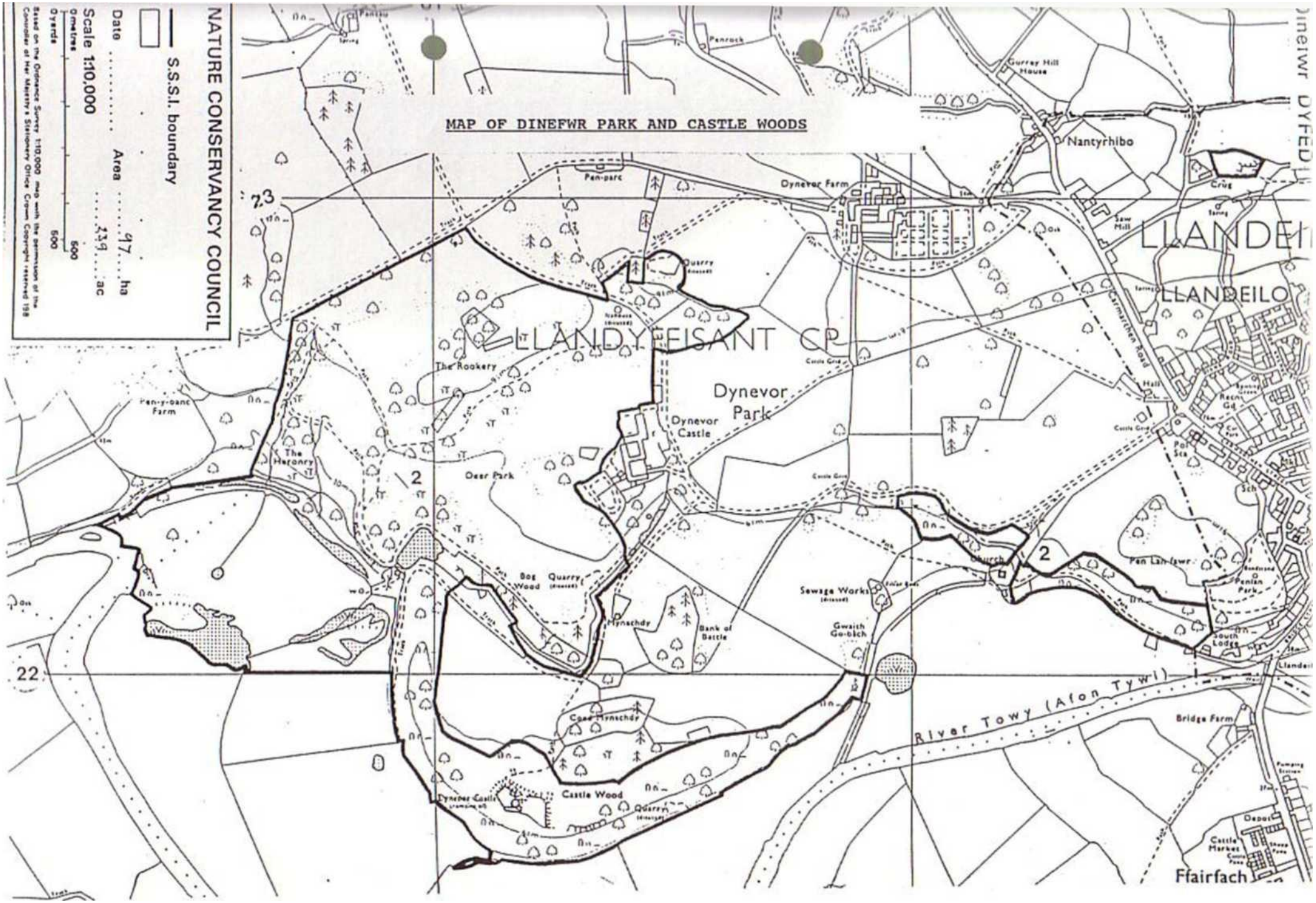
MAP OF DINEFWR PARK AND CASTLE WOODS
NATURE CONSERVANCY COUNCIL
S.S.S.I. boundary
Date .....
Area .....917.... ha
.....339.... ac
Scale 1:10,000
0 metres 500
0 yards 500
Based on the Ordnance Survey 1:10,000 map with the permission of the Controller of Her Majesty's Stationery Office Crown Copyright reserved 198
LLANDYFEISANT CP
Dynevor Park
Dynevor Castle
Deer Park
The Rookery
The Heronry
Pen-y-oant Farm
Dynevor Farm
Pen-parc
Nantyrhibo
Gurrey Hill House
Saw Mill
LLANDEILO
Carmarthen Road
Sewage Works
Gwaith Go-bich
Bog Wood
Quarry
Hynschdy
Bank of Battle
Coed Hynschdy
Castle Wood
Dynevor Castle
River Towy (Afon Tywi)
Bridge Farm
Pen Lan-fawr
Penlan Park
South Lodge
Cattle Market
Depot
Ffairfach
22
23
2

THE CONOPIDAE OF DYFED – D.K. CLEMENTS

A brief review of the occurrence of some members of this intriguing family of flies in Dyfed was given in the 1986 annual summaries of Diptera recording in the vice counties of Carmarthenshire and Ceredigion (DIG 4: 4-6), which included the earlier records of Miles (1957, 1959). In 1986, some ten or so of the 25 known British species had been recorded in south-west Wales. Three species have been added to this list in the intervening period, and a considerable quantity of distributional data has been accumulated. The purpose of this article is to give a more detailed introduction to the family and the occurrence of individual species in the region.

The Conopidae are a small family of uncertain taxonomic position, comprising about 650 species worldwide. The biology of the family is poorly known, but the great majority are believed to develop as internal parasites of aculeate hymenopterans. One or two non-British species have been recorded in association with the eggs of orthopterans, suggesting a host range curiously similar to that of bee-flies (Diptera; Bombyliidae) and oil beetles (Coleoptera; Meloeidae).

Female conopids stalk target hosts as they forage in the field, often diving on the host and wrestling with it in mid-flight. The conopid usually inserts an egg directly into the abdominal cavity of the host, apparently using a special pincer-like device on the underside of her abdomen to part the aculeate's abdominal sclerites. The conopid larva develops fast, feeding at first on the host's non-essential abdominal organs, whilst the host carries on with its day-to-day business, albeit in an increasingly unco-ordinated way. In the third instar, however, the larva develops a long, thin anterior portion, which is used to probe through the narrow waist of the host in order to feed on the thoracic contents as well, by which time the host has died. The conopid pupates inside the shell of the host's body, and usually overwinters in this state, before emergence the following season.

Studies carried out in Switzerland suggest that parasitism frequencies of some host groups, such as bumblebees, may often be of the order of 20-30% of sampled populations, and sometimes as much as 50% (Schmid-Hemple et al 1990). Despite this, adult conopids are infrequently encountered in the field, and most dipterists count themselves lucky to take more than a handful each season. Intriguingly, there is now also evidence that the parasite significantly alters the behaviour of the host, suggesting a very complex physiological process is involved (Schmid-Hemple & Muller 1991).

The British species are keyed by Smith (1969, amended by Smith 1970), although there are significant difficulties in distinguishing a number of the species (particularly in the genus Myopa) using this text. Revisionary keys for critical species have appeared in recent issues of the Conopid Recording Scheme (CRS) Newsletter, along with supplementary identification aids. These are available from the writer of this article, who also offers an identification service.

The attached distribution maps indicate the occurrence of species recorded in Dyfed to date. Of these, Conops vesicularis is one of the rarer species nationally, being otherwise largely confined to the southern half of England. This is a large and spectacular species which has been associated with Bombus muscorum, and which is on the wing from about April through to August.

Conops striqatus is rarer still, and is a smaller and more delicate species, easily overlooked in collections as the much commoner C. ouadrifasciatus. The national distribution is primarily southern and western England, flying between July and September. The host is unknown.
Conoos flavipes is one of the commoner species nationally, occurring throughout England and Wales, and in southern Scotland. It has the black and yellow, rather wasp-like appearance which is typical of the remainder of the genus. The main flight period is from July to August, and known hosts include Bombus lapidarius. Osmia spp. and Vespula rufa.

Conops quadrifasciatus is the commonest member of the genus, as the regional map indicates, and the national distribution encompasses most of the UK. Bombus lapidarius is a known host, although there are very probably others. The flight period is from June to September.

Conops ceriaeformis is moderately common nationally, but is primarily a southern species, although there is one aberrant and possibly bogus record from Scotland. The flight period is from July to October, and the host is unknown.

Leopoldius signatus belongs to a closely related genus, and is generally somewhat similar to the black and yellow Conops species. It is a scarce if widely-distributed species nationally, associated with late season Vespula wasps, and possibly also with Polistes. It is by far most frequently taken on the flowers and leaves of sunlit ivy, during the period September to October.

Physocephala rufipes belongs to another related genus, characterised by an elongated second abdominal segment. This conspicuous fly is moderately common throughout most of England and Wales, and is associated with a wide range of hosts, including 8 species of Bombus and the wasp Vespula rufa. On the wing between June to September.

The remainder of the Dyfed species belong in the subfamily Myopinae, and are smaller, duller and less conspicuous species, many of which are difficult to identify confidently. The two species of Thecophora recorded are often associated with calcareous grasslands and duneland situations, and are probably associated with Halictus and Lasioglossum bees. They are generally uncommon but widely distributed nationally, with fulvipes tending to show a more northerly distribution. The flight period for atra extends from May to October, whilst that of fulvipes is shorter, from June to August.

Most of the members of the genus Myopa are early-season (April - early June) species, widespread but primarily associated with the southern half of England and Wales. Probable hosts include Andrena bees, although buccata is known to use Vespa and Bombus hosts in the Pacific region. M. extricata is a rare species nationally, but recent work indicates that it is probably much overlooked, since its range of variation overlaps with that of both testacea and tessellatipenis. Critical identification relies on examination of the genitalia, details of which appeared in the most recent Conopid Recording Scheme Newsletter.

Sicus ferrugineus is the commonest member of the family, occurring everywhere in the UK. A number of Bombus species are used as hosts, and the flight period extends from May to September. The second British species of this genus, the much rarer Sicus abdominalis has not so far been recorded from the region, although there is an old Merionethshire specimen (a male) in the Crow Collection at Liverpool Museum. The two species are exceedingly similar, and can often only be separated reliably in the female, so it may be that abdominalis is present but overlooked in the region. Guidance on separation is given in the CRS Newsletter, and the author will be happy to look at any "suspect" specimens.

Zodion notatum, by contrast, is one of our rarest species, represented in the region by a single specimen taken at Llangeitho, Ceredigion in 1986. There are less than a dozen records nationally, although the species has recently been recorded apparently flourishing on the Isle of Man. The host is unknown in Britain, but may be halictine bees.

Further details and newsletters of the Conopid Recording Scheme can be obtained from David Clements at 1 Quarry Close, Stratton, Cirencester, Glos GL7 2JN. The author is grateful to Ian Morgan and Adrian Fowles for their assiduous compilation of conopid records for the region, and to Ian for preparing the maps.

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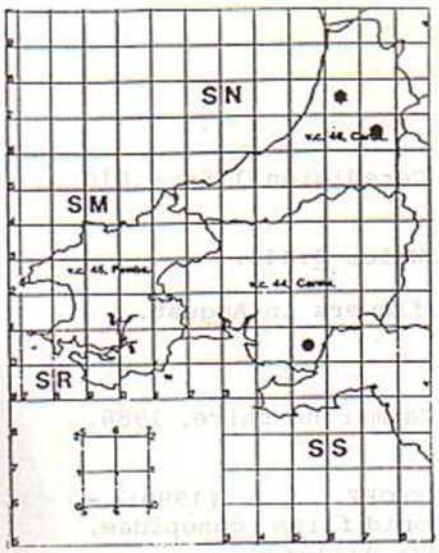
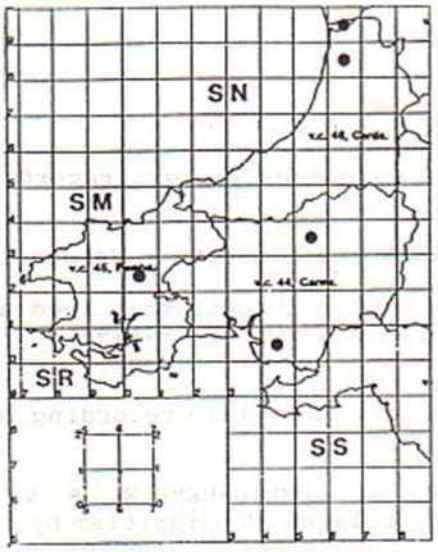
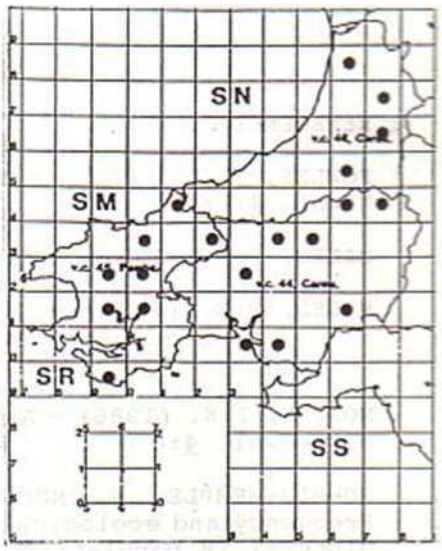


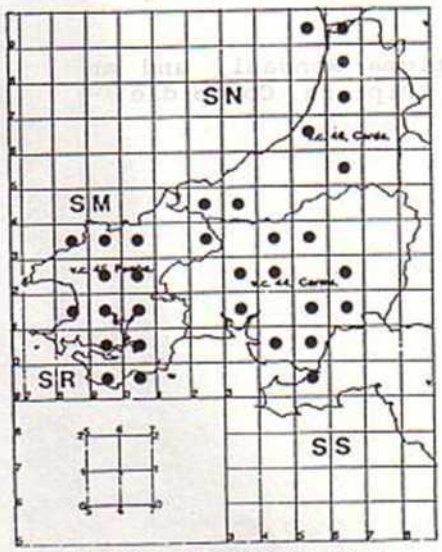
Conops vesicularis



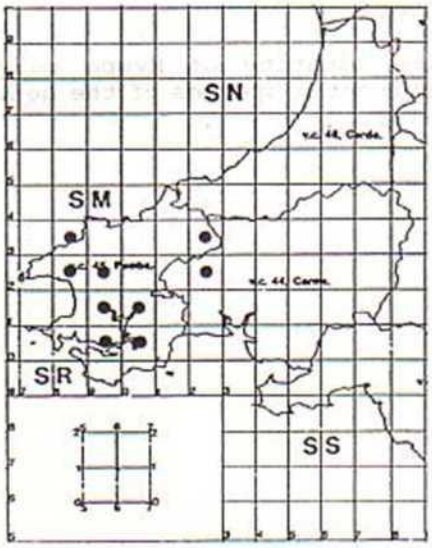
Conops striqatus



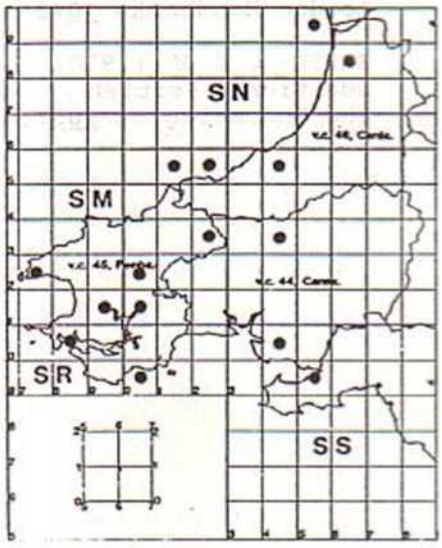
Conops flavipes



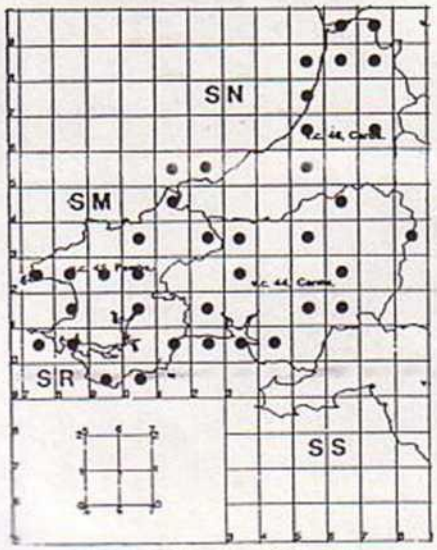
Conops quadrifasciatus



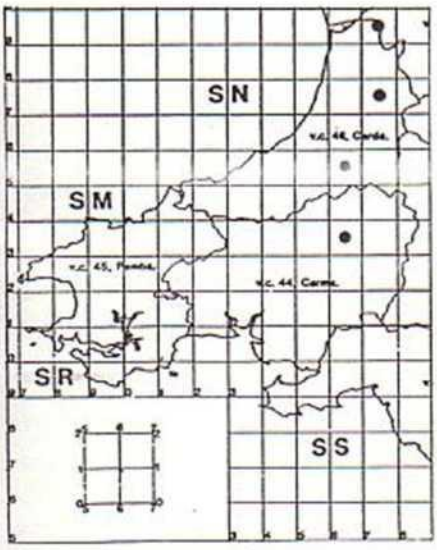
Conops ceriaeformis



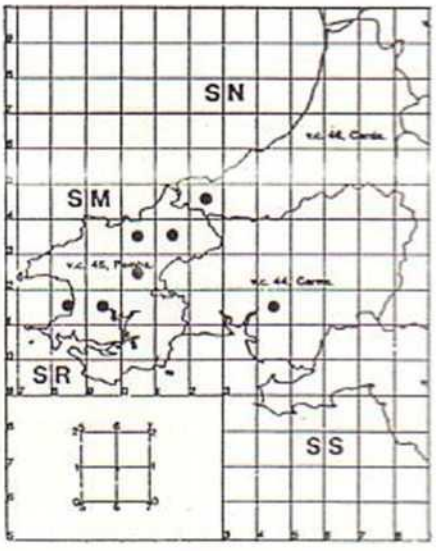
Physocephala rufipes



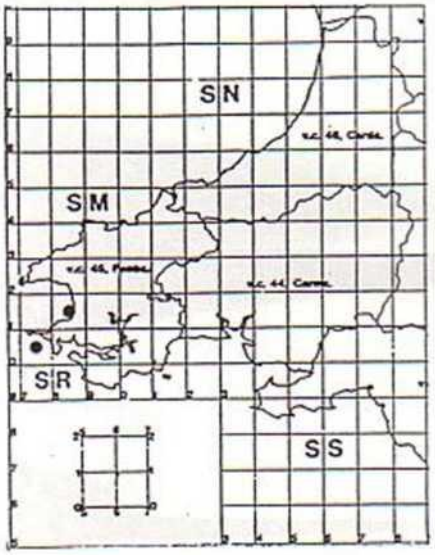
Sicus ferrugineus



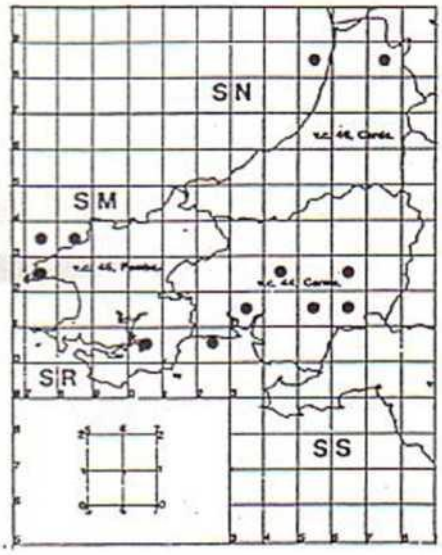
Myopa buccata



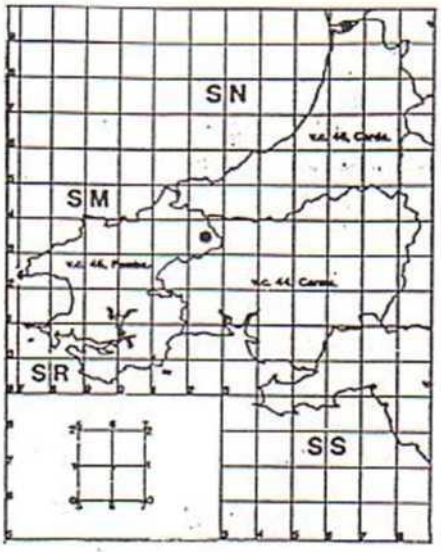
Myopa testacea



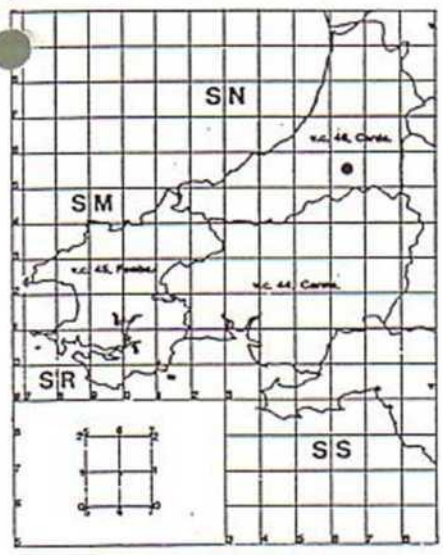
Myopa extricata



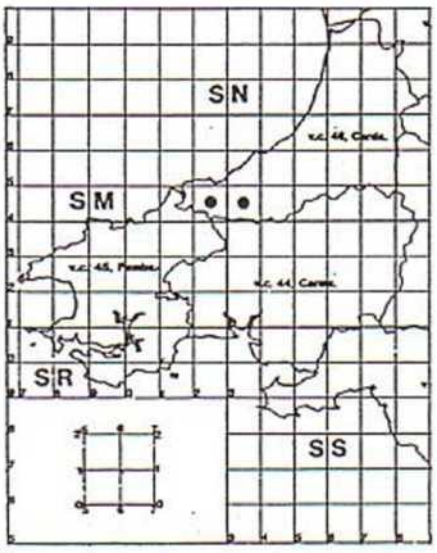
Thecophora atra



Thecophora fulvipes



Zodium notatum



Leopoldius signatus

A PROVISIONAL LIST OF THE HETEROPTERA OF PEMBROKESHIRE (VC45) - P KIRBY

The history of the recording of Heteroptera in Pembrokeshire is one of steady accrual of species. Saunders (1892) made specific mention of 13 species occurring in the county. Butler (1923), in his table of occurrence of the British Heteroptera by county, included *26* entries under Pembrokeshire. The county distribution table of Bedwell *&* Massee (1945) listed 52 species for the county, which had increased to 117 by the time of the second edition (Massee 1955). Scudder (1956) added a modest 9 additional species. A number of entomologists have continued to add to the county list in recent years. The present list includes 218 species, though confirmation of two of these would be welcome. A record of one further species from the county is considered likely to be erroneous, and another has been recorded only tentatively on the basis of nymphs alone.

The total of species for the county is less than that for Carmarthenshire and rather more than that for Ceredigion. The list is in a way surprisingly short, since of the three counties Pembrokeshire has historically been the best-known for Heteroptera, particularly since the discovery of the rare lygaeid Pionosomus varius at Freshwater West in 1938 (Daltry 1939), and has almost certainly been visited by a greater number of Heteropterists. The list is certainly still incomplete. This no doubt results in part from visiting entomologists publishing records only of the rarer species they encountered (or indeed of no species at all). Recording has been concentrated on the coast at the expense of inland habitats. Since Pembrokeshire has good coastal habitats, and since many of the county's Heteroptera records have been made by holidaying entomologists from elsewhere in Britain, this is not surprising. The bias towards coastal habitats is emphatically demonstrated by the fact that the Heteropteron most frequently recorded from the county is Enoplops scapha, a very local bug usually found on Compositae on coastal cliffs, the earliest records of which in the county extend well back into the nineteenth century. In contrast, seven very common species of the arboreal genus Psallus (out of 8 species known from the county) were not recorded until 1990.

The following list has been compiled from all readily available sources. The search for records has, however, not been exhaustive. There may be some published records, and must certainly be unpublished records, which have not been included.

SOURCE CODES

B59 = Brinkhurst (1959)
Bu23 = Butler 1932
C27 = Campbell-Taylor (1927)
D39 = Daltry (1939)
F = A.P. Fowles records 1988-92, det. P. Kirby
FA = A.P. Foster records 1977
FS = S. Foster records 1978-84
G56 = Green (1956)
H = R.D. Hawkins records 1990
Hy = P.S. Hyman records 1985, det. P. Kirby
J = S. Judd records 1985-86
K = P. Kirby records 1990
Ke = R.S. Key records 1988, det. P. Kirby
L51 = Leston (1951)
M55 = Massee (1955)
MN65 = McNulty (1965)
Mo = I.K. Morgan records 1991, det. P. Kirby
N = B.S. Nau records 1990
R57 = Ryle (1957)
S = J. Steer records 1991
S&B = Skidmore & Burn 1983
S55 = Scudder (1955)
S56 = Scudder (1956)
S57 = Scudder (1957)
S57a = Scudder (1957a)
Sa92 = Saunders 1892
St52 = Stokes (1952)
W = Welsh Peatland Invertebrate Survey: Nature Conservancy Council survey material, 1987: det. S. Judd or P. Kirby
Wa35 = Walton (1935)
Wa38 = Walton 1938
Wo64 = Woodroffe (1964)

LIST OF HETEROPTERA RECORDED FROM PEMBROKESHIRE, WITH SOURCES OF RECORDS

ACANTHOSOMATIDAE	
Acanthosoma haemorrhoidale (L.)	Bu23;C27;H;M;Sa92
CYDNIDAE	
Sehirus bicolor (L.)	C27;M;S&B
SCUTELLERIDAE	
Odontoscelis fuliginosa (L.)	FS;K;Ke;M;S&B
Eurygaster testudinaria (Geoffroy)	H;Hy;K;S&B
PENTATOMIDAE	
Aelia acuminata (L.)	K;N
Palomena prasina (L.)	C27;H;K;M;N;S;S&B;St52
Dolycoris baccarum (L.)	Bu23;C27;H;K;M;N;S&B;St52
Piezodorus lituratus (Fab.)	C27;H;K;M;N;S;S&B
Pentatoma rufipes (L.)	C27;H;Hy;K;M;S;S56;S&B

Picromerus bidens (L.)	Hy;M;S;St52;W
Troilus luridus (Fab.)	Bu23;C27;H;M
Zicrona caerulea (L.)	Hy;K;M;S&B
COREIDAE	
Enoplops scapha (Fab.)	Bu23;C27;F;K;M;MN65;Mo;S; Sa92;S&B;St52;Wo63
Coreus marginatus (L.)	Bu23;C27;H;M;S;S&B
Syromastus rhombeus (L.)	C27;K;M;S&B;St52
Arenocoris falleni (Schill.)	Bu23;C27;FS;H;K;M;Sa92;S&B
Coriomeris denticulatus (Scopoli)	C27;M;N;S&B
ALYDIDAE	
Alydus calcaratus (L.)	K;S&B
RHOPALIDAE	
Liorhyssus hyalinus (Fab.)	J
Rhopalus parumpunctatus Schilling	Bu23;M
Rhopalus rufus Schilling	M
Corizus hyoscyami (L.)	Bu23;C27;FA;H;K;M;N;S&B;St52
Myrmus miriformis (Fall.)	H;K;M;S&B;St52
Chorosoma schillingi (Schummel)	Bu23;M;Sa92
STENOCEPHALIDAE	
Dicranocephalus agilis (Scopoli)	Bu23;F;FA;H;K;M;N;Sa92
LYGAEIDAE	
Henestaris laticeps (Curtis)	Bu23;C27;F;H;K;M
Nysius ericae (Schilling)	F;H;K;Wo64
Nysius thymi (Wolff)	S&B;Wo64
Pachybrachius fracticollis (Schilling)	W
Peritrechus lundi (Gmelin)	Bu23;M
Beosus maritimus (Scopoli)	C27;F;H;K;M;Mo
Rhyparochromus pini (L.)	B23;FS;M;Sa92;S&B;Wo64
Megalonotus chiragra (Fab.)	H;K
Megalonotus dilatatus (H.-S.)	K;S&B
Megalonotus praetextatus (H.-S.)	FS;H;J;K;S&B
Trapezonotus ullrichi (Fieb.)	K
Trapezonotus arenarius (L.)	H;K;S&B;Wo64
Macrodema micropterum (Curtis)	K;M;S&B
Pionosomus varius (Wolff)	D39;FS;H;K;M;S&B;Wo64
Stygnocoris fuligineus (Geoff.)	K;R57;S57;S&B
Stygnocoris rusticus (Fall.)	S56
Stygnocoris sabulosus (Schilling)	M;W
Plinthisus brevipennis (Latreille)	K
Ischnocoris angustulus (Boheman)	Wo64
Drymus ryei (D.& S.)	*S55;S56

* Scudder (1955) records D. sylvaticus; Scudder (1956) reports that the specimen involved was 'var. ryei', now generally regarded as of specific rank.

Drymus sylvaticus (Fab.)	W
Lamproplax picea (Flor)	W
Scolopostethus affinis (Schilling)	K;M
Scolopostethus decoratus (Hahn)	K;W

Scolopostethus puberulus Horvath	W
Scolopostethus thomsoni Reuter	H;K;M;N;W
Taphropeltus contractus (H.-S.)	Wo64
Cymus glandicolor Hahn	Bu23;C27;F;K;M;N;Sa92;S&B;W
Cymus melanocephalus Fieb.	K
BERYTINIDAE	
Berytinus clavipes (Fab.)	Bu23;C27;M;Sa92
Berytinus minor (H.-S.)	S&B
Berytinus montivagus (Meyer)	Bu23;M;Sa92;S&B
Berytinus signoreti (Fieb.)	Bu23;M;S&B
Neides tipularius (L.)	Bu23;C27;K;M;Sa92;S&B;St52
Gampsocoris punctipes (Germar)	Bu23;C27;H;K;M;N;Sa92; S&B;St52
Metatropis rufescens (H.-S.,)	S&B
PIESMIDAE	
Piesma maculatum (Laporte)	Bu23;C27;M
Piesma quadratum quadratum(Fieb.)	Bu23;C27;F;K;M;N
TINGIDAE	
Acalypta brunnea (Germar)	K
Acalypta parvula (Fall.)	M;S&B
Dictyonota strichnocera Fieb.	K;N;S&B
Kalama tricornis (Schrank)	C27;K;M
Derephysia foliacea (Fall.)	S&B
Tingis cardui (L.)	Hy;K;M;S56
Agramma laetum (Fall.)	S&B
REDUVIIDAE	
Coranus subapterus (DeGeer)	H;K;L51;M;Wo63
Empicoris vagabundus (L.)	S&B
NABIDAE	
Nabis ferus (L.)	M;S&B
Nabis pseudoferus Remane	Wo64
Nabis rugosus (L.)	N;W
Aptus mirmicoides (Costa)	C27;F;K;M;S&B
Anaptus major (Costa)	C27;M;W;S&B
Nabicula limbata (Dahlbom)	Hy;M;S&B;St52;W
Nabicula lineata (Dahlbom)	K
Nabicula flavomarginata Scholtz	K;R57;S&B;S56;W
ANTHOCORIDAE	
Temnostethus gracilis (Horvath)	K
Anthocoris confusus Reuter	H;N
Anthocoris nemoralis (Fab.)	H;K;M;N;St52;W
Anthocoris nemorum (L.)	H;K;M;N;St52;W
Orius laevigatus (Fieb.)	F
Xylocoris cursitans (Fall.)	Bu23;M
Brachysteles parvicornis (Costa)	W
MICROPHYSIDAE	
Loricula elegantula (Barensprung)	K

Myrmedobia distinguenda Reuter	K;N
MIRIDAE	
Monalocoris filicis (L.)	K;M;N;S&B;St52;W
Bryocoris pteridis (Fall.)	N;S&B
Deraeocoris ruber (L.)	N
Oncotylus viridiflavus (Goeze)	M;S&B;St52
Macrotylus solitarius (M.-D.)	N
Macrotylus paykulli (Fall.)	H;K;M;N
Tytthus geminus Flor	W
Tytthus pygmaeus (Zetterstedt)	Bu23;K;M;Sa92
Phylus coryli (L.)	H;K;M;N;St52
Phylus melanocephalus (L.)	K
Psallus ambiguus (Fall.)	K
Psallus betuleti (Fall.)	N
Psallus perrisi (M.& R.)	K
Psallus lepidus (Fieb.)	N
Psallus haematodes (Gmelin)	H;M;S&B
Psallus diminutus (Kirsch.)	N
Psallus mollis (Mulsant)	K
Psallus varians (H.-S.)	K
Compsidolon salicellus (H.-S.)	M;St52
Atractotomus magnicornis (Fall.)	H
Plagiognathus albipennis (Fall.)	F;K
Plagiognathus arbustorum (Fab.)	F;H;Hy;K;M;N;S&B;St52;W
Plagiognathus chrysanthemi (Wolff)	H;K;M;N;S&B;St52
Chlamydatus saltitans (Fall.)	Wo64
Sthenarus rotermundi (Scholtz)	K;N
Asciodema obsoletum (Fieb.)	H;K;N
Dicyphus constrictus (Boheman)	N
Dicyphus epilobii Reuter	H;K;M;N;S&B;W
Dicyphus errans (Wolff)	K;M;N;S&B
Dicyphus stachydis Reuter	N
Dicyphus pallicornis (M.-D.)	M
Dicyphus annulatus (Wolff)	H;K;M;N;St52
Dicyphus globulifer (Fall.)	Bu23;H;K;M;N
Campyloneura virgula (H.-S.)	H;K;N;S&B
Strongylocoris luridus (Fall.)	K
Orthocephalus saltator (Hahn)	K;N
Malacocoris chlorizans (Panzer)	M;St52
Fieberocapsus flaveolus (Reuter)	K;S&B
Cyllecoris histrionicus (L.)	K
Heterocordylus genistae Scopoli	Bu23;M;Sa92
Heterotoma meriopterum (Scopoli)	F;H;K;M;N;S&B;St52
Blepharidopterus angulatus (Fall.)	H;N;S56
Orthotylus tenellus (Fall.)	K
Orthotylus marginalis Reuter	H;K;N;S&B
Orthotylus ochrotrichus Fieb.	K;N;S&B
Orthotylus ericetorum (Fall.)	H
Orthotylus flavosparsus (Sahlberg)	K;M;N
Orthotylus moncreaffi (D.& S.)	K
Cyrtorhinus caricis (Fall.)	K;M;S&B;W
Globiceps dispar (Boheman)	K;M
Mecomma ambulans (Fall.)	H;K;N;S&B;St52;W

Pithanus maerkeli (H.-S.)	H;K;M;N;S&B;W
Lygus maritimus Wagner	H;K
Lygus rugulipennis Poppius	H;K;N;S&B;S56
Liocoris tripustulatus (Fab.)	F;H;M;St52;W
Orthops cervinus (H.-S.)	M;N;St52
Orthops campestris (L.)	K;M;S&B;St52
Orthops kalmi (L.)	K
Orthops basalis (Costa)	Hy
Lygocoris pabulinus (L.)	H;K;M;N;St52;W
Lygocoris contaminatus (Fall.)	M;N
Lygocoris viridis (Fall.)	H;N
Lygocoris lucorum (M.-D.)	H;M;N;S&B;St52;W
Lygocoris spinolai (M.-D.)	S&B
Polymerus palustris Reuter	H;S&B
Polymerus nigritus (Fall.)	Hy;N
Charagochilus gyllenhali (Fall.)	M;St52
Calocoris stysi Wagner	K;N
Calocoris norvegicus (Gmelin)	Bu32;H;K;M;N;S;S&B;W
Calocoris roseomaculatus (Degeer)	S&B
Adelphocoris lineolatus (Goeze)	M;N;S&B
Adelphocoris seticornis (Fab.)	H
Stenotus binotatus (Fab.)	H;K;M;N;S&B;St52
Miridius quadrivirgatus (Costa)	M;St52
Phytocoris longipennis Flor	H;N
Phytocoris tiliae (Fab.)	K;M;S&B;St52
Phytocoris ulmi (Fab.)	M;N
Phytocoris varipes Boheman	K;M;N;S;S&B
Capsus ater (L.)	H;K;N;W
Stenodema calcaratum (Fall.)	H;K;M;S&B;St52;W
Stenodema holsatum (Fab.)	S&B;W
Stenodema laevigatum (L.)	K;M;S&B;St52
Notostira elongata (Geoff.)	K;N
Trigonotylus ruficornis (Geoff)	K;N
Teratocoris saundersi D.& S.	K;N;S&B;W
Leptopterna dolabrata (L.)	H;K;Hy;N
Leptopterna ferrugata (Fall.)	K;M;N;S;W
DIPSOCORIDAE	
Ceratocombus coleoptratus (Zett.)	S&B
Pachycoleus waltli Fieb.	W
SALDIDAE	
Salda littoralis (L.)	F;K
Salda muelleri (Gmelin)	W
Halosalda lateralis (Fall.)	K
Saldula orthochila (Fieb.)	M
Saldula c-album (Scholtz)	M;Wa35
Saldula palustris (Douglas)	K
Saldula saltatoria (L.)	K;M;St52;W;Wa35
Chartoscirta cincta (H.-S.)	S&B;W
Chartoscirta cocksi (Curtis)	W
Aepophilus bonnairei Signoret	G56

HEBRIDAE	
Hebrus ruficeps (Thomson)	S&B; W
HYDROMETRIDAE	
Hydrometra stagnorum (L.)	K; M; W; Ea35
VELIIDAE	
Velia caprai Tamanini	B59; K; M; S55; S56; W
Microvelia reticulata (Burmeister)	W
GERRIDAE	
Gerris costai (H.-S.)	B59; M
Gerris thoracicus Schummel	B59; M; N; Wa35
Gerris gibbifer Schummel	W
Gerris lacustris (L.)	B59; Hy; M; W; Wa35
Aquarius najas (DeGeer)	B59; S56; W
NEPIDAE	
Nepa cinerea L.	M; W; Wa35
NOTONECTIDAE	
Notonecta glauca L.	M; Wa35
Notonecta marmorea Fab.	M; Wa35
Notonecta obliqua Gallen	M; Wa35
PLEIDAE	
Plea minutissima Leach	M; Wa35
CORIXIDAE	
Micronecta poweri (D.& S.)	S56; Wa38
Callicorixa praeusta (Fieb.)	M; Wa35
Corixa affinis Leach	M; Wa35
Corixa punctata (Illiger)	M; Wa35
Hesperocorixa sahlbergi (Fieb.)	M; Wa35
Hesperocorixa moesta (Fieb.)	M; Wa35
Arctocorisa germari (Fieb.)	M; Wa35
Sigara dorsalis (Leach)	M; Wa35
Sigara distincta (Fieb.)	M; Wa35
Sigara falleni (Fieber)	M; Wa35
Sigara scotti (Fieb.)	Wa35
Sigara lateralis (Leach)	M; Wa35
Sigara nigrolineata (Fieb.)	M; N; Wa35
Sigara concinna (Fieb.)	M; Wa35
Sigara venusta (D.& S.)	M; Wa35

DOUBTFUL RECORDS

Rhopalus rufus Schilling is recorded from the county in the distribution tables of Massee (1955). Though the occurrence of the species is by no means impossible, R. rufus is very similar to the more widely distributed and frequent P. parumpunctatus and misidentifications are known to have occurred in the past. R. rufus is a rare species in Britain, and the Pembrokeshire record is one of the most northerly. The

species is retained in the table above, but the record ideally requires confirmation.

Dicranocephalus albipes (Fab.) was recorded from Tenby Burrows by Campbell-Taylor (1927, 1927a). Scudder (1956) notes the record but, oddly, refers it to the county of Glamorgan. There is no confirmed British record of D. albipes. Campbell-Taylor's specimen was reared from a nymph and it seems possible that he was led into mis-diagnosis by the unusual coloration of a somewhat teneral specimen, probably of D. agilis.

Dlcranocephalus medius (M.& R.) was recorded from Bosherton Sand Dunes SSSI by Skidmore & Burn (1983). D. medius is usually associated with wood spurge Euphorbia amygdaloides in inland localities. D. agilis is the usual species in coastal situations, and is quite frequent on the Pembrokeshire coast. Skidmore & Burn did not record D. agilis. The separation of the species of Dicranocephalus, a rather uniform genus, is not always easy. Misidentification must be suspected in this case. However, there is a record of D. medius from Portland spurge Euphorbia portlandica on the Dorset coast (Woodroffe 1958), so it is not impossible that the Pembrokeshire D. medius record is genuine. Nonetheless, the extent of doubt is sufficient that the record has been omitted from the table.

Nysius thymi (Wolff). Records under this name given in Massee (1955) and Stokes (1952) pre-date the recognition of N. ericae in Britain (Woodroffe 1959), and so cannot confidently be assigned to species. The records are omitted from the table. There are more recent and reliable records of both N. thymi and N. ericae from the county.

Megalonotus chiragra (Fab.). Records of this species given by Skidmore & Burn (1983) and Woodroffe (1963) pre-date the widespread recognition of the occurrence of a closely related species, M. emarginatus, in Britain (Aukema & Nau 1992), and as such are open to doubt. They are omitted from the table. Specimens collected in 1990 have been checked, and are true M. chiragra.

Trapezonotus desertus Seid. Woodroffe (1963) considered that a nymph he found amongst heather on St David's Head was probably this species. However, he was not certain of its identity, and the species is not included in the table.

Eremocoris plebejus (Fall.) was listed in the county distribution table of Bedwell & Massee (1945). The record is noted as requiring deletion in the A.M. Massee archive held at Monks Wood Experimental Station, and is omitted from the distribution table in Massee (1955).

Orthops kalmi (L.). Records of this species in Massee (1955) and Stokes (1952) pre-date the recognition of the very similar O. basalis in Britain (Woodroffe 1973). These records are not included in the table. Both O. basalis and O. kalmi have been recorded from the county in recent years.

Trigonotylus ruficornis (Geoff.). A record of this species in Skidmore & Burn (1983) pre-dates the recognition of the closely related T. caelestialium in Britain (Aukema & Nau 1992) and is not included in the table. Specimens of Trigonotylus collected in 1990 have been checked

Saldula pallipes (Fab.). Records under this name in Massee (1955) and Walton (1935) could refer to S. palustris. a species which is known to occur in the county and which is very closely related to S. pallipes and has been much confused with it. In the absence of recent reliable records, S. pallipes is not included in the table, but it is a generally common species and may well occur in the county.

Micronecta minutissima (L.) is recorded for the county by Massee (1955) and Walton (1935), both presumably referring to the same record. Walton's 1935 record was published before it was recognised that three distinct species of Micronecta occurred in Britain, of which M. minutissima is by far the rarest. In his paper describing the separation of the three species, Walton (1938) re-recorded his Pembrokeshire specimens as M. poweri, but Massee appears to have overlooked this revision.

Sigara striata (L.) was recorded by Massee (1955) and Walton (1935). It is now known that the true S. striata is confined to a small area of south-eastern England, and that over the rest of Britain the insect which had formerly been given that name is in fact S. dorsalis. The Massee and Walton records of S. striata have therefore been included in the table under S. dorsalis.

NOTES ON RARER SPECIES

Brief notes are given here on those species of Heteroptera recorded from Pembrokeshire which are considered by the Joint Nature Conservation Committee to qualify for Red Data Book or Nationally Notable (Scarce) (believed to occur in 100 or fewer 10-kilometre squares in Britain) status. Statuses are taken from Kirby (1992), with reference also made to Shirt (1987).

Odontoscelis fuliginosa (L.) (RDB3)
O. fuliginosa is a ground-dwelling and burrowing insect confined in Britain to coastal dunes, where it occurs in open but not very unstable areas, probably in association with stork's-bill Erodium. It is a very local insect, recorded from only seven southern coastal counties between Norfolk and Cheshire, and seems usually to be rare even where it occurs. Since the first finding of Odontoscelis in Pembrokeshire in 1938 (Daltry 1939), O. fuliginosa has been recorded on several occasions both from Freshwater West and from Stackpole Warren/Broad Haven and Barafundle Bay. The bug has been more frequently recorded from this stretch of coast than from any other area of Britain save the dunes at Deal, in Kent, a site with much greater recorder pressure. I found O. fuliginosa quite commonly beneath Erodium cicutarium at Barafundle Bay in early July 1990.

Rhopalus rufus Schilling (RDB3), included in the table but regarded as requiring confirmation, has been discussed under 'doubtful records'.

Dicranocephalus agilis (Scopoli) (Notable)
D. agilis feeds on sea and Portland spurges Euphorbia paralias and E. portlandica. This greatly restricts the distribution of the insect, but P. agilis occurs frequently on south-western coasts where there is a reasonable population of either or both of these plants. There are many records of the bug from Pembrokeshire over a wide span of years, but all are from the well-visited areas of Freshwater West (Broomhill Burrows), Broad Haven and Barafundle Bay. I found it commonly in all three localities in early July 1990.

Dicranocephalus medius. (Notable), believed to have been recorded from the county erroneously, is not included in the table but is discussed under 'doubtful records'.

Rhyparochromus pini (L.) (Notable)
A large ground-dwelling bug with an interesting duality of habitat preferences. In south-eastern England it is associated with heathland; in south-west England and Wales it is coastal, occurring on dunes and sheltered banks. In Pembrokeshire it has been reported from Freshwater West by both Skidmore & Burn (1983) and, in the same year, by S. Foster, who found the insect in association with Erodium. Woodroffe (1963) reported finding R. pini commonly at Whitesands Bay, St Davids, in August/September 1963, in association with Thymus.

Megalonotus dilatatus (H.-S.) (Notable)
There are two records of this species from Pembrokeshire, both recent: Skidmore & Burn (1983) report it from Maiden's Castle (Trefgarne); I found a single specimen amongst rocks overlooking Bosherton Lily Pools, SR9794, on 1 July 1990. M dilatatus is a ground-dwelling species of wide but very local distribution in dry open situations. It is recorded as far north as Scotland, but most records are south-eastern. Even where it occurs it is often scarce and elusive.

Megalonotus praetextatus (H.-S.) (Notable)
This brightly-shining groundbug occurs in dry open places on sand or amongst small stones, especially on the coast, in southern England and Wales. It occurs north to Yorkshire in the east, but Pembrokeshire represents its known limit in the west. It appears not to have been noted in the county until 1983, but in that year and since it has been recorded from Freshwater West, Broad Haven and Barafundle Bay.

Pionosomus varius (Wolff) (RDB3)
This small but distinctive ground-bug is confined, in Britain, to sandy places on the coast, and has been recorded only from Kent, Dorset, Glamorgan and Pembrokeshire. Though very local, even within a site where it occurs, it can be numerous within its colonies. It was first found in Pembrokeshire at Freshwater West in 1938 (Daltry 1939). There have since been further records from that site and also from Broad Haven, Stackpole Warren and Barafundle Bay. It was recorded from all these localities in 1990.

Trapezonotus ullrichi (Fieb.) (RDB3)
I captured a male and female of this bug by beating flowers of ox-eye daisy Leucanthemum vulgare on a sheltered slope of the sea cliff at Caerfai, SM760253, on 25 June 1990. This is a surprising find not only because it was made from wet vegetation in quite dense fog, but also because T. ullrichi had previously been recorded in Britain only from Devon and Cornwall. Its preferred habitat in Britain seems to be amongst fairly tall grassland on cliffs.
II
Nabis pseudoferus Remane (Notable) (RDB3 in Shirt (1987))
This rare predacious bug was recorded from Barafundle Bay in August/September 1963 by Woodroffe (1963). The record is based on a single brachypterous female. This could leave an element of doubt as to the certainty of the identification, particularly since this is the only Welsh record. However, Woodroffe was very familiar with N. pseudoferus, which appears to be quite frequent on coastal dunes in south-western England and extends north to Norfolk on the eastern coast.

Tytthus geminus Flor (Notable)
This is a small and rather elusive insect which lives low down amongst rushes Juncus or sedges Carex in wet places. Though undoubtedly very local, it may be rather under-recorded. The Welsh Peatland Invertebrate Survey found T. geminus at two localities, at both sites by searching litter. It was found amongst Carex riparia litter at Cwm Dewi, SN010399, 11August 1987; and amongst litter of Typha and of mixed Oenanthe, Typha and Carex at The Ritec, SN104019, 5 August 1987.

Strongylocoris luridus (Fall.) (Notable)
I found this bug at two localities in 1990: Dinas Head, SN0043, 26 June; St Davids Head, SM7227, 28 June. On both occasions it was found on its only host, sheep's-bit Jasione montana, on cliff-tops, S. luridus is a predominantly south-western species, with records extending from Kent to Cumberland. It may well be quite frequent on the Pembrokeshire coast, and it is rather surprising that it appears not previously to have been recorded from the county.

Adelphocoris seticornis (Fab.) (Notable; RDB3 in Shirt (1987))
R.D. Hawkins found this large and distinctive plant bug amongst large bird's-foot trefoil Lotus uliginosus (a known foodplant) and soft rush Juncus effusus at Kings Moor Nature Reserve (Dyfed Wildlife Trust), Kilgetty, SN123066, 24 July 1990. A. seticornis presents something of a puzzle. It is a large, distinctive insect which is quite easily found by standard recording techniques, so the very few records of the species in Britain presumably represent genuine rarity. Yet it is widely distributed, occurring from the Isle of Wight to Perthshire and from Pembrokeshire to Norfolk, can feed on a wide range of Papilionaceae, and has been found in habitats as varied as wetland and dry chalk quarries.

Pachycoleus waltli Fieb. (Notable)
A small, fragile and easily overlooked insect which usually occurs deep amongst wet moss, less often amongst wet plant litter. The single Pembrokeshire record is from a pitfall trap of the Welsh Peatland Invertebrate Survey: Portheiddy Moor, SM808314, 23 June 1987, from a grazed sedge-rich fen.

Aepophilus bonnairei Signoret (Notable)
Green (1956) records a single specimen of this species walking over a stone near low water in South Haven, Skomer Island, 21 August 1955. A. bonnairei lives in rock crevices on the sea shore and has been recorded in Britain from western coasts from Hampshire to the Isle of Man. Suitable localities for the insect are probably quite frequent in Pembrokeshire. Since A. bonnairei must usually be sought with hammer and cold chisel it is inevitably under-recorded.

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