

DYFED  
INVERTEBRATE  
GROUP



## NEWSLETTER No 30

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### EDITORIAL

A quick glance through the pages of this Newsletter will clearly show a bias of articles towards Carmarthenshire, which is undesirable for a publication which seeks to promote invertebrate recording and conservation throughout the three vice-counties of Dyfed (itself soon to disappear with local government reorganisation). The departure of Adrian Fowles to the north-west corner of Wales has obviously resulted in far less material coming forward from Ceredigion (Cards., VC46). Likewise, Dave Boyce who was very active in beetle recording, has left for a post in SW England and Arthur Chater is understandably concentrating on field and desk work for his proposed Flora. In compensation, Mike Bailey has kindly written a summary of interesting records of spiders in VC46.

Pembrokeshire has always been a problem in terms of provision of material for this Newsletter in spite of visits to the county by entomologists and the presence of excellent resident naturalists. In this annual "review of records" issue, we are missing features by two regular and valued Pembrokeshire contributors, through no fault of their own - John Steer's annual VC45 *Orthoptera Review* and Stan Dobson's *Spider Review*. The reason for this was John Steer's summer-time exile in Carmarthenshire (from where, however, he has produced some useful records) whilst Stan Dobson's annual Field Study Centre's course regrettably did not take place in 1994.

I was particularly pleased to receive Peter Walker's paper on the *Crustacea of Carmarthenshire Caves*, as I had always hoped that one day someone would find *Proasellus cavacicus* in one of our limestone caves. A copy - as a Christmas present - of Chapman's thoroughly recommended *Caves and cave life* (in the "New Naturalist" series) had already won me over into the ranks of those who are interested in cave invertebrates. We have now no less than 122 caves (not including man-made adits) to explore!

May I now give all readers the annual reminder that 1995 subscriptions are now due - four 1st class stamps. No further issues will be sent unless subscriptions are paid.

There is only one formal field meeting arranged for this year - a joint meeting with the British Entomological and Natural History Society at Dinefwr Park, Llandeilo on Saturday 1st July 1995. We meet at the National Trust car

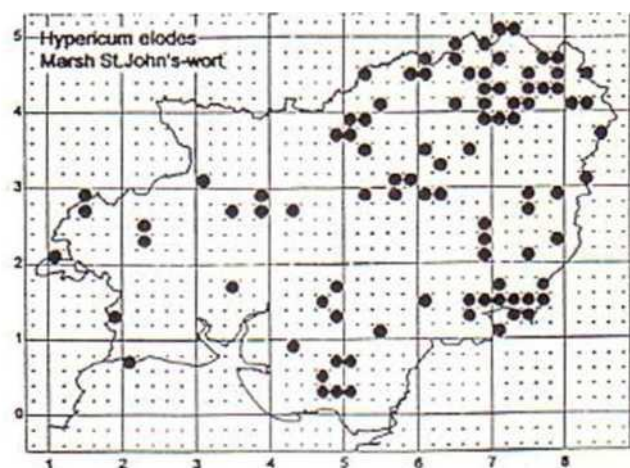
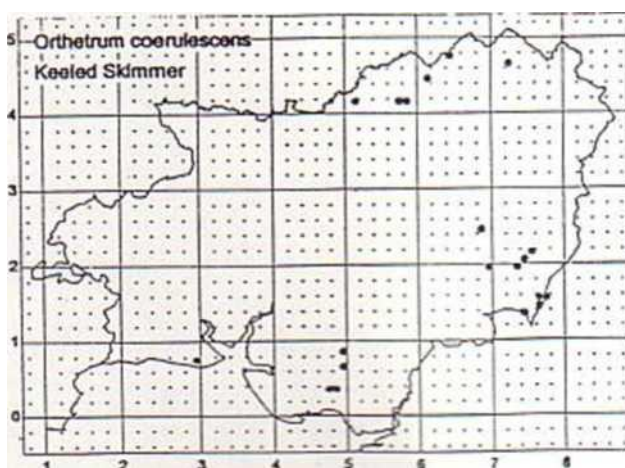
park (SN615225) at 10.30AM. Non-National Trust members may have to pay a parking fee. We shall be sampling the rich fauna of this most important deadwood site as well as tufa flushes, oxbows and possibly shingle. For those who are interested there will also be an evening moth-trapping session. Those wishing to attend should ideally let me know by about a fortnight before the date.

## DRAGONFLIES & DAMSELFLIES IN CARMARTHENSHIRE 1994 - I. K. Morgan

The 1994 Odonata season began extremely early with the sighting of a teneral (freshly-emerged) large red damselfly *Pyrrhosoma nymphula*, at Glynea, Bynea 21/553989 on 29th March. Although *Pyrrhosoma* is invariably the earliest species to appear in spring, normally this occurs in mid to late April; indeed the next 1994 sighting of this damselfly was not until the 30th of that month and the species was not frequent until early May, so the late March record is rather extraordinary.

Early summer saw the appearance of the hairy dragonfly *Brachytron pratense*, with two (including one ovipositing female) at the "Frogbit Ditch" at Ffrwd Fen N.R. 22/419023 on 11th June. An adult male was also caught in a mist net at Tir Morfa 21/533982 on 31st May by Barry Stewart; the species is known to occur regularly on some ditches on the surrounding coastal flats, and there also have been other recent records from the adjacent Wildfowl and Wetlands Centre at Penclacwydd. An earlier record of the ruddy darter *Sympetrum sanguineum* at Penclacwydd has recently come to light. "Several" were seen by Barry Stewart on 3rd August 1990 (21/539985).

Sarah Andrews (CCW Phase 1 survey worker) provided an useful record of the keeled skimmer *Orthetrum coerulescens*, at Glangyforiog Farm 22/519417 (1st August). This is a localised dragonfly of flushed situations and *Sphagnum*-filled bog hollows and shows a positive correlation with such plants as marsh St. John's wort *Hypericum elodes* and also white beak-sedge *Rhynchospora alba* and bog pondweed *Potamogeton polygonifolius*. Since it has a restricted flight period - mostly mid/late June to mid-August (sometimes a little later), then a knowledge of the distribution of suitable habitat (with the above plants) will help in locating appropriate habitat to be visited during the limited flight period. A map (see below, based on Coker & Fox, 1985 and updated) shows the known distribution of the keeled skimmer in the county and a map showing the tetrad distribution of *Hypericum elodes* is also offered. The latter is more likely to show the real distribution of this dragonfly in Carmarthenshire, if time were to allow sufficient survey work.



Another species, the late-flying black darter *Sympetrum danae* is also associated with acidic mires; the species was reported by N.R. Thomas from Ddolwen near Harford, Pumsaint 22/642428 on 15th August, together with the golden-ringed dragonfly *Cordulegaster boltoni*, an emperor *Anax imperator*, common darters *Sympetrum striolatum*, emerald damselflies *Lestes sponsa* and common blue damselflies *Enallagma cyathigerum*. As is usual, common hawkers *Aeshna juncea* put in an appearance at many localities in late summer and there were several records of southern hawkers *A. cyanea* from coastal SE Carm. One of the latter was also recorded at Llanglydwen 22/17-25- on 28th July (John Steer).

Dragonfly enthusiasts in Carmarthenshire (myself included) are regretting not looking out for three migrants in 1994, all of which were recorded at the well-watched Kenfig NNR in Glamorgan. Here, a red-veined darter *Sympetrum fonscolombei* was spotted on 1st July; whilst "a week later...an excellent view" was had of a vagrant emperor *Hemianax ephippiger* and, to cap it all, on 23rd July, a yellow-winged darter *S. flaveolum* was seen! (*BDS Newsl.* 26:7 (Autumn 1994)). The vagrant emperor had a good year in 1994 with "individuals turning up in almost every region of England (*Brit. Wildlife* 5, No6: 389-390). *Hemianax* is a generally brownish species, with a pale brown blotch on the hind wing of the male; there is also a bright blue patch at the base of the male's abdomen. It is a very migratory species - essentially breeding in Africa and the Middle East, but travelling widely with individuals even having reached Iceland, where it is the only dragonfly recorded, (Silsby, 1993). Perhaps we should be more diligent henceforth and be aware of the possibility of migrants.

Acknowledgements: Thanks to Sarah Andrews, Jamie Sevan, Richard Howorth, George Hutchinson, Morfydd Lloyd, Graham Motley, John Steer and Nick Thomas for submitting records. Gratitude is also due to Richard Pryce for producing the distribution maps, using "D Map" written by Dr Alan Morton.

Reference:

Coker, S. & Fox, A.D. (1985) - *West Wales Dragonflies*. Mountain Books, Haverfordwest.

Silsby, J. (1993) - A review of *Hemianax ephippiger*, the Vagrant Emperor. *J. Br. Dragonfly Soc.* 9, No2: 47-50.

## CARMARTHENSHIRE BUTTERFLIES & MOTHS, 1994 - I K Morgan

The ongoing Countryside Council for Wales (CCW) 'Phase 1/2 survey' of Carmarthen District and Dinefwr Borough continues, through the enthusiasm of the surveyors†, to provide very useful records particularly of butterflies associated with unimproved pastures, most especially the marsh fritillary *Eurodryas aurinia* and small pearl-bordered fritillary *Boloria selene*. Some of the sites where these species were recorded are listed below, with previously- unknown sites for the marsh fritillary marked with an asterisk (\*):

(†Sarah Andrews (SA), Richard Howorth (RH), Morfydd Lloyd (ML), Graham Motley (GSM) and Jamie Bevan (JB)).

As usual, any unattributed records in the text are those of the author.

Marsh fritillary

(i)	nr. Bryn Coch-bach	22/572116	28.6.94	2 adults}	
(ii)	nr. Caeau Ffos-fach	22/574124	28.6.94	7	" }
(iii)	nr. Tyllwyd-fach	22/576114	30.6.94	1	" } GSM & JB
(iv)	Caeau Pant-y-bryn	22/656145	5.7.94	1	" }

[there is also an unconfirmed record from near Rhydyglyn, 22/608355 per. GSM & JB].

A visit to two sites in the Brecon Beacons National Park by Jonathan Graham and Stuart Reid also produced records at:-

(v)	Brynychwith*	22/715215	15.6.94	5 adults
(vi)	Ynys Toddeb*	22/725212	27.6.94	1 "

Richard Pryce et al provided a batch of marsh fritillary records from the Lower Gwendraeth valley, complementing those made in the same general area (but from different sites) by Barry Stewart in 1993. There certainly seems to be a concentration of suitable habitat for this declining butterfly in this coalfield valley. The 1994 localities are listed below:

(vii)	East of Brydlas Farm*	22/438035	2.6.94	2 individuals
(viii)	S. of Waun Bagiam*	22/443036	2.6.94	1 individual
(ix)	S. of Penllwyn Uchaf*	22/437024	16.6.94	1 individual
(x)	NE of Berth Farm*	22/443044	10.6.94	1 individual
(xi)	SW of Pant y gino*	22/474049	25.6.94	3 individuals
(xii)	SSE of Pant y gino*	22/476048	25.6.94	3 individuals

(vii)-(x) were recorded by Richard Pryce (RDP), whilst (xi) & (xii) were recorded by RDP, Liz Flood, George Hutchinson & Janet Crowden.

This aggregation of sites, which are close to Barry Stewart's 1993 localities (where he recorded no less than 70 butterflies on the wing at one rough pasture) and other local stations for this species, could be regarded as part of a "metapopulation" as defined by Warren (1994).

The writer discovered another marsh fritillary site on 22nd June - at Cefn Gwili\* (22/577089), where four adults were in flight with one small pearl-bordered fritillary, and a host of meadow browns *Maniola jurtina* and ringlets *Aphantopus hyperantus*. Five marsh fritillaries at Nant y Garreg\* near Rhos (22/374364) on 16th June provided a new site record (RH), here Andrew Lucas (AL) also noted 10 larval webs on 12th September. A larval web was also found at Cefn-llech-clawdd (22/366394) on 5th October (RH). Near Tirlan, Llwyn-teg (22/555070), 10 or more 'marsh frits' were on the wing in warm sunshine on 27th June; and here, in October, Janet Crowden counted no less than 57 larval webs, indicating a very reasonable colony indeed. AL also counted 30 adults at Pen-ty SSSI (22/478167) on 16th June whilst John Steer noted one at Rhos Pwll y Gawnen, Trelech 22/29-29- on 8th July; both localities already known sites. Finally, Barry Stewart recorded two marsh fritillaries near Ty Croes\* (22/610110) on 9th June.

A very useful survey by Melanie Bagley on behalf of CCW of known marsh fritillary sites in Dinewr Borough in late May/June, led to the sighting of "93 individual marsh fritillaries on 15 different sites", with the highest number (45) being recorded at Caeau Ffos-fach/Broaa Oak meadow (22/576120-22/580122) near Capel Hendre. Six previously-known sites are believed to be extinct, with losses attributed to open-casting for coal, afforestation, overgrazing or agricultural improvement of pasture. Although recognizing that there are doubtless unrecorded localities for this now-symbolic butterfly of species-rich pasture, CCW's Invertebrate Ecologist - Adrian Fowles - made the pertinent observation that this recent extinction of six "colonies" represented an approximate loss of up to 30%! Certainly, it is known that marsh fritillary colonies elsewhere in Carmarthenshire (ie in Carmarthen District and Llanelli Borough) are similarly threatened, if not directly by for example, open-cast mining then by successional change, eg the current scrubbing-over of the Cencoed-uchaf (22/484032) colony near Llanelli. Surviving colonies are now "islands" in a "sea" of unsuitable, lush green pastures, with no longer the linkage of appropriate pasture to aid recolonisation of temporarily unsuitable sites for the usually rather sedentary adult butterflies, though Warren (loc.cit) notes that adults can on occasions disperse as much as 15-20 kms.

Melanie Bagley's survey was followed up in September/October by Peter Hack on

behalf of CCW. This confirmed that the Capel Hendre area is the only known truly viable marsh fritillary colony in Dinewr, at least outside of the boundary of the Brecon Beacons National Park. Here, over 70 webs were discovered at Caeau Ffos Fach/Broad Oak Meadow which has to be regarded as the core of the colony, and future monitoring of these fields should be a priority. Excitingly, webs were also discovered at half a dozen other fields in the near vicinity, although these supported far less significant populations, holding a dozen or so less webs. Only at Caeau Ffos Fach was the vegetation highly suitable, with lush and abundant *Succisa*. On all other known sites in the Capel Hendre area succession was often occurring, with rank *Molinia* or *Juncus* threatening to swamp the *Succisa*, and the need for light grazing on some of these fields is urgent. Other once suitable fields here were being badly hammered by intensive pony grazing, resulting in tight unsuitable swards. This area, however, should be regarded as a priority for management, as further colonies could undoubtedly be uncovered and effort targeted at implementing correct grazing levels will result in a viable colony, the only known one in Dinewr.

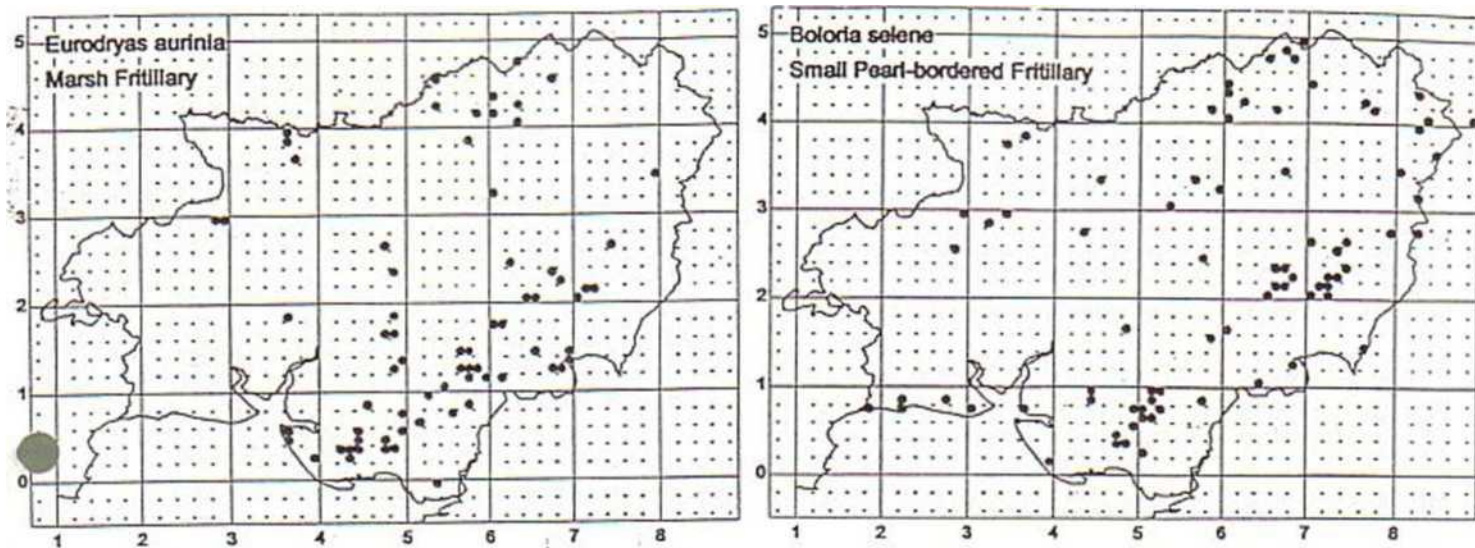
Further effort could well be rewarded if areas such as Gwynfe/Llanddeusant or the rest of the Coalfield were targeted, where habitat is more extensive and colonies are less isolated. Here, further sites could well be discovered, and if additionally new pockets of suitable habitat could be created, adjacent to existing sites, this would enhance colonies' viability. This has to be implemented if the species is to survive in one of its traditional British strongholds.

A map showing the known Carmarthenshire distribution of the marsh fritillary is shown on the next page. The rather optimistic picture it presents should be tempered by the comments given above and the realisation that this is a cumulative map (mostly post-1985 records) and that some records refer to very few individuals. Indeed, the record represented by a dot in SS59 (the Llwynhendy area) can be disregarded, as it represented a single individual, presumably a wanderer from the strong colonies on the Gower commons. The map does, however, show the concentration of records on the Coalfield where the premier threat to the species is open-cast coaling. The close aggregation of records from the Lower Gwendraeth valley for example, almost precisely coincide with a proposed major open-cast site!

### Small Pearl-bordered Fritillary

The Phase 2 (GSM & JB) surveyors saw small pearl-bordered fritillaries (2) at Dugoedydd (22/775416, 12th July) and three in *Molinia* pasture at Blaen-dyffryn (22/605442) on 13th July. This species was additionally observed in three parts of the Crychan Forest: at 22/883401 (1), 22/838404 (1) and 22/848369 (3), all on 25th June and on coastal acidic grassland at Ragwen Point 22/221073 (1) 30th June, when the year's first clouded yellows *Colias croceus* put in an appearance. A single "s.p.b. frit" was seen by John Ellis at Furnace Pond, Llanelli (22/503021) on 12th June and Jonathan Graham also reported three sites for this butterfly: Ynys Toddeb, (Gwynfe 22/725211 & 22/722203), 27.6.94 (c.8 butterflies); Nant llyndir, Cynghordy (22/822394, 7.6.94 c.4) and Cwm Sawdde, Llangadog (22/708262, a 1993 record, c.10 adults). Whilst also engaged on survey work, Sarah Andrews reported small pearl-bordered fritillaries in a field at Rhoswen (22/453330), on 7th July, and Morfydd Lloyd noted one near Pontarsais (22/438272), also in July.

A map of this species' known distribution in the county is shown below. Whilst there are clusters of records, for example in the Llanelli area (partially due to intensive recording here) and on the flanks of the eastern uplands, the species is perhaps more widely-distributed than the marsh fritillary. This is probably due to the greater survival of the rushy pastures with bog violets (one of the larval food plants), that are beloved of small pearl-bordered, than the *Succisa*-rich tussocky heath-grasslands favoured by the marsh fritillary.



Above: Known Carmarthenshire distributions of the marsh fritillary and the small pearl-bordered fritillary.

Agile dark green fritillaries *Argynnis aglaja* were noted at their usual haunts on Laugharne Burrows (22/27-07-), 12th July (AL); at Tywyn Burrows (22/36-05-, 16th July); on coastal grassland near "Top Castle", Marros (22/193075, 22nd July) and inland in Brechfa Forest (22/475283, 19th July). A few sightings of silver-washed fritillaries *Argynnis paphia* were reported - one just north of Pont Cych (22/272371, 23rd July) and another feeding at a flower of knapweed *Centaurea nigra* north of Login (22/16-24-) on 9th Sept. (both by George Hutchinson and Richard Pryce). Two more records hail from one of the species' Carmarthenshire strongholds - the Cothi Valley around Brechfa-Abergorlech, where Julian Friese (JF) saw one at Darren Fawr, Ynys Brechfa (22/537285) and another at Pont Ynyswen (22/531255), both on 24th July. John Steer also provided some west Carms. records of this fritillary: one at Llanglydwen 22/17-26-, 22nd July; "several" nearby 22/17-25- on 4th August and one at Henllan Amgoed 22/18-20- on 21st August.

Barry Stewart and Sandra Turner also provided a very interesting record on 24th July of two small blues *Cupido minimus* at Wernos, Ty Croes (22/617114). The site comprises an old shaley spoil tip and the normal food plant of this butterfly in Britain - kidney vetch *Anthyllis vulneraria* was NOT found growing at this locality, in spite of careful searching, though it is possible that it was simply missed. Kidney vetch used to be common on old spoil tips at Great Mountain Colliery, Tumble (R.D. Pryce, pers.comm. 1994). Interestingly, if this plant was absent, this is not the sole record of the small blue being found at a site without *Anthyllis* in Carmarthenshire: it occurred in a neutral grassland sward at Pen-ty (22/483166) in August 1988. Bird's-foot trefoil *Lotus corniculatus* was frequent at the Wernos spoil tip and it is presumed that this species is being fed upon by small blue caterpillars. The thirty or so marbled whites *Melanargia galathea* observed at this locality also represent a noteworthy record. Often such spoil tips are regarded as environmental eyesores and are subjected to "improvements" (usually grassing-over and with the planting of a few grey alders, white poplars or sycamores!), but these mature coalfield tips and other areas of "wasteground" are a rich wildlife resource. For example, the abundance of butterflies recorded by BS & SJT on their brief

visit to the Wernos spoil tip is indicated below:

large white (6)  
small white (1)  
small skipper (c.150)  
small blue (2)  
red admiral (2)  
painted lady (1)  
small tortoiseshell (5)  
small heath (5)  
marbled white (c.30)  
meadow brown (c.20)  
gatekeeper (c.50)  
grayling (c.70)  
speckled wood (2)  
ringlet (15)

In contrast to last year (1993), when there was only one record of a clouded yellow, summer 1994 was a moderate season for this great traveller which migrates to our shores from southern Europe. The first, as already stated, was on the coast at the very end of June but subsequently there were at least about twenty-five records, both coastal and inland, including four at Cefn Sidan beach on 23rd September (BS). The last record was made at Sandy Water Park, Llanelli (22/495006) on 11th October (Andrew Mitchell) who also reports the pale female form of the clouded yellow *Colias croceus* var. *helice* at the same site near the end of September. Migrant red admirals *Vanessa atalanta* were in evidence from late April to the end of June and then again from late July onwards to at least the end of October; individuals were still to be seen in early November. On 23rd September (BS) estimated about 50 red admirals flying in from over the sea at Cefn Sidan in about 4 hour's watching (along c.4ml stretch of beach, stopping at six points to count). Painted ladies *Cynthia cardui* were also noted throughout the summer, again from the end of April, and five were watched feeding on sea aster *Aster tripolium* at Penclacwydd on 2nd September. Due to the clement weather conditions - November was reported to be the mildest since records began in 1659! (*The Guardian*, 30.1.94) - vanessids were around well into the early winter period. Three painted ladies were spotted by Mark Pavett on the dunes near the North Dock, Llanelli in sunny weather on 27th November and another was watched feasting at flowers of *Hebe* at Stradey on the same day. A late record was one seen by JF at Llandeilo on 2nd December, but the latest record of all was one seen, in sunny conditions, at Pembrey Forest on 21st December (BS). That night though, the first of several very hard frosts occurred which probably slaughtered any remaining active butterflies. The first observation of large whites *Pieris brassicae* was that of ten at the Penrhyngywn shingle spit (21/517973) on 30th May (BS).

Of the resident species, green hairstreaks *Callophrys rubi* were fluttering amongst rank gorse to the east of Gel1i'r-wydd, Llwyn-teg (22/552077) on 2nd May and with another singleton basking on a sunny, bilberry-clad laneside bank south of Llwyn-teg (22/552077). On the same date, a male brimstone *Gonepteryx rhamni* was spotted at the edge of a conifer plantation behind the chapel at Llwyn-teg (22/551082). I have seen brimstones at this latter site on previous occasions and Janet Crowden informs me of the presence of a bush of the larval foodplant, alder buckthorn *Frangula alnus* thereabouts, thus explaining the attraction of this locality for this butterfly. JF reported two useful records of this very local Carmarthenshire species, both well inland - above Llangadog Bridge (22/698290) and at Felindre, Llansadwrn (22/687306), both on 31st May. On 11th July, RH observed a brimstone just south-west of St David's Hospital near Carmarthen (22/388199). It was a swift-flying male which rapidly moved on. Very close to the coast, an adult brimstone was also spotted near Penybryn (21/541983) on 13th August by Barry Stewart. It is hoped that a permanent population will establish itself in the area now that alder buckthorn has been planted at the Wildfowl and Wetlands Trust Centre at Penclacwydd. Graylings *Hipparchia semele* were recorded at several localities, including individuals along the pathway on the landward side of Sandy Water Park (AM), where they also occur on adjacent stoney wasteground. Formerly, they were also found (together with small blues) on the nearby railway sidings below (S. of) Sandy

Bridge (22/499005). Now the latter site is grassed-over and the butterflies have, expectedly, disappeared.

Commas *Polygonia c-album* were extremely scarce this year (after several seasons of relative plenty), and except for some records from near Furnace Pond (22/503022), (AM), there was only one other record of the holly blue *Celastrina argiolus*, a singleton at WWT Penciacwydd (21/527984) on 21st August. Marbled whites were seen by several observers at their regular coastal stations and a noteworthy count of 30+ was made by Andrew Lucas at a known colony on neutral, unimproved pasture at "Stonefield", Llanedi (22/588085 part of the Caeau Afon Gwili SSSI, 28th July). Jonathan Graham noted one at Glynhir (22/641153) in August. This species was also noted near Wharley Point, Llansteffan, not far from Lords Park Farm (at 22/337094) on 28th July, a "new site" (Richard Ellis) and one was seen on rough grassland at Gelli Aur 22/593197 on 9th and 13th Aug. (Mat Ridley).

## MOTHS

In last year's summary (DIG 28: 5-9), it was announced that Barry Stewart, 'stalwart of moth recording' was leaving the area to start, as a mature student, in college at Plymouth. Well, he did leave but returned in time for much of the 1994 summer season, having transferred to University College Swansea, thereby regaining his status as the most knowledgeable and active moth recorder in Carmarthenshire. Indeed, the greater bulk of 1994's interesting records were made by Barry assisted by Sandra Turner (with 248 spp. of macromoth being recorded), so unless otherwise indicated, readers should assume that all the following records were made by Barry Stewart (BS) in conjunction with Sandra Turner (SJT).

BS's & SJT's main trapping was carried out at Erw-las, Llwynhendy (21/538992, their current residence), where the moths listed below were recorded. There is a discussion of the records in the paragraph following the list. ("Nationally notable" species are suffixed by the emboldened letter N; nationally notable moths are those which have been recorded in less than a hundred 10km squares, with Nb representing 31 to 100 10km square records and Na 16 to 30 10km square records).

### Erw-las, Llwynhendy (21/538992). BS/SJT

oak hook tip *Drepana binaria* 8/8 (1).  
vestal *Rhodometra sacraria* 8/8 (1).  
phoenix *Eulithis prunata* 22/7 (1), 23/7 (1). wood carpet  
*Epirrhoe rivata* 28/6 (1), 17/7.  
bordered pug *Eupithecia succenturiata* 2/7 (1), 9/7 (1), 13/7 (1).  
small seraphim *Pterapherapteryx sexalata* 2/7 (2), 4/7 (1).  
lilac beauty *Apeira syringaria* 2/7 (2).  
round-winged muslin *Thumatha senex* 17/7 (1), 22/7 (6).  
rosy footman *Mitochrista miniata* 22/7 (2).  
red-necked footman *Atolmis rubricollis* Nb 2/7 (1).  
snort-cloaked moth *Nola cuculatella* 8 in Aug.  
heart & club *Agrotis clavis* 2/7 (2).  
dog's tooth *Lacanobia suasa* 9/7 (1), 13/7 (1).  
broad-barred white *Hecatera bicolorata* 2/7 (1), 9/7 (1).  
striped wainscot *Mythimna pudorina* 2/7 (1).  
southern wainscot *M. straminea* 4/7 (1), 9/7 (3).  
obscure wainscot *Mythimna obsoleta* Nb (3).  
Svensson's copper underwing *Amphipyra berbera* 8/8 (1). double-lobed  
*Apamea ophiogramma* 22/7 (1).  
bulrush wainscot *Nonagria typhae* 30/5 (1).  
twin-spotted wainscot *Archanaria gemnipuncata* Nb 8/8 (2). brown-veined  
wainscot *A. dissoluta* Nb 22/7 (1),  
small rufous *Coenobia rufa* 23/7 (3), 8/8 (3).  
pale mottled willow *Caradrina clavipalpis* 4/7 (1), 6/7 (1), 9/7 (1).  
bordered sallow *Pyrrhia umbra* 2/7 to 17/7 (several dates, singles),  
gold spangle *Auzographa bractea* 17/7 (1).  
silver hook *Eustrotia uncula* Nb 2/7 (1).  
scarce burnished brass *Diachrysia chryson* Nb 2/7 (1), 13/7 (1).



The vestal is a migrant, in irregular numbers, to the county and was also recorded at Penrhynwgwyn on 4th August. The bordered pug feeds (in its larval state) on mugwort *Artemisia vulgaris*, a plant which is common in the urban fringes of Llanelli- The round-winged muslins, silver hook, the striped, southern and obscure wainscots doubtless hail from Techon Marsh (21/540993), which is only a few hundred yards from the trapping site at Erw-las; the obscure wainscot is a rarity in Wales, whilst the southern wainscot is a reed-bed specialist, uncommonly recorded in the Principality. The double-lobed is a *Phalaris* or *Glyceria* (both wetland grasses) feeder and the small rufous, bulrush, twin-spotted and brown-veined wainscots are also thought to be visitors from the fen at Techon Marsh. Indeed, Techon Marsh is already known to support a regionally outstanding assemblage of fenland moths, with silky wainscots *Chilodes maritimus* (Nb), and Webb's wainscots *Archanara sparganii* (Nb) additionally found at this reedbed. The pale mottled willow is, however, said to be associated (as a caterpillar) with cereals and straw; certainly there are some accumulations of old' straw nearby in a horse-feeding area. The bordered willow's caterpillars feed on rest harrow *Ononis repens*, whilst the aptly-named scarce burnished brass feeds on hemp agrimony *Eupatorium cannabinum*; the occurrence of the attractive golden plusia and the broad- barred whites in early July are both noteworthy. Two local geometrids light- trapped at Erw-las were the phoenix 22nd - 23rd July and three wood carpets on 28th June and 17th July. The former species' larvae feed on the leaves of currents and gooseberry, those of the latter feed on lady's bedstraw *Galium verum* and hedge bedstraw *G. mollugo*.

Three species of pug, possibly new to the county, were recorded. A marsh pug *Eupithecia pygmaeaea* was netted during the day at Glynea Pond, Bynea (21/554990) on 25th May. The larvae of this northern species are said to feed on field mouse-ear *Cerastium arvense*. Three specimens of the satyr pug *E. satyrata* were recorded, at Pembrey Saltings (21/41-99-) on 28th and 31st May. Also recorded on the 28th May, nearby at Penybedd Wood (22/416017), was the ochreous pug *E. indigata* (Nb) whose larvae feed on pines *Pinus* spp which are plentiful at this location.

Two species associated with saltmarshes - the rosy wave *Scopula emutaria* (Nb) 6/7 (8) and the dog's tooth *L. suasa* 18/6 (2) were both recorded at the Wildfowl and Wetlands Trust Centre, Penclacwydd (21/533984) where, double lobed (31/7) and small rufous were additionally recorded. Also taken was the poplar/willow feeding olive *Ipimorpha subtusa* on 31st July. The silky wainscot has only ever been recorded in two 10km squares in Wales, so its occurrence at Penclacwydd on 31st July was most welcome. The species was also recorded by IKM at the nearby Techon Marsh in July 1990.

At the shingle headland of Penrhynwgwyn at the tip of the Machynys Peninsula (21/517974), a yellow belle *Aspitates gilvaria* was captured on 30th May, when four small yellow underwings *Panemeria tenebrata* were also spotted; the latter's larvae feed on *Cerastium* (a species of dry or wasteground). Yellow belles were additionally noted at Pembrey Burrows (21/41-99-) in late May, when up to 11 were observed. In Pembrey Forest (22/391026) and in the satellite plantation of Penybedd Wood (22/416017), grass rivulets *Perizoma albulata* were recorded in late May/early June; the larvae devour yellow rattle *Rhinanthus minor*, a common plant of dry grassland. Small purple-barreds *Phytometra viridaria* were netted near Tywyn Burrows (22/372033) in mid-late May.

Trapping at June & Doug Williams' garden at Ty Croes (22/609111) proved to be productive - with a lobster moth *Stauropus fagi* on 19th June, striped wainscot (also on 19th June), pale mottled willow on 26th June, burnet companions *Euclidia glyphica* on 9th June and a peatland species - the marbled white spot *Lithacodia pygarga* also on 9th June. However, the best species recorded was the very local alder kitten *Furcula bicuspis* (Nb), light trapped on 29th June. This is thought to constitute the first record of this species in Carmarthenshire. A wood carpet and a blackneck *Lygephila pastinum* were both also recorded there on 26th June, whilst an earlier record of a lunar thorn on 31st May was a bonus. Burnet companions were additionally noted at Machynys

(21/513980, 30th May). Visitors at Penclacwydd WWT reported two sightings of the migratory hummingbird hawk-moths *Macroglossum stellatarum* on 3rd July and 31st July, and one was seen in a garden at Denham Avenue, Llanelli (22/495011) on 23rd July (J.R. Ellis). Apart from an earlier sighting of one feeding at *Petunia* flowers in a garden at Betws (22/642121) on 5th June (Steve Lucas), these provide the sole submitted records for 1994. BS/SJT also noted a caterpillar of the privet hawk-moth at Penyfai, Llanelli (22/497017) on 11th August, where it was feeding on garden privet *Ligustrum ovalifolium*.

At Carmel Bog (22/594157) two attractive species were seen after dark on 6th May - the red sword-grass *Xylena vetusta* and the emperor *Pavonia pavonia*. Adults of the former overwinter to mate in the spring, and the camouflage of this moth at rest is most remarkable. The emperor moth on the other hand is much more striking in its appearance and always a pleasure to see.

Compared to the massive contribution made by BS & SJT (*all* the above moth records), the author's effort was negligible, the few records of note being confined to the present paragraph. Additional small purple-barred were frequent in the rides and trackways of the upland Crychan Forest (22/839405 etc) on 21st May; at this site the larvae are likely to feed on heath milkwort *Polygala serpyllifolia* whilst down on the coastal burrows (ref. BS/SJT records already cited)., this moth probably utilises common milkwort *P. vulgaris*. Six-spot burnets *Zygaena filipendulae* were abundant on the lower, floriferous rocky slopes of Ragwen Point (22/222073) on 15th June, but - best of all - was the presence of several thrift clearwings *Bembecia muscaeformis* (Na, a second VCR) fluttering above clumps of its food plant, thrift *Armeria maritima*. Burnet companions were noted on a rank, acidic pasture at Tir-lan, Llwyn-teg (22/555072) on 27th June, when almost the first of the summer's silver-Y's *Plusia gamma* was spotted; the species was to become ubiquitous and abundant in late summer (see later). A silver hook (Nb), a very local moth of acidic pastures) was also reported from Tirlan by Janet Crowden in mid-June, and four more were recorded in wet slacks at Laugharne/Pendine Burrows (MoD Pendine) on 21st July (BS, SJT). Yet another was seen on flushed, acidic pasture at the edge of the mostly long-infilled Cors Helyg, Cefn Bryn Brain (22/74213S) in July. IKM's last record of interest concerns caterpillars rather than adult moths -the distinctive larvae of the beautiful yellow underwing *Anarta myrtilli*, found abundantly on heather at the superb Dyfed Wildlife Trust reserve at Cors Goch Llanllwch (22/364186) on 24th September. Although it is said to be quite frequent (if local) nationally, the species is regarded as markedly scarce in Ceredigion, VC46 (Fowles, 1988) with rather few records.

Although Andrew Lucas' output has necessarily diminished due to domestic commitments, he continues to provide quality records. His main effort in 1994 was some trapping done near Tirlan, just south-east of Llwyn-teg, Llannon (22/557073), the adjacent habitat comprising rushy pastures, heath and bog. The highlights are listed below:

clouded brindle *Apamea crenata* 3/6  
map-winged swift *Hepialus fusconebulosa* 29/6  
marbled white-spot *Lythacodia pyrgarga* 29/6 & 8/7 striped  
wainscot *Mythimna straminea* 29/6 & 8/7  
dingy shears *Enargia ypsilon* 2/8  
round-winged muslin *Thumatha senex* 8/7  
dingy shell *Euchoeca nebulata* 14/7

Several of the above species are regarded as "local" in Ceredigion (Fowles, loc.cit.), the only county adjacent to Carmarthenshire for which a modern moth review exists. In particular, both the dingy shears and the dingy shell have only been recorded on a handful of occasions in Ceredigion. A couple of nights' trapping on the extensive Pendine-Laugharne Burrows yielded some useful records, the trap being positioned to the SE of the Witchett Pool at 22/288073. Several round-winged muslins were caught and are likely to have originated from the adjacent wet, mossy dune slacks, whereas the lichen-feeding Brussels lace *Clerodes lichenaria* probably wandered from nearby scrub woodland which fringes the wetland areas. AL also recorded a lobster moth *Stauropus fagi* from "Stonefield", Llanedi 22/588085 on 29th June.

A useful record was that of a white-pinion spotted *Lomographa bimaculata*, seen in a lane north of Salem (22/620284) by Graham Motley (GSM) and Jackie Murphy on 14th May; it is a local species and suggested to be a recent colonist of SW Wales (Fowles, loc.cit). GSM with Jamie Bevan provided records of scarlet tigers, with one recorded at Caeau Dugoedydd (22/775416) on 12th July and 'seven in the air at same time, perhaps over 10 individuals seen' at Helfa Hall (22/421276) on 7th July.

Sarah Andrews and Richard Howorth also produced scarlet tiger records in 1994:

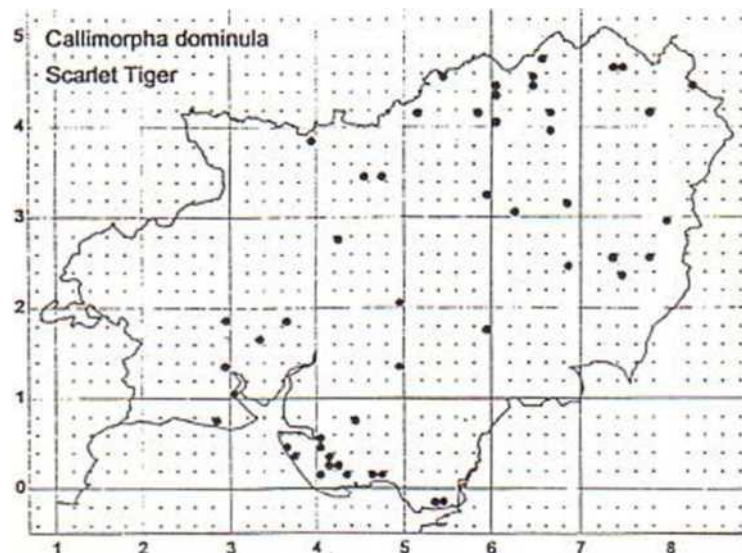
(i)	NW of Bedwirion	22/453348	12th	July	(2)
	SA				
(ii)	Gellifelin	22/471344	18th	July	(1)
(iii)	Pantycraff	22/519412		July	"
(iv)	nr Bwlchmelyn, Pentre-cwrt	22/391383			22nd
	June	(1)		RH	

Julian Friese also made his contribution to the year's scarlet tiger tally during his ornithological survey of coastal fens:

(i)	Ffrwd Fen, Pembrey	22/421025	28th	June	(1)
22/4180254† -	"			(4+)	
(ii)	East of Saltrock, Pinged	22/418032	27th	July	(3)
(iii) behind the Ashburnham Hotel, Burry Port	22/436010		30th	June	(1)
(iv) "Banc-y-Lord" (nr. Pembrey Airfield)	22/401046 - "				(2)
(v) Kymer's Canal, Kidwelly (Cydweli)	22/403058 " "				(1)

(†one was also seen near here on 18th June on a Llanelli Naturalists field meeting)

Finally, N.R. Thomas recorded a scarlet tiger at Llwyncelyn, Llansawel (22/626554) on 12th July, and AL also noted one at Nant-y-Garreg near Rhos 22/372364 on 1st July giving a total of twelve new stations in 1994. A map showing the known distribution of the scarlet tiger in Carmarthenshire is shown on page below.



Steve Lucas (SL) has joined Barry Stewart and Sandra Turner as one of the main contributors to moth recording in 1994. Steve made a significant number of noteworthy records and also provided an useful summary report and lists of his year's trapping activities, with the main effort being made at his home at

Betws near Ammanford (22/642121). Here he noted a minimum of 175 species of "macro-moths". Of special note were the following:

oak hook-tip *Drepana binaria* 6/8 & 20/8.  
the spinach *Eulithis mellinata* 10/7, 16/7, 22/7, & 6/8.  
small yellow wave *Hydrelia flammeolaria* 10/7.  
the v-moth *Semiothisa wauaria* 22/7.  
the double line *Mythimna turca* Nb 10/7.  
dusky-lemon sallow *Xanthia gilvago* 16/7.  
large ear *Amphipoea lucens* 20/8.  
scarce silver-lines *Bena prasinana* 6/8.  
the blackneck *Lygephlla pastinum* 10/7.  
the olive *Ipimorpha subtusa* 6/8.

According to the literature, the spinach is associated with cultivated currants; the small yellow wave with broom, and the dusky-lemon sallow with elms. The latter is a second record for Carmarthenshire (ie is already known from the Kidwelly area), and it also should be sought in the Tywi valley where hybrid elms *Ulmus x hollandica* and some wych elms *U. glabra* are frequent; if the species also utilises English elm *U. procera*, then the coastal belt SE of Llanelli should additionally support this species. The double line is a 'nationally notable' species but is likely to be reasonably frequent in Carmarthenshire. Of SL's records listed above, the scarce silver-lines is also mention-worthy, for it is a scarce moth of oakwoods; the record of the olive in early August is believed to constitute a third or fourth county record. Steve also recorded a red-necked footman and a white-pinion spotted at Betws. At Dinefwr Castle Woods, Llandeilo (22/623222), checking of the copper underwings by Steve showed that both the copper underwing *Amphipyra pyramidea* and Svensson's copper underwing *A. berbera* subsp. *svenssoni* were present in late August.

As well as the record of a hummingbird hawk-moth already cited, SL captured a migratory bordered straw *Heliothis peltigra* at Betws (the 3rd vc record) on 25th June. Additionally, he provided records of the pearly underwing *Peridroma saucia* (near Talley, 22/660336) on 26th September, and - at Betws - a dark sword-grass *Agrotis ipsilon* (4th Nov.) and the gem *Orthonoma obstipata* (16th July). All three species are migrants. Interestingly, IKM and Mark Pavett also had a bordered straw this summer, but not - alas - in Carmarthenshire. It was seen on the coastal cliffs at Horton, Gower (21/480855, VC41), on 6th August.

Many useful records of unimproved pasture moths were made by the CCW grassland surveyors, including most of the following numerous sightings of five-spot burnets *Zygaena trifolii* subsp. *decreta*.

(i)	NW of Bedwirion	22/453348	12/7	(30+)	S.Andrews
(ii)	S. of Llanybydder	22/528423	25/7	( 1)	
(iii)	Bryn-coch bach	22/572116	28/6	('several')	GSM & JB
(iv)	nr. Thornhill Mansion	22/577115	30/6	('many')	
(v)	Caeau Lotwen	22/582113	1/7	('many')	" "
(vi)	Bwlch Bychan	22/406277	7/7	('many')	" "
(vii)	Helfa Hall	22/421276	7/7	('many')	
(viii)	Blaen-dyffryn	22/603444	13/7	('several')	
(ix)	Caeglas	22/560300	15/7	('many')	" "
(x)	nr. Telpyn Farm	22/181075	22/7	('few')	IKM
(xi)	WWT Penclacwydd	21/533984	13/7	(6)	BS/SJT
(xii)	Laugharne Burrows	22/24-07-	-/7	('several')	BS
(xiii)	Pant Ifor	22/383388	27/6	(1)	RH
(xiv)	Camnant	22/378388	27/6	( 1)	RH
(xv)	Wthan	22/369374	28/6	(2)	RH
(xvi)	Ty Hen, Cwmpengraig	22/350362	6/7	(1)	RH
(xvii)	Capel farm	22/552156	-/7	(1+)	ML

GSM & JB also noted two forester moths *Adscita stacices* (typically on damp acidic pasture), near Caeau Ffos-fach SSSI, Capel Hendre (22/574124) on 28th June, whilst a burnet companion was observed flying over swards of bird's-foot trefoil (its larval food plant) in the disused limestone quarry SW of Carmel (22/577161) on 13th June (IKM).

Six-spot burnets *Zygaena filipendulae*, which in Carmarthenshire tend to be found in much drier situations than the 5-spot burnet, were noted at Dolwen Point, Pendine (22/233077, 8th July, IKM); Penrhynwyn (21/517974, BS); and abundantly on the small area of dunes at St Ishmael (22/36-07-, IKM & BS/SJT). Richard Howorth discovered three sites for the small, all black chimney sweeper *Odezia atrata*: two at Penclawdd-isaf (22/368357, 20th June); another two NW of Wthan (22/369374, on 28th June) and about five individuals near Ty-hen, Cwmpengraig (22/350362) on 6th July. One was also noted by AL on rough grassland at the NW corner of the Dyfed Wildlife Trust reserve at Cors Pum Heol (22/486047) near Five Roads on 20th June. This dainty diurnal moth is sometimes confused for a butterfly by the novice lepidopterist. It is a very local species of neutral grassland in Carmarthenshire.

Reference was made earlier to "almost the first" silver-Y of this summer's influx, at Tirlan, Llwyn-teg on 27th June. Actually, there was a sighting a day earlier at WWT Penclacwydd (BS) and a *considerably* earlier record on the Dinefwr Estate, Llandeilo (22/61—22—) on 13th May (SL). Many observers commented on the abundance of this species throughout the county in July-Sept., with numbers expectedly highest on the coast, where Barry Stewart commented that, "at Penclacwydd on 2nd September 260+ were feeding on dense patches of the rayless variety of *Aster tripolium* (sea aster) on the saltmarsh". Some 300+ were noted along the coastal path near Pendine on 17th Sept. (GSM & JM). BS also observed that during fine weather on 21st Sept., at 1400 hrs on Cefn Sidan, silver Y's were noted coming in off the sea at c.200 per 20mins (=600/hr), just on one short stretch (c.200m) of beach. In similar weather on 23rd Sept., c.200 were watched over a 4hr period (ie c.50/hr). The total immigration of this insect must have been enormous.

### Acknowledgements

I am indebted to the following for submitting records: Sarah Andrews, Melanie Bagley, Jamie Bevan, John Ellis, Richard Ellis, Julian Friese, Jonathan Graham, Peter Hack, Richard Howorth, George Hutchinson, Morfydd Lloyd, Andrew Lucas, Steve Lucas, Andrew Mitchell, Graham Motley, Jackie Murphy, Mark Pavett, Richard Pryce, Mat Ridley, John Steer, Barry Stewart, Nick Thomas and Sandra Turner. Particular thanks are due to Barry Stewart and Richard Pryce for making suggestions to improve the first draft of this report. Richard also kindly prepared the distribution maps, using "D Map" written by Dr Alan Morton.

Special gratitude is offered to Steve Lucas, Graham Motley & Jackie Murphy and Barry Stewart & Sandra Turner for their neatly-presented records and summaries, sent punctually without the need for persistent reminders. They serve as an example to others! A very few observers still do not provide grid references, and any supplementary information is always appreciated (eg numbers, habitat, which flowers are utilised etc).

### References

Bagley, M. (1994). *1994 Marsh Fritillary (Eurodryas aurinia): Adult Flight Survey of Dinefwr. Unpublished CCW internal report, Dyfed & Mid Wales Region.*

Fowles, A.P. (1988). *The Moths of Ceredigion*. Research & Survey in Nature Conservation No8. NCC Peterborough.

Lucas, S. (1994). *Moth Report 1994 - Macrolepidoptera*. (unpublished report on moth recording by the author in 1994).

Warren, M.S. (1994). The UK status and suspected metapopulation structure of a threatened European butterfly, the marsh fritillary *Eurodryas aurinia*. *Biological Conservation* 67: 239-249.

### Erratum

In last year's report (*Llanelli Nats. Newsl.* 56: 37-40), it was erroneously stated that the record of a golden plusia at Betws was a new county record,

whereas in fact it has already been noted. My apologies for this error.

## DIPTERA RECORDING IN CARMARTHENSHIRE 1994 - I.K. Morgan

Rather more effort was made in 1994 with regard to the recording of hoverflies, though not approaching the intensity of recording achieved several years ago.

A great early bonus was the discovery of *Cheilosia chrysocoma* (RDB3) on 1st May, SE of Cencoed-uchaf 22/486030. Two resplendent rufous individuals were seen in presumed courtship flight alongside a steep, laneside bank with flowers of dandelions, bluebells and violets. At first they were thought to be the spring brood of the solitary bee *Andrena fulva*, which is reputedly widespread but actually very scarce in Carmarthenshire. However, a nervous sweep of the net showed that they were dipterans and at once it was realised that here was *Cheilosia chrysocoma*, a syrphid I had long unsuccessfully sought. Stubbs and Falk (1983) suggest an association with fens which are subject to some calcareous influence and consequently I had previously searched, obviously without success, sites such as Ffrwd Fen or the small fens at the rear of the Pembrey-Tywyn dune belt. The 1994 location was the aforesaid lane which separates young woodland and an area of rank, overgrown wet acidic pasture (with *Molinia caerulea*, *Carum verticillatum*, *Salix repens*, *Succisa pratensis* etc). Interestingly, Mark Pavett tells me that he has also had this species in similar habitat in Glamorgan. A commoner, but still scarce *Cheilosia* was *albipila*, recorded south of Llwyn-teg 22/552077 on 2nd May, and also in the Crychan Forest 22/839405 on the 21st of the same month.

The old alder carr on the south-western margin of Cors Goch Llanllwch 22/363184 was productive on 19th May, with *Brachypalpus lentus*, *Criorhina floccosa* and *C. berberina*. *C. berberina* was also seen, together with *Xylota coeruleiventris*, at Gelli Aur 22/593197 on 23rd May. Low, slumped clayey sea-cliffs near Ragwen Point 22/222073 had frequent *Eumerus sabulonum* (N) on 15th June; this local, ground-hugging fly is also found just to the west, near Underhill Farm.

*Brachypalpus laphriformis* (N) was at its now-regular haunt, a dead sweet chestnut at Stradey Woods 22/489014, (again in mid-June), whilst Dinefwr Castle Woods 22/618219 yielded two rarities - a gravid *Rhingia rostrata* (RDB3) and an equally egg-bound *Xylota xanthocnema* (N). Both species have previously been recorded at this important Dyfed Wildlife Trust reserve, *R. rostrata* rather regularly and *X. xanthocnema* by P.M. Pavett in 1988. The specimens were released after identification. Keith Alexander took the notable "window fly" *Scenopinus niger* (new to Carms.) at the adjacent Dinefwr Park in July. It is known to be associated with deadwood. A forest ride at Penbryn, Cynheidre 22/507076 had *Chrysotoxum arcuatum* on 17th July; in fact such situations seem to be good sites for finding this attractive little wasp-mimic in Carmarthenshire.

A visit to record aculeates at the Llanwrda shingle banks 22/713307 in late July also resulted in the capture of *Xanthogramma pedissequum* and the shingle specialist "stilleto-fly" *Thereva lunulata* (RDB3, for which Llanwrda is a regular site). Alan Stubbs also made a fleeting visit to this locality (probably the Tywi's best shingle area) on 21st June, when he recorded the local crane fly *Nephrotoma submaculosa* and the Nb *Limnophila apicata* (also see later). In fact Alan made a whistle-stop tour of several Carmarthenshire localities, the highlights of which are given below:

(i) CORS GOCH LLANLLWCH. 22/36-18- 20/6/1994

Several species of local crane flies were noted - *Prionocera turnica*, *Limnophila squalens*, *Molophilus occultus* (all on the bog or marginal carr habitats) and *Limonium fusca* at the southern edge of the carr. *Chalcosyrphus nemorum* was recorded in an area of birch/alder carr (at 22/362184) and *Dioctria linearis* at 22/362183; the latter being the first record away from the coast for this robberfly.

(ii) COED PENRHIWIAU. 22/660236, 20/6/1994

"A late evening visit under very dull conditions"

Three notable (Nb) tipulids - *Limonia trivittata*, *L. aquosa* and *Molophilus variispinus*, the local species *Dolichozepea albipes*, *Limonia didyma*, *L. fusca*, *Epiphragma ocellaris* and *Ptychoptera lacustris* were also recorded as was the hoverfly *Sphegina elegans*. A.S. recommends checking the log-jams on the stream for the rare *Chalcosyrphus eunotus*. *Criorhina asilica* is already known from this site (see DIG 20:20).

(ii) CRAIG DDU. 22/324100, 20/6/1994

A.S. regarded this site as a "very impressive tufaceous moss cliff" - formed by calcium-impregnated seepages from a small Carboniferous limestone outlier flowing onto the Old Red Sandstone cliff below. The highlight was the RDB3 crane fly *Limonia goritiensis*, with *L. aquosa* (Nb) and the local *Gonomyia lateralis* and *Molophilus pusillus* also recorded. The local sciomyzids *Pelidnoptera fuscipennis* and *Tetaneura pallidiventris* were also taken.

(iii) LLANWRDA SHINGLES, 22/705308, 21/6/1994

Only two species of interest were taken - *Limnophila apicata* (Nb) of which there are "few Welsh records for this aquatic species", and *Nephrotoma submaculosa* for which there are "few river shingle records in Wales (mainly sand dunes)".

(iv) PANT-Y-LLYN "TURLOUGH", 22/605165, 22/6/1994

Sweeping of roadside vegetation adjacent to this seasonally-fluctuating water body on Carboniferous limestone yielded the Nb tipulid *Thaumastoptera calceata* and the Nb sciomyzid *Sepedon spegea*.

(v) DINEFWR DEER PARK. 22/607224, 21/6/1994

"Under rain-soaked conditions", Alan Stubbs visited the tufa streams at the western edge of the Deer Park. He regarded the site as "an outstanding example of a spring stream" (actually there are two main tufa streams), and felt that the fauna "ought to prove exceptionally good" regarding it as "potentially a top site for tufa spring species."

Some twelve species of crane fly were recorded on these streams by Alan including *Pilaria fuscipennis* (Nb) and the local *Dolichozepea albipes*, *Limonia fusca* and *Limnophila aperta*. He recommends further sampling of these streams, particularly in the second week of June, late July and late August plus some autumnal sampling in early October. Indeed, some collecting by R.G. Woods on 27th July and IKM on 30th August produced nine tipulid species, of which five are associated with streams including the local *Pedinia littoralis*.

However, the major surprise on these streams was the independent collection of the notable (Nb) soldier-fly *Oxycera pardalina*; it being recorded here by the National Trust Biological Survey Team (Andy Foster) on 18th July and subsequently on 25th July (IKM), 27th July (R.G. Woods) and 30th August (IKM). Until recently it was regarded as a rare species of upland calcareous streams or flushes. It was also recorded in Glamorgan in 1994 (A.E. Stubbs pers.comm.). *Oxycera rara* (= *pulchella*) was also taken at Dinefwr Park.

Of the remaining 1994 diptera records, that of *Hybomitra micans* (RDB2) is by far the most interesting. Eagle-eyed Mark Pavett spotted a male resting on a pathway (which is used by horses) in Pembrey Forest (conifer plantation on dunes) 22/402012 on 11th June. There is just one other VC44 record - a female taken in extreme NE Carmarthen (Allt-y-Ferdre 22/812338, 19.6.1990, IKM - DIG 20:21), and very few modern records are offered by Falk (1991). Another horsefly - the much commoner *Tabanus bromius*, was taken in the writer's garden

at Erw-las, Llwynhendy (21/537993) at the end of July. Recent determinations of two of Mark Pavett's horsefly specimens provide records of interest: *Hybomitra montana* SW of Dinewr Castle Woods 22/609222 (4.6.1988) and *H. muehlfeldi* by Machynys Ponds 21/514980 (on 14.7.1989). The latter is rather a rare species (RDB3), known essentially from the Norfolk Broads and the coast of Carmarthenshire/West Glamorgan; there are other recent verified records from the edge of Pembrey Forest and Ffrwd Fen, Pembrey.

*Beris clavipes* was found in abundance on planted *Salix* at Dafen 22/534018 on 9th June, whilst the small area of dunes at St Ishmael 22/365075 the asilids *Dysmachia trigonus* and *Philonicus albiceps* (14th July). A few tachinids were recorded: *Servillia ursina* in early spring sunshine at Pembrey Forest 22/387032 on 10th March and at Cors Goch Llanllwch 22/363184 on 19th May; whilst *Tachina fera* was taken on a flowery bank below Carreg Cennen 22/669189 on 26th July. The tachinids are "a large and variable family whose larvae are internal parasites of caterpillars and other young insects, whilst some attack adult bugs and grasshoppers" (Chinery, 1986). Conopids were apparently very scarce this year, with only one record - *Myopa buccata* on Tywyn Burrows 22/36- 05- (16th July).

#### References:

Chinery, M. (1986) - *Collins Guide to the insects of Britain and Western Europe*.

Falk, S.J. (1991) - *A review of the scarce and threatened flies of Great Britain (Part 1)*. Nature Conservancy Council, Peterborough.

Stubbs, A. E. & Falk, S.J. (1983) - *British Hoverflies*. British Ent. & Nat.Hist.Soc.

## COLEOPTERA RECORDING IN CARMARTHENSHIRE 1994 -

I.K. Morgan

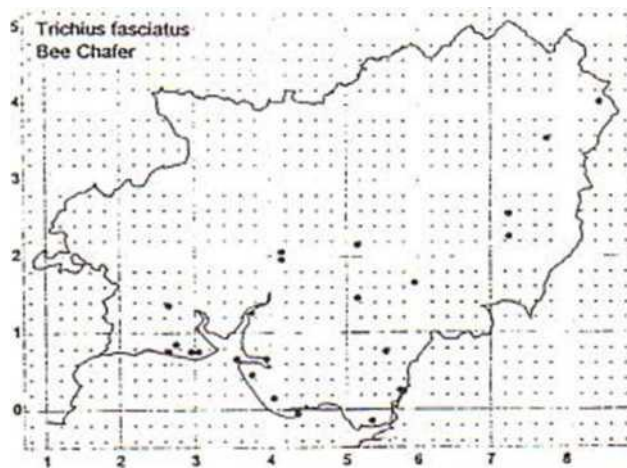
The first record of note was the finding, on 11th May, of the "orange ladybird" *Halyzia 16-guttata* - unusually under hazel leaves - in woodland south of Fforest Farm, Whitland 22/228159. Typically this ladybird, which was once thought to be a rather rare inhabitant of ancient woodland in SE England, is associated with sycamore. It was also found (this time on sycamore) at Henllan Amgoed 22/18-20- (1st Sept., John Steer). On 27th May, Barry Stewart found a distinctive-looking weevil on willow at Glynea Pond, Bynea 21/553989 which proved to be *Cryptorrhynchus lapathi* (Nb), new to the county. Surprisingly, another was taken (with *Apoderus coryli*) by the author at Abergorlech 22/587338 on 2nd September, resting on a fence post. This species is associated with alders and willows into which the larvae burrow. The marshes at Ffrwd Fen provided for Mark Pavett what was perhaps the best record of 1994 - the chrysomelid *Donacia impressa* (Na), swept from alongside the "Frogbit Ditch" 22/419023 on 12th June. It is a very localised species which is reputed to be associated with *Scirpus*; here - presumably - *Eleogiton fluitans* (= *Scirpus fluitans*), which grows in the ditch.

*Pyrochroa serraticornis* - "the Cardinal beetle" (on account of its bright red elytra) was found on an old *Populus x canadensis* at Penybryn Farm, Bynea 21/542982 on 27th May; *Strangalia quadrifasciata* also breeds in the same tree. The little longhorn *Pogonochoerus hispidus* (a mating pair) was found, new to the county, on a slender branchlet of an old apple tree at Erw-las, Llwynhendy 21/538994 on 11th June; surprisingly, another was found the very next day at the base of an old oak in the old orchard at "Garden Cottage", Gelli Aur 22/598203. *Judolia cerambyciformis* abounded in rides in Crychan Forest (eg 22/840405 and 22/848369) in late May, and the upland soldier beetle *Podabrus alpinus* was beaten regularly from bushes growing along the rides in the same area (22/840405) where the large weevil *Pissodes piceae* was frequent on



spruce. *Judolia* was also noted in late June at Dinefwr Castle Woods 22/617217; the longhorns *Clytus arietis*, *Grammoptera ruficornis*, *Strangalia maculata* and the all-black click beetle *Melanotus erythropus* (whose larvae develop in hardwoods attacked by red rot) were additionally found.

There was a crop of bee chafer *Trichius fasciatus* records - in the Crychan Forest 22/840405 (on a flower of marsh thistle *C. palustre*, 25th June); near Tirlan, Llwyn-teg 22/555073 (on meadow thistle *Cirsium dissectum*, Janet Crowden, June); near Maes-llydan Hall 22/778357 (on marsh thistle, 28th June); Laugharne Burrows 22/26-07- (on driftwood on foredunes, 9th July) and N. of Capel Gwynfe 22/723228 (on bramble blossom, 4th August). The writer's files now hold some 24 records of *Trichius* in Carmarthenshire of which, all but three are post-1975. Of the 24 records, just half (13) are coastal - associated with accumulations of driftwood on Carmarthenshire's essentially depositional coastline - on the foredunes of the extensive burrows or at the upper fringes of saltmarshes. There is no doubt that *Trichius* is breeding in these driftwood piles - for example, Mark Pavett found no less than a dozen adults "ready to emerge" in logs at Tywyn Point in June 1988. Thistles - spear *Cirsium vulgare*, marsh *C. palustre* and meadow *C. dissectum* are utilised for feeding by the newly-emerged adults as is ox-eye daisy *Chrysanthemum leucanthemum*, ground elder *Aegopodium podagraria* and, on the dunes, pyramidal orchid *Anacamptis pyramidalis*. No doubt other flowers are also frequented. Most occurrences refer to June and July, with only one in (1994) sighting at the beginning of August. The earliest record on file refers to one at the end of the first week of June, but the main emergence occurs in the third week of that month, peaking in the last week of June and the first week of July; less records then refer to the period through July to the beginning of August. Miles (1982) refers to the incidence of this scarabaeid until the end of August, and also cites a personal observation of hogweed *Heracleum sphondylium* as a food source, as well as listing flowers used by *Trichius* noted by other entomologists. An updated map showing its known distribution is given below.



The remains for *Nacerda melaneura* were also found on the foreshore at Laugharne Burrows - remnants of predation by the fearsome carabid *Broscus cephalotes* which lurks under driftwood. A scarcer carabid was *Panageus bipustulatus* (Nb) found running over a sandy trackway on Tywyn Burrows (22/360055, 16th July). However, no search this spring was made under logs by the flooded large slack at Tywyn Point for the RDB1 *Panageus crux-major*.

Several attempts have been made in the past to try to find *Silis ruficollis* in the superb fens around the Witchett Pool, on Laugharne Burrows, but although the vaguely-similar *Cantharis thoracica* has been found, *Silis* had eluded me - until this year, when it was common in the marginal fen at 22/282078. The lesson here must be that it is always worth repeat searching likely-looking habitats for particular species. This site is now the westernmost in the county. An account of its rather peculiar British distribution (SE England and Carms./West Glam.) is given by Alexander (1988). The 5-spot ladybird *Coccinella quinquepunctata* (RDB3) was recorded on the

shingle banks below Dinefwr Park 22/603223 by Andrew Foster and also at Llanwrda 22/713307 on 28th July (IKM) ; both are known sites for this rare species.

After an apparent lapse of several years, the bulky duneland chafer *Anomala dubia* was noted at three sites - the dunes at Llansteffan 22/357109 (11th July), at St Ishmael 22/365075 (14th July), and on Laugharne Burrows 22/26-07- (9th July). Mark Pavett kindly determined some dung beetles collected by the writer in the spring. They included nothing outstanding but *Aphodius plagiatus* (Nb) was found at Penrhynwyn 21/517973 (6th June), whilst horse dung at Pembrey Burrows 22/425002 supported *Onthophagus similis* (and *Aphodius prodromus* on 26th March (with *A. ater* on 1st May). Not far away, at Trenal 22/417009 horse dung was utilised by *A. sphaecalatus*.

Finally, a couple of chrysomelids of minor interest were *Chrysolina staphylea* at Tir-clun 22/783267 (Graham Motley, 16th May) and *Cassida murraea* (brown form) at Erw-las, Liwynhendy 21/538994 (11th June) and Stradey 22/497012 (26th June); *Cassida* was, typically, on *Pulicaria* (fleabane). Jackie Murphy and Graham Motley provided some very useful carabid records, which included new county records of two rather uncommon species - *Synuchus nivalis* near Pendine 22/230076 (17.9.1994) and *Amara eurynota* from Ferryside 22/365104 (5.11.1994). Both were confirmed by P.M. Pavett. They also recorded *Laemostenus terricola* from Dinefwr Castle Woods 22/616218 (Aug. 1994) - a second record (it was recorded from Dinefwr Deer Park in 1988 by Mark Pavett).

During a recent conversation with Mark Pavett, it was realised that I had neglected to refer, in this Newsletter, to two records made by him of *Amara fulva* (Nb), a reddish-brown ground beetle found on sandy shingle. They were recorded beside the Tywi at Llanwrda 22/781995 (15.4.1989) and SW of Dinefwr Castle Woods 22/603221 (7.6.1991).

Acknowledgements: Thanks to Mark Pavett and the other recorders mentioned in the text for forwarding details of their discoveries. Also again many thanks to Richard Pryce for preparing the *Trichius* distribution map.

#### References:

Alexander, K.N.A. (1988) - *Cantharoidea and Buprestoidea Recording Scheme Newsletter 2* (May 1988).

Miles, P.M. (1982) - Bumble-bee mimic *Trichius fasciatus* (L. ) (Col., Scarabaeidae) in Wales. *Entom.Month.Mag.* 118:11-16.

Miles, P.M. (1983) - Further records of *Trichius fasciatus* in Wales *Entom.Month.Mag.* 119: 80.

## **TRACHYPHLOEUS ASPERATUS, NOT T. ARISTATUS (COLEOPTERA, CURCULIONIDAE), IN DYFED - A.P. Fowles**

The short-nosed weevil *Trachyploeus aristatus* has been reported in the DIG Newsletter several times from Ceredigion and Pembrokeshire over the past five years (DIG 16:16-21; 20:15-20; 23:19-20; 24:18-22). It has recently been realised that these records are based on erroneous identifications and all records refer to the closely-related *T. asperatus*. Both species are inhabitants of coastal grassland and are probably polyphagous. *T. asperatus* is now known from Pembs., Cards., and Caernarvonshire in Wales, whilst *T. aristatus* is only known for the limestone cliffs of Gower in West Glamorgan.

## SPIDER RECORDING IN CEREDIGION 1994 - M.P. Bailey

The most interesting find this year was that of a male *Haplodrassus minor*, which was taken in a pitfall trap between 1 June and 10 July at Ynyslas, Borth (22/606924). This is only the second Welsh record of this nationally rare (RDB3) gnaphosid, the first one being from shingle at Foryd Bay, Caernarfonshire, in 1984. Elsewhere in Britain the species is known from a handful of localities on the coast of England from Dorset to Suffolk, where it inhabits strandlines and sparsely vegetated shingle, (Fowles, 1994). The Ynyslas capture was made from a "sub-fossil" shingle ridge, cloaked with an incomplete carpet of maritime grassland, some 30 metres inland of a sea-defence stockade. It is interesting to note that amongst the meagre capture from the same location were two additional nocturnal hunting gnaphosids - *Drassodes cupreus* and *Haplodrassus signifer*. Two local liniphids *Walckenaeria monoceras* and *Pelecopsis nemoralis* were also amongst the catch, adding to their known Ceredigion habitat on riverine shingle.

Elsewhere around the Dyfi, *Maso gallicus* was taken from *Calluna/Erica* "wet heath" at the edge of Llancynfelin Common/Cors Fochno National Nature Reserve (22/636920). This is the sixth Welsh record of this nationally notable (Na) species, with all previous records coming from modified raised bog habitats of the Cors Fochno complex. The pitfall trapping programme at Cors Fochno now in its ninth year produced single specimens of *Drassylus lutetianus* and *Hyposinga albovittata* together with 23 *Agraecina striata*.

Examination of pitfall material collected at Coed Rheidol National Nature Reserve (22/7477) in 1992 confirmed the presence of *Zora nemoralis* with singletons from two locations. Other noteworthy captures from previous years so far unreported are as follows: On 1 July 1993 a third female specimen of *Heliophanus dampfi* (RDBK) was swept from *Myrica* near to the centre of Cors Fochno - the capture of a male in Wales is still awaited; in June 1991 *Philodromus praedatus*, (Nb), and *Tetragnatha obtusa*, two new county records, were taken from oak woodland in the Llyfnant Valley (22/7197); and finally, the derivation of two old Cardiganshire records came to light with the unearthing of an article in "The Naturalist" of January 1927. Listed amongst other commoner species from mid-Wales are *Robertus neglectus* (Nb) and *Cercidia prominens* both taken by W.P. Winter, the former from Pen Dinas, Aberystwyth, in August - September 1911, and the latter from "Traethsaith" (Tresaith, near Aberporth), in July 1914.

### References:

Fowles, A.P. (1994) - A provisional checklist of the Invertebrates recorded from Wales 1. Arachnida. CCW, Bangor.

## MISCELLANEOUS INVERTEBRATE RECORDS IN CARMS., 1994 - I.K. Morgan

Lack of time has unfortunately relegated certain groups of invertebrates to this section - groups (such as grasshoppers and bush-cricket, spiders and millipedes) which would have, in the past, justified sections of their own.

ORTHOPTERA - The speckled bush cricket *Leptophyes punctatissima* was swept from herbage below Laugharne Castle 22/305109 on 29th June, and there were just two records of the common groundhopper *Tetrix undulata* - in a damp slack with much common spike rush *Eleocharis palustris* at Morfa-uchaf, Ferryside 22/389123 (15.8.94) and several (including strongly white-marked individuals) alongside the ditch north of Dyffryn Farm, Bynea 21/548985 (10.9.94).

HEMIPTERA - The striking black and red froghopper *Cercopis vulnerata*, was captured in a sunny ride in Crychan Forest 22/839405 (21st May), apparently a new county record. Certainly, I haven't seen this unmistakable species previously in Carmarthenshire, though P.M. Pavett tells me it does occasionally occur in parts of Glamorgan. Adrian Fowles has two north Ceredigion (VC46) records (1991) for *C. vulnerata* and agrees that it is also rare in that county.

ARACHNIDA - The attractive jumping spider *Evarcha falcata* was noted below Carreg Cennen 22/670189 (14.5.94) and in Crychan Forest 22/831397 (21.5.94). An all-black adult female *Steatoda grossa* was taken in Carmarthen 22/410203 (7.1.95)

ERRATUM: *Xysticus luctuosus*, announced as new to the county from Tywyn Burrows 22/36-05- (29.6.1991) and Pembrey Forest 22/390030 (9.7.1991) in DIG 24:27, has been recently redetermined by Dr P. Merrett as *X. acerbus* (Na). The record of *X. acerbus* is itself new to VC44. The redetermination was based on the Pembrey Forest specimen, the other having been lost in the interim. There is but one previous Welsh record of this spider - a male taken at Penrice, Gower in 1948 (Wild, 1952). This 1948 record was, incidentally, the first British record of this species. I am grateful to Adrian Fowles for drawing my attention to the Penrice record.

FORMICIDAE & MYRIAPODA - Carmarthenshire's sea cliffs are limited to the western part of the coastline, which offers appropriate habitat for various species which are far more frequent in cliff-bound Pembrokeshire. An interesting assemblage is present, for example, on the flaggy sandstone headland of Telpyn Point 22/185073 - the bristle millipede *Polyxenus lagurus* (which is quite common here) and the ants *Lasius mixtus*, *L. alienus* and *Tetramorium cespitum*; Telpyn Point being the only known Carms. station for the last-named.

Following a tip-off from Dr Malcolm Holding of Whitland, a brand new locality for wood ants *Formica rufa* was discovered - south of Fforest Farm (22/228159 etc) on 11th May. Seven nests occupied the SW-facing edge of a wooded hill. This is now the most south-westerly known population in Wales.

### Reference

Wild, A.M. (1952) - Additions to the known spider fauna of Glamorgan, Carmarthen and other counties in the British Isles. *Trans. Cardiff Nats. Soc.* 80: 8-11.

## THE CRUSTACEA OF CARMARTHENSHIRE CAVES - Peter Walker

More than 122 caves and sites of lesser speleological interest exist in the Watsonian vice-county of Carmarthenshire (Oldham, 1990). Faunistic records, however, exist for only seven of these caves and a total of sixty four species have been recorded (Jefferson 1989; Walker 1993).

In the caves of South Wales, twenty species of crustacea from six orders have been recorded (Jefferson 1989). Contributions are made to this list from five Carmarthenshire caves, with three species from two orders being recorded. These three species are: *Androniscus dentiger* Verhoff, also known as the rosy woodlouse; *Niphargus fontanus* Bate, a depigmented gammarid amphipod; and *Proasellus cavaticus* (Leydig), a blind white asellid isopod. Table 1 shows the caves in which they have been recorded to date.

Cave & Grid Ref.	Llygad Llwchwr SN669178	Cil yr Ychen SN613166	Foel Fawr SN734188	Pal y Cwrt SN674182	Dan y Lleud Wen SN7569 1851
Species <i>Androniscus dentiger</i>	14/9/92	(Jeff)			
<i>Niphargus fontanus</i>	(Jeff) 20/9/92 Harding		(Jeff)	13/2/93	1/9/92
<i>Proasellus cavaticus</i>					14/2/93

#### Table 1. Key

(Jeff)	=	observation cited by Jefferson, 1989
(date)	=	date of observation of species in cave by author
(Harding)	=	Further records also held by Harding at ITE: Huntingdon

*Niphargus fontanus* (Fig.1) also called the well shrimp, is a translucent eyeless troglobite (obligate cave-dweller), measuring up to 15mm in length (Fitter, 1986). It is one of the commonest cavernicolous amphipods in Britain (six species of which have been recorded) and is sometimes seen in surfacing underground water, having been washed out with it. *N. fontanus* was first discovered in Britain in 1946 in the now famous show caves of Dan yr Ogof (Jefferson 1989), and has since been shown to be distributed mainly in the southern part of Britain, with strongholds on the limestone of South Wales and in the Mendips.

*N. fontanus* is commonly found in static or relatively slow moving underground water, but has amphibious propensities as observed by Chapman (1993). As an omnivore, it leads an opportunistic life-style, feeding on surface-film microbes, particulate organic material and even smaller cave animals (eg collembola) when available.

*Proasellus cavaticus* (Fig.2) is the only troglobitic isopod in Britain (Chapman, 1993). It lacks chromatophores, is eyeless, and measures up to 8.5mm in length. It was first recorded not in a cave but from a well in Hampshire (Tattersall, 1930). Like *N. fontanus*, its first sighting in a cave was made in Dan yr Ogof in 1939, this time by a great contributor to cave biology, Mary Hazelton (Collinge, 1944).

Two discrete populations of *P. cavaticus* have been identified (Map 1), one in South Wales, the other in the Mendips. The population in South Wales has members which are slightly larger (up to 8.5mm long; as opposed to up to 4mm long), and produce more young per brood than the Mendip population. Also, the South Wales population, unlike the Mendips population, can live in completely submerged cave passages, whereas the latter has only been observed in water which does not completely fill the passage!

*P. cavaticus* is commonly found in the water films covering cave formations such as stalagmites, where it is believed to feed on organic deposits as well as on in-washed plant material. In some localities it can be found in large assemblies.

Both *N. fontanus* and *P. cavaticus* are thought to have existed in Britain before the Pleistocene ice age and throughout subsequent glacial events, ranking them with the oldest of our fauna. Several theories have been suggested to account for their survival through the rigours of these times. One theory suggests that they could have survived this period under the ice, another suggests that they didn't survive under the ice, but after it retreated they are envisaged to have re-colonised the areas. (Jefferson, 1989)

Whichever theory in the end proves to be correct, in the majority of caves I have visited, if one of the cave crustacea is present, then the other is not far away. Indeed one of my favourite memories is that of seeing both species for the first time in a relatively newly discovered Carmarthenshire cave. In one of the chambers in this cave, a small stream was flowing over a scree slope consisting of boulders and smaller rock fragments and, in the water, both species were to be found - *P. cavaticus* living in the water that was gently flowing over the large boulders and *N. fontanus* living in the pools at the bases of the boulders. *P. cavaticus* was probably feeding on any organic material or bacteria deposited on the boulders, and *N. fontanus* in turn, was feeding on any *P. cavaticus* that lost their footing and were washed into the pools below!

The third crustacean recorded in Carmarthenshire caves is *A. dentiger* (Fig 3), a trichoniscid woodlouse, measuring up to 6mm in length, being a beautiful pink or rosy red colour, with two yellow stripes running antero-posteriorly

along the dorsal plates (Hopkins, 1991), but is also found in a white form (Webb, 1906; Sutton, 1972). Although it is the most commonly encountered woodlouse in caves, mines and tunnels in the British Isles (Oliver, 1993) it is not an obligate cave dweller (troglobite) , and is also common in other subsurface habitats such as in calcareous scree, and garden rubble etc (Harding, 1976).

It is an interesting enough exercise for anyone who is not claustrophobic or terrified of the dark to go caving. For those who are willing to make the extra effort of doing some systematic biological underground collecting the experience can be even more worthwhile, and a great deal can be accomplished in the somewhat neglected but interesting field of biospeleology.

## References

Chapman, P. (1993) - *Caves and cave life*. New Naturalist, Harper Collins.

Collinge, W.E. (1944) - On the British Species of the Isopod Genus *Asellus* (Geoffroy). *Arbroath*.

Fitter, R. & Manuel, R. (1986) - *A guide to the freshwater life of Britain and north-west Europe*. Collins Field Guide.

Glennie, E.A. (1967) - The distribution of the hypogean amphipoda in Britain. *Trans. C.R.G.: Hypogean Fauna and Biological Records 1964-1966*. 9(3): 132-136.

Harding, P.T. (1976) - *Provisional Atlas of the Crustacea of the British Isles. Part 1 Isopoda: Oniscidea*. NERC. ITE Monks Wood Experimental Station, Huntingdon.

Harding, P.T. (1989) - *The occurrence of Asellidae in the British Isles. Part 1. Asellus cavaticus*. *Abbots Ripton: Huntingdon*.

Hopkins, S.P. (1991) - *A key to the woodlice of Britain and Ireland*. Aidgap No204, Field Studies, 7, No.4

Jefferson, G.T. (1989) - Cave biology in South Wales c.5. *Limestones and Caves of Wales*. T. Ford (ed). Cambridge.

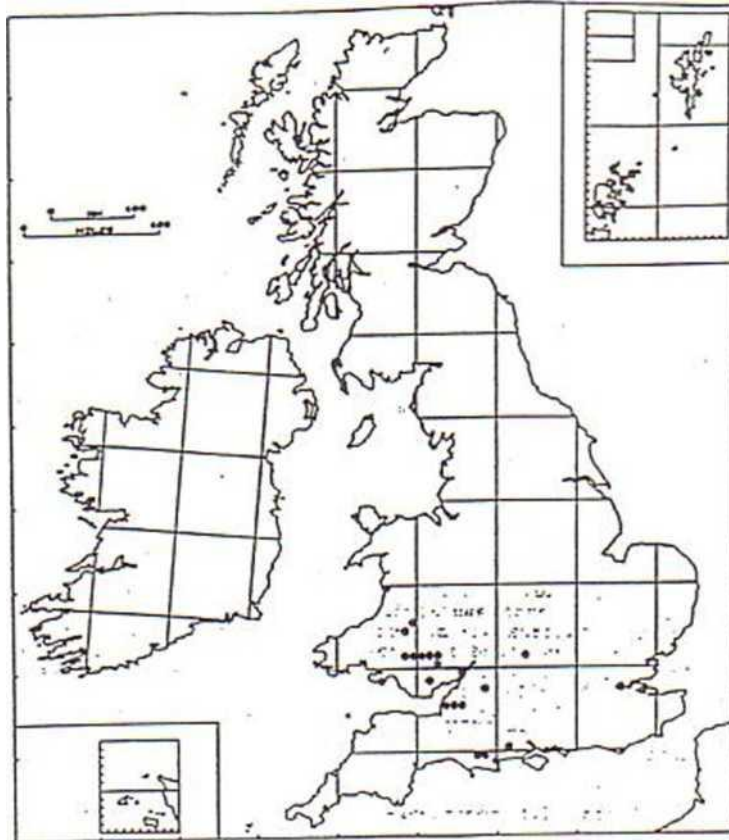
Oldham, T. (1990) - The limestones of Carmarthen. 2nd ed. Part 3 in the series *Limestones and caves of south Wales*.

Oliver, P.G. & Meehan, C.J. (1993) - *Woodlice. Synopses of the British Fauna. Field Studies Council*.

Sutton, S. (1972) - *Invertebrate Types; Woodlice*. Ginn & Co. Ltd.; London. Tattersall, W.M. (1930) - *Asellus cavaticus* Schiodte, a blind isopod new to the British fauna from a well in Hampshire. *Linn. Soc .J. Zoology*, 37:79-91

Walker, P.L. (1993) - *A study of the fauna of Ogof Dan y Lleud Wen: a newly discovered cave in South Wales*. Unpublished.

Webb, W.M. & Sillem, C. (1906) - *The British Woodlice, A monograph of the terrestrial isopod crustacea occurring in the British Islands*. Duckworth; London.



Above: Distribution of *Proasellus cavaticus* (reproduced by kind permission of Harding (1989)).

Below: *Niphargus fontanus*, *Proasellus cavaticus* & *Androniscus dentiger* (reproduced by kind permission from Chapman (1993)).

