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THE MYRIAPODA OF GOWER

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Gower (S.Wales) is an interesting area for myriapods; it has a wide variety of habitats from acid grassland on the commons and on the uplands of Cefn Bryn and the Rhossili Down, to the limestone grasslands, scrub and woodlands extending right down to the sea shore. Only a few miles separate the Swansea conurbation from the quiet rural areas of the peninsula.

Ian Morgan's paper on the myriapods of South West Wales (Morgan, 1988) stimulated me to sort the records accumulated over a succession of annual field courses in September. In addition, an area of Park Woods has been sampled by Tullgren funnels, pitfall traps and by hand to research the life cycles of certain species of millipedes (Blower & Miller, 1974; Blower, 1979).

Records are summarised in Table 1 and Figure 1. These include 28 species of millipedes and 23 of centipedes. I have incorporated records from Morgan, 1988 and also the more recent records which he has kindly sent to me. In Table 1 Morgan's habitats are indicated by a lower case m at the head of each kilometre square. Full habitat data are lodged with the Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon. This paper summarises the data and gives notes on habitats and the rarer species.

THE SITES

In Figure 1 the number of species in each kilometre square are given, millipedes above, centipedes below. Some squares include more than one site (see list of squares and sites in Appendix 1). Five sites have yielded twenty or more species; Oxwich (26), Park Wood (nr. Llethrid)(24), Bishop's Wood, Caswell Bay (24), Horton Dingle (footpath to Slade)(22) or, if the whole length of the path is included in two adjacent squares (27). Finally, Ilston Cwm (20). All these sites are on limestone; as a result, there are fewer species of centipedes than of millipedes, but only just lower in Bishop's Wood (13:11). Next in the league table of good sites are Parc Cwm (19), Nicholaston (18) and Pennard (17); this last is dume heath and is exceptional in providing more species of centipedes than of millipedes (8:9). Two of the three best sites, Oxwich and Bishop's Wood are limestone woods extending right down to the spash zone of the shore. Llethrid probably owes its high position to its status as a research site.

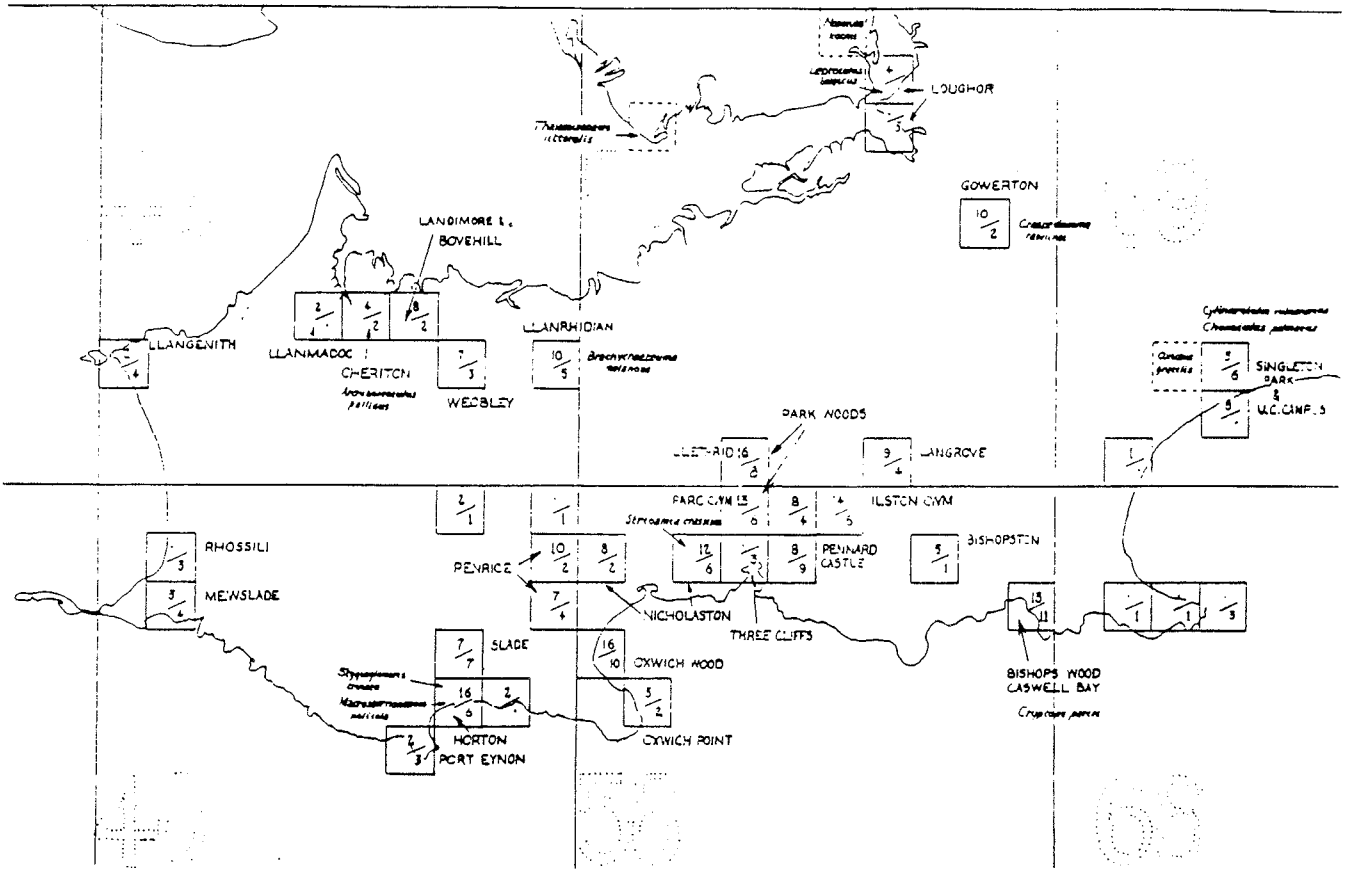

Figure 1

The six 10 Km squares of Gower are shown. The 1 Km squares which have been worked show the number of species of millipedes (above) and of centipedes (below) within them. The position of some of the rarer species is indicated.

Table 1

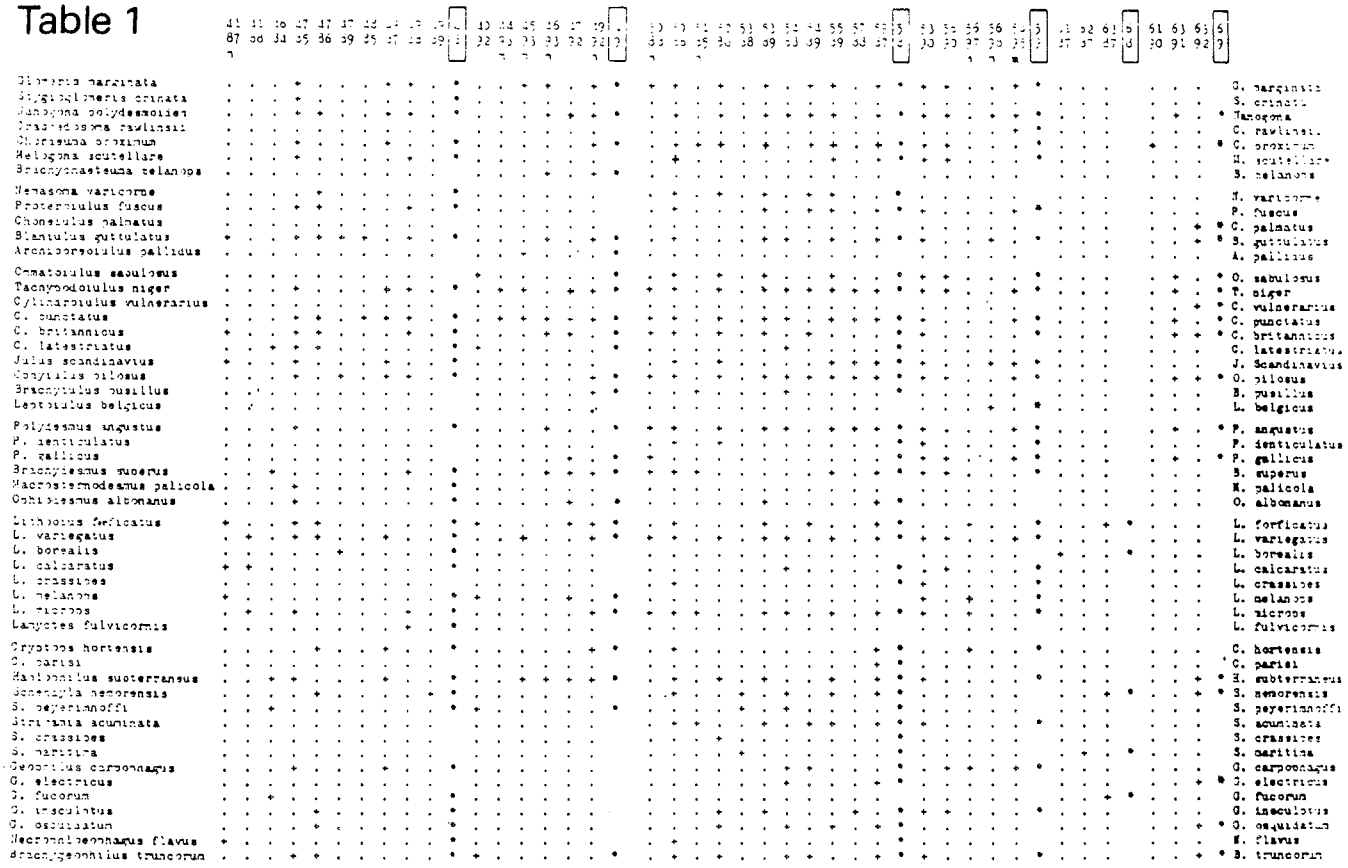

Table 1

Showing the presence or absence of species for each kilometre square. The 1 Km co-ordinates appear across the top, easting above, northing below (these are listed in Appendix 1 together with the sites therein). A sub-fix m below the grid reference denotes a square worked by I K Morgan. The boxed figures show the 10 Km square and the asterisks summarise the records within them. The Km and 10 Km squares are shown in Figure 1.

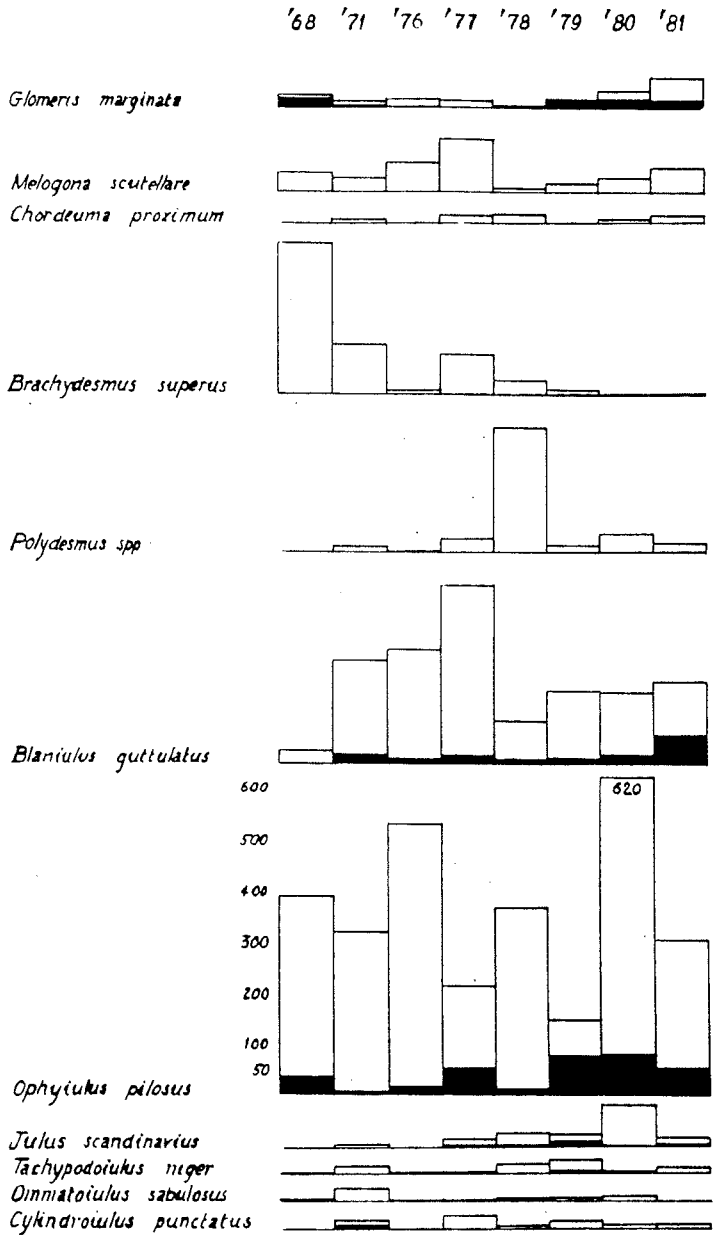

Figure 2

The mean overwintering densities per square meter at Park Wood (Llethrid), Gower, estimated from Tullgren funnel extractions of 20 units of 0.1 m^2 in September of the years shown. Adults within each species are indicated by the back section of each column. 1968-1977, from Blower, 1979; 1978-1981 are new data.

Oxwich

Mixed deciduous with oak (Quercus spp.) dominant. The wood is well provided with fallen trees which have remained where they fell, in various stages of decomposition. It is a curious feature of Oxwich that Cylindroiulus britannicus is often much more common than C.punctatus in dead wood. Nemasoma varicorne is only locally common and Proteroiulus fuscus is distinctly rare.

Llethrid (Park Wood)

At the northern end of Park Woods is a mixed deciduous plot which has been systematically sampled since 1968; initially samples were taken several times a year; laterly the samples have been taken once only, in September. The objective was to provide phenological data to clarify the life-histories of Ophyiulus pilosus (Blower & Miller, 1974), Melogona scutellare, Brachydesmus superus and Blaniulus guttulatus (Blower, 1979). The site is exceptional in carrying a mean overwintering density of nearly 800 individual millipedes per square metre, belonging to sixteen species. Figure 2 shows the annual change in density of ten of these sixteen; the Polydesmus spp. are mostly immature and not referable to a species, but adults of P.angustus, P. denticulatus and P. gallicus have occurred. Nanogona polydesmoides, Proteroiulus fuscus and Cylindroiulus britannicus are occasional visitors. This data from 1968-1977 was published in Blower (1979); the figures for 1978-81 are given here for the first time. One of the more interesting features of these time series was the decline in numbers of Brachydesmus superus in the seventies and early eighties this decline may have followed by dry summers of 76 and 77; Blower (1979) showed that most of the production of B.superus occurred in the summer months and this may mean that the species is vulnerable to dry summers since the soil at Llethrid is a shallow well-drained rendzina.

In contrast to the high density of millipedes there was only a modest mean of 22 centipedes per square metre and these belong to five species only: Lithobius variegatus, Haplophilus subterraneus, Geophilus insculptus, Strigamia acuminata and Brachygeophilus truncorum. In addition, Lithobius crassipes, L. melanops and L. microps have occurred just off the main sampling area. The frequencies of centipedes in the main samples are low and never more than 50% of the 20 units taken.

Bishop's Wood, Caswell Bay

Like Oxwich Wood, Bishop's extends right down to the shore. There are two main areas. At the shore end the wood is dominated by the Holm oak (Quercus ilex). Further inland, sycamore (Acer pseudoplatanus) dominates and the soil is a typical mull. Bishop's wood was one of the three sites from which Geophilus osquidatum was first recorded as British (Blower, 1961). From here also came the second British find of Chordeuma proximum in 1967 since when we have the feeling that this species has become much more common throughout Gower.

RARE AND NOTEWORTHY SPECIES

Seven species of millipedes are represented at only one site; two have been found in only two sites and another two confined to three sites. Six of these rare species were recorded first by Ian Morgan, four from the north and north east which we have neglected:

Polyxenus lagurus This species has not yet been recorded at a specific site, but Gillham (1977) records it 'on Gower cliffs'. Morgan (pers. comm.) suggests that careful searching under stones and mats of sea campion (Armeria maritima) on the super-littoral zone of the Gower cliffs is likely to reveal this species in the future.

Stygioglomeris crinata 3♀♀ ix/87

Macrosternodesmus palicola 2♀♀ and immatures ix/85. Both these species were found under well-embedded limestones at the abse of an only dry wall in the shade of hazel (Corylus avellena) in the Dingle at Horton; both occurred together in association with Ophiodesmus albonaus.

Choneiulus palmatus 2♂♂ ♀♀ and immatures ix/81 under a piece of wood on the site of a recently demolished hut (one time a biology lab.) on the campus of the University College.

Archiboreoiulus pallidus Under logs in a mixed deciduous wood at Cheriton (Morgan, 1988).

Cylindroiulus vulnerarius Numbers of adults and young were found in the soil of the azaelea bed in Singleton Park, immediately adjacent to the campus of University College in 1979, 1981, 1984 but not in 1986. This was the first Welsh record (and the third British). This blind julid occupied the topsoil which had been treated at some time with peat and a mulch of bark chippings; it was associated with Blaniulus guttulatus and Cylindroiulus britannicus.

Leptoiulus belgicus Common under the litter of Reynoutria japonica on grassland at Loughor on the North East fringe of Gower (Morgan, 1988).

Craspedosoma rawlinsi in an oak, hazel (Corylus avellena) and alder (Alnus glutinosa) wood (wet, acidic). NW of Cefn Gorwydd-Fawr, Gowerton 22.v.1985 (Morgan 1988) and in another patch of wet acidic woodland south of Gowerton in the same kilometre square 8.iv.89 (Morgan. pers. com.)

Brachychaeteuma melanops Under stones in a grazed ash wood, Landimore, under stones in grazed scrubby limestone grassland, Bovehill (both these in the same kilometre square) and under well-embedded stones in an ash wood north of Llanrhidian; all three records on the same day, 8.iv.89 (Morgan, pers. com.).

Brachyiulus pusillus A gynandromorph was found in September 1979 but the specimen was not given a specific habitat. More recently it was recorded under Festuca mats at Oxwich Point (Morgan, 1988), collected 12.ii.87. The following year I had a male under a stone at the base of Pennard Castel (ix.88). Thirdly, the species was found at Llanrhidian on the salt marsh near high water mark 8.iv.89 (Morgan, pers. comm.).

Polydesmus denticulatus This species so far has only been recorded from Oxwich, Nicholaston and Llethrid woods. Its rarity merely reflects the fact that adults of Polydesmus are rare, and underlines the need to find a method of recognising immature stadia - the only young diplopods not recognisable.

Ten species of centipede are here considered rare; three species are known only from a single site, five species are known from two sites only, and two are present in three sites, but one species from each of these categories has been found repeatedly in one of the sites.

Strigamia crassipes Nicholaston Wood, ix.86, immature, 51 podous

Necrophloeophagus flavus Mewslade 29.v.88 (Morgan, 1988)

Cryptops parisi Caswell Bay ix.84 and 86

Geophilus fucorum seurati First found in a limited area of stones in the

Enteromorpha zone close to the old lifeboat slipway in front of the YHA at Port Eynon, ix.73 (then the third British record) and found there, but not collected of late, in most subsequent years. There is also a record from mid-head, Mumbles viii.73 by Dr P E King.

Lithobius borealis from Stout Hall Wood, ♂ iii.59 and on the cliff path from Langland to Mumbles, iii.59. More recently it was found at Rhossili Moor (acidic heath), 12.x.88 (Morgan, pers. comm.) and on the dune heath by Pennard Castle, 16.ix.89 by Dr R R Askew.

L. crassipes Oxwich wood, ix 78 and 82.

Lamyctes fulvicornis Penrice, valley bottom ix.85 and Nicholaston, ix.86. A third record came from Ilson Cwm, ix.89 but this was too late to include in Table 1.

Schendula peyerimhoffi On the shore at Port Eynon, viii.83 (coll. P E King) Burry Holme, 23.ix.73 Coll. C.E.T.Nield. Three Cliffs Bay ix.81 and in several years following. The occupied habitat is a small area at high water neap, of stones covered with the orange yellow lichen.

Moving a yard or so out of this area one can still find Schendyla, but it is S. nemorensis. On one occasion, further upstream on the west bank of the Pill where the high spring tides reach the edge of North Hill Wood, there were two Schendyla under the same stone; one was S. peyerimhoffi the other was S. nemorensis, ix.85.

Geophilus electricus 1♀ Bishop's Wood 11.iv.61 Walltop, Singleton Park imm. ix.81 2oo North Hill Wood ix.85.

In volume 4 of this Bulletin I drew attention to the arboreal habit of some larger than usual individuals of Geophilus carpophagus. In 1985 two students found a male and two females 5 feet up a pine tree outside the Sea Beach Hotel at Horton. In September 1986 two females measuring 42 and 40 mm (57 and 55 segments respectively) were found exploring the garden wall of the same hotel at 9 o'clock in the evening. This form of G. carpophagus was described by Eason (1979); in my note in vol. 4 I omitted to quote a paper by Lewis (1985) on this same phenomenon.

In view of the occurrence of Lithobius pilicornis in Pembroke and adjacent Carmarthen (Morgan, 1988), I should stress that all larger lithobiids have been examined most carefully; to date, no individuals of L. pilicornis have been found in Gower. Finally I should mention that as recently as this year I collected two individual "Brachygeophilus truncorum" in their usual compact

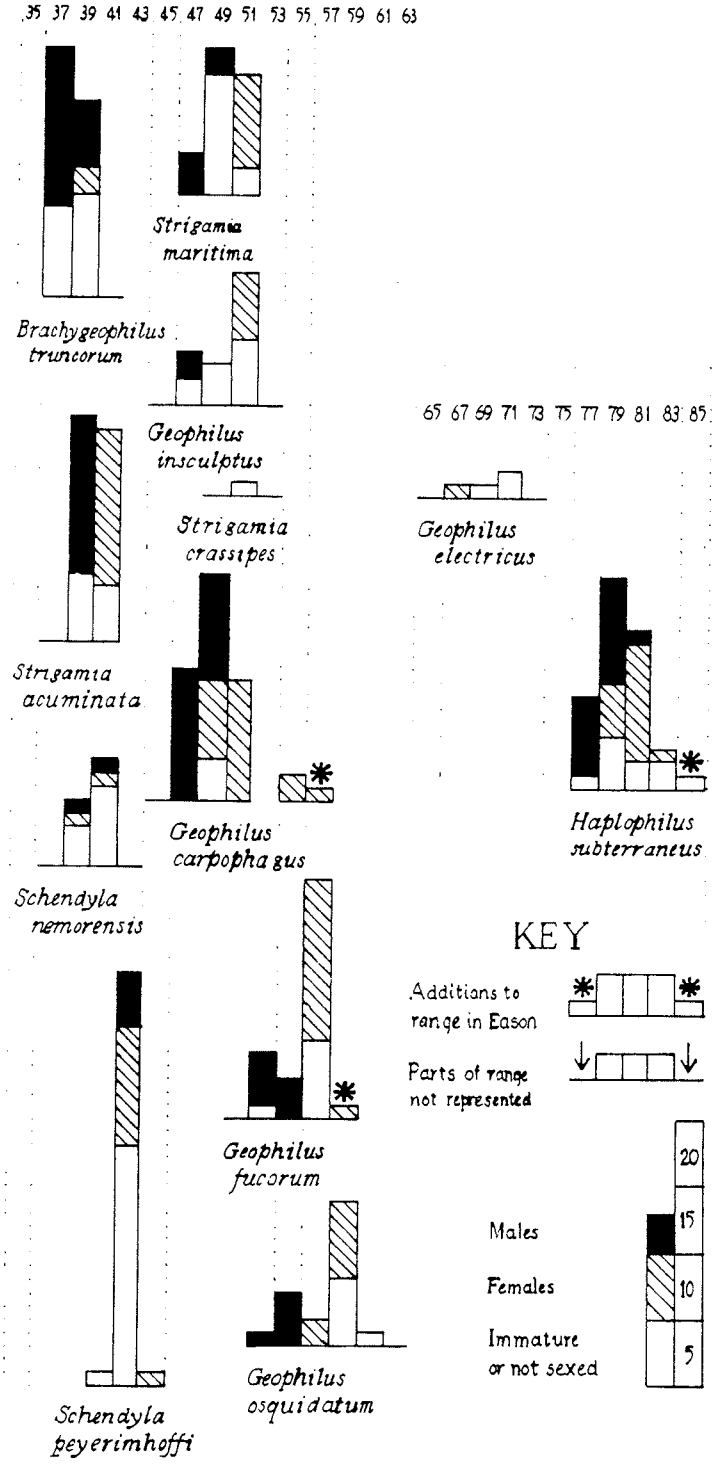

Figure 3

Frequencies of numbers of podous segments of Gower geophilomorphs compared with the national ranges given by Eason (1964).

resting attitude under the bark of a fallen branch in Ilston Cwm; on examination in the laboratory they both turned out to be Schendyla nemorensis; this last is known to be common in coastal regions; it is especially common in Gower in a very wide variety of habitats!

SEGMENTS NUMBERS IN GEOPHILOMORPHA

Figure 3 shows the frequency of numbers of podous segments within each species. Although the sample size is small (the figure includes 278 individuals which have been examined) it is perhaps useful towards establishing the possibility of regional variation. There are minor deviations from the overall distribution given in Eason (1964). Notable in Gower is the absence of any B. truncorum with 41 segments, and the limitation of S. nemorensis to either 39 or 41 segments. Although individual G.carpophagus mentioned in the previous section with 57 segments is not included in Eason (1964) it is included by Eason, 1979 and by Lewis, 1985.

CONCLUSION

Many of the Gower records have resulted from September field courses in faunistics where students become familiar with as many animals of all groups as possible. Our collecting has been restricted to a few sites in which the species diversity is greatest. Most of these sites are on base rich soils and acid sites have been neglected. This bias alone may account for the relative paucity of chilopod records. Ian Morgan has suggested to me that we have probably missed Craspedosoma rawlinsii, for example, since we have not sampled in the wet coalfield valley woods of Northeast Gower. Morgan also points out that the restriction of our collecting to September may limit the number of species we encounter.

Figure 1 shows the uneven coverage of Gower at the present date (all known records up to the end of 1988 are included). The summary will serve as a guide to just where and when our further collecting should be directed in order to increase our knowledge of the myriapods of Gower.

ACKNOWLEDGEMENT

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Appendix: The Kilometre Squares and the Sites Included

41 87	m	Mewslade Bay	416873
41 88		Rhossili, footpath to shore	41588.
		Rhossili, path to Worm	416880
46 84		Port Eynon, shore by YHA	470848
		Port Eynon, above splash zone	47.84.
47 85		Horton, Seabeach Hotel	477856
		Horton, Dingle, footpath to Slade	479857
47 86		Dingle, further north	479860
47 89		Stout Hall Wood	47489.
48 85		Horton, shore path to Oxwich	48.85.
49 87		Penrice, old oaks near village	491879
49 88		Penrice, bottom	493883
40 92		Llangenith burrows	40.925
		Burry Holme	400925
	m	Three Chimneys	405926
44 93	m	Llanmadoc	446937
45 93	m	Cheriton	452932
46 93	m	Llandimore	463936
	m	Bovehill	463934
47 92		Weobley	47.927
49 90		Cefn Bryn, quarry	498901
49 92	m	Llanrhidian	491923 498924
50 88	m	Nicholaston Wood	50.88.
50 86		Oxwich Wood	50.86.
51 85	m	Oxwich point	512855
52 88		Nicholaston Wood	523883
53 88		Three cliffs Bay: west bank Pill by ford	53.883
		shingle bank	538880
		marsh by maze	538883
53 89		Parc Cwm, burial chamber	537897
		Redden Hill	536897
54 88		Pennard Castle, base of mound	544885
		North Hill Wood	542885
54 89		Wood by road to Parc Cwm	541894
		Wood at entry to Pennard Castle valley	545891
55 89		Wood near Langrove Inn	55.89.
		Ilston Cwm, poplar stand	55789.
57 88		Bishopston valley	57.88.
59 87		Bishop's Wood, Caswell Bay	59.87
53 90		North end Park Woods, near Llethrid	532908
56 90		Wood near Langrove Inn	56.90.
		Fairwood Common	568905
56 97	m	Loughor	563979
56 98	m	Loughor	568985
58 95	m	Gowerton	583956/7
61 87		Langland, path to Mumbles	61.87.
62 87		Mumbles / Oystermouth, sea wall	62.87.
63 87		Mumbles Head	63.87
61 91		Clyne Woods	61.91.
63 91		University College Campus, E car park	631918
63 92		University College campus hut site	630920
		Singleton Park, Azaelea bed	631922
		Wall top by Sibly Hall	631922