

## Notes on some Linyphiid Spiders from Tentsmuir, Fifeshire

D.W. Mackie

11 Ashmore Avenue,  
Stockport.

During the period from October 1967 to November 1968, spiders and other invertebrates were trapped on the coastal dunes at Tentsmuir National Nature Reserve, Fifeshire, Scotland, by Dr. M.J. Cotton, University of Dundee. The spiders were sent to me for identification and I am indebted to Dr. Cotton for the opportunity to work out the population and distribution of some of the species.

Pitfall traps were located in eleven different habitats as listed in Table 1; a reference letter being designated for each habitat for use in the histograms. The total number of trap changes during the thirteen month study period was fifty-six.

The Tentsmuir Reserve is a coastal strip about one mile long, having the usual succession of sand dune features as shown in Fig. 1, starting from the seaward end of the dune system and moving inland to the dune slacks, which are backed by a coniferous tree belt. A detailed description of the Reserve is given in Gordon (1963).

A	Agropyron dunes		
B	Elymus dunes		
C	Mobile dunes,	seaward side	(Marram tufts)
D	Mobile dunes,	seaward side	(Open sand areas)
E	Mobile dunes,	landward side	(Marram tufts)
F	Mobile dunes,	landward side	(Open sand areas)
G	Semi-fixed dunes,	Marram dominant	(Marram tufts)
H	Semi-fixed dunes,	Marram regressing	(Open sand areas)
J	Semi-fixed dunes,	Marram dominant	(Marram tufts)
K	Semi-fixed dunes,	Marram regressing	(Open sand areas)
L	Dune slacks		

Table 1: Habitat locations of traps

A total of 96 spider species were recorded in the traps, but only 32 species were numerous (with 9 or more specimens). Table 2 lists these 32 species, giving the totals trapped and the sex ratios for each species. It will be seen from this table that only 7 species were really numerous viz: *Hypomma bituberculatum* (297), *Phaulothrix hardyi* (201), *Centromerita bicolor* (243), *Centromerita concinna* (189), *Oedothorax retusus* (150), *Erigone promiscua* (101) and *Lycosa monticola* (200).

This present paper deals with the first four of these species and shows, by means of histograms and graphs how the adult population of each species varied from month to month, and how they were distributed among the dune habitats. Other relevant notes of interest are also given.

Species	Totals	Females	Males
<i>Drassodes signifer</i>	25	10	15
<i>Zelotes pusillus</i>	13	4	9
<i>Z. electus</i>	9	0	9
<i>Agroeca proxima</i>	25	1	24
<i>Xysticus cristatus</i>	14	0	14
<i>Lycosa monticola</i>	200	27	173
<i>L. tarsalis</i>	30	14	16
<i>L. pullata</i>	75	20	55
<i>L. amentata</i>	15	6	9
<i>L. nigriceps</i>	80	15	65
<i>Arctosa perita</i>	74	41	33
<i>Pachygnatha degeeri</i>	20	10	10
<i>Hypomma bituberculatum</i>	297	177	120
<i>Oedothorax retusus</i>	150	122	28
<i>Trichopterna thorelli</i>	27	16	11
<i>Gonyldiellum vivum</i>	19	10	9
<i>Savignia frontata</i>	30	7	23
<i>Araeoncus crassiceps</i>	66	20	46
<i>Typhocrestus digitatus</i>	76	5	71
<i>Erigone atra</i>	30	7	23
<i>E. dentipalpis</i>	15	8	7
<i>E. promiscua</i>	101	7	94
<i>Phaulothrix hardyi</i>	201	132	69
<i>Porrhomma pallidum</i>	22	21	1
<i>Centromeris sylvaticus</i>	38	10	28
<i>Centromerita bicolor</i>	243	162	81
<i>C. concinna</i>	189	67	122
<i>Bathyphantes gracilis</i>	22	10	12
<i>Stemonyphantes lineatus</i>	39	18	21
<i>Lepthyphantes tenuis</i>	47	30	17
<i>L. zimmermanni</i>	24	12	12
<i>L. ericaeus</i>	80	26	54

Table 2:

Numbers of dominant species trapped with sex ratios

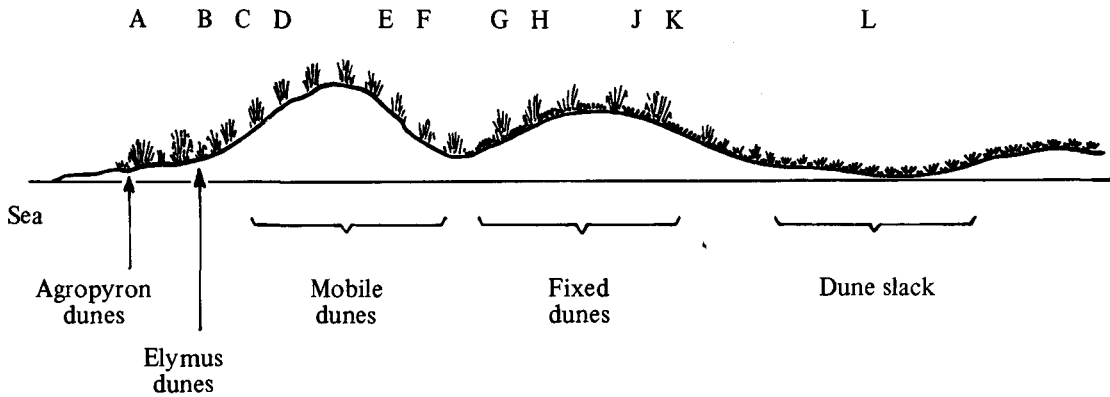


Fig. 1: Diagram of dune succession

The very large population of *Hypomma bituberculatum* which occurred in the fore-dunes at Tentsmuir was one of the outstanding features of this dune system. The monthly totals of this species trapped over the whole dune system are shown in Fig. 2, indicating that the population increased slowly in March and April, then rapidly in May to four times the April number, and again doubled in June to the peak of the year. After July and August the totals dropped steadily until December, followed by a continuous fall to February when the summer rise commenced again in March. Fig. 3 shows the sex ratios of this species for each month. Adult males did not appear until April, but rose to a peak population in June and were no longer recorded after the end of July. This gives a maximum period of activity for adult males of four months and it was probably somewhat less than this when one allows for successive broods becoming mature. There was also a drop in the number of adult females trapped during July followed by a rise in August before the numbers declined rapidly to the end of the year. During identification, it was possible to note the numbers of gravid females trapped each month (Fig. 3). It may be significant that the gravid females also showed a decrease in July prior to a rise in August. This drop in numbers is difficult to explain; it may have been a coincidence or due to a less numerous second brood of females becoming adult in August and persisting in small numbers through the winter months. It may also be due to a reduction in trapping efficiency because of adverse weather or other factors.

Fig. 4 shows the distribution of *Hypomma bituberculatum* in the various habitats and it will be noted that the maximum population occurred in the first four habitats which were nearest the sea, with a more or less gradual diminution in numbers through the succeeding habitats as one moved inland, ending in the dune slacks with the lowest total. From the results of hand-collecting at Tentsmuir, Duffey (1968a; 1968b) records *H. bituberculatum* as the most abundant species on the dunes in June 1966, also with peak numbers in the foredunes, but with a small

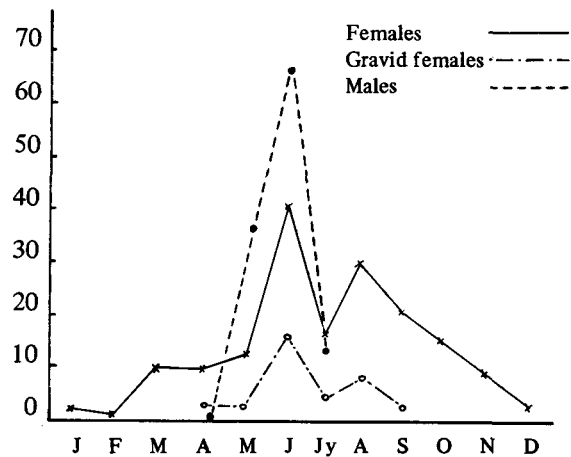


Fig. 3  
*Hypomma bituberculatum*  
Totals of each sex and  
of gravid females per  
month

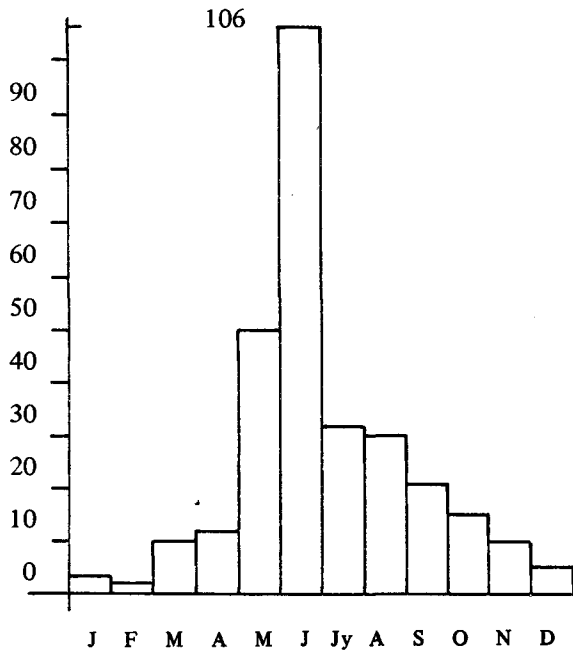


Fig. 2  
*Hypomma bituberculatum*  
Totals per month

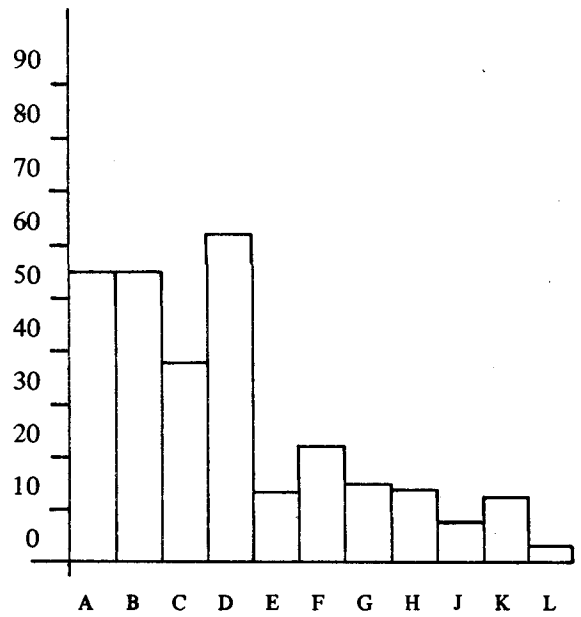


Fig. 4  
*Hypomma bituberculatum*  
Totals per habitat

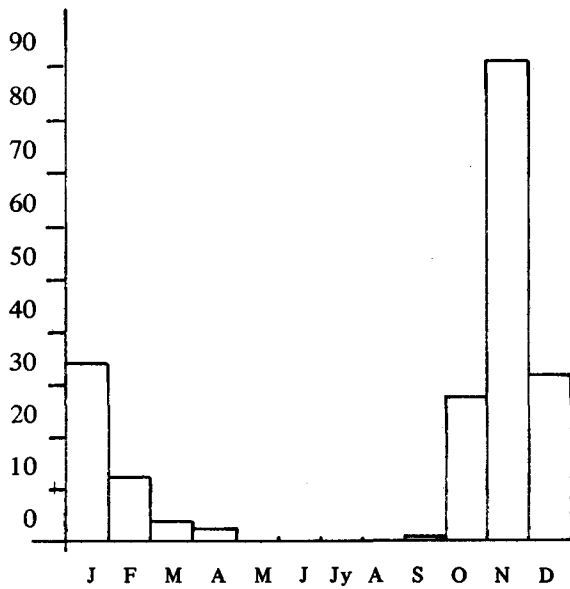


Fig. 5  
*Phaulothrix hardyi*  
Totals per month

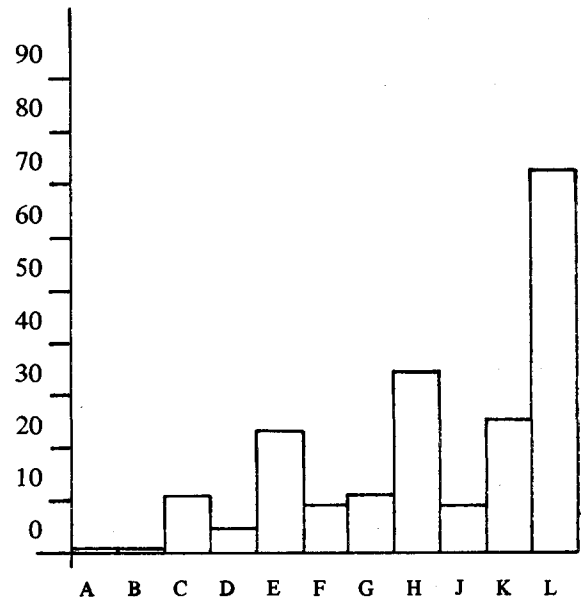


Fig. 6  
*Phaulothrix hardyi*  
Totals per habitat

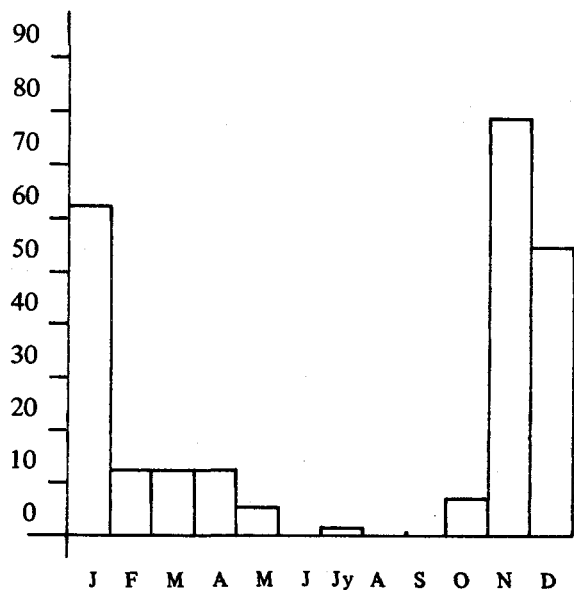


Fig. 7  
*Centromerita bicolor*  
Totals per month

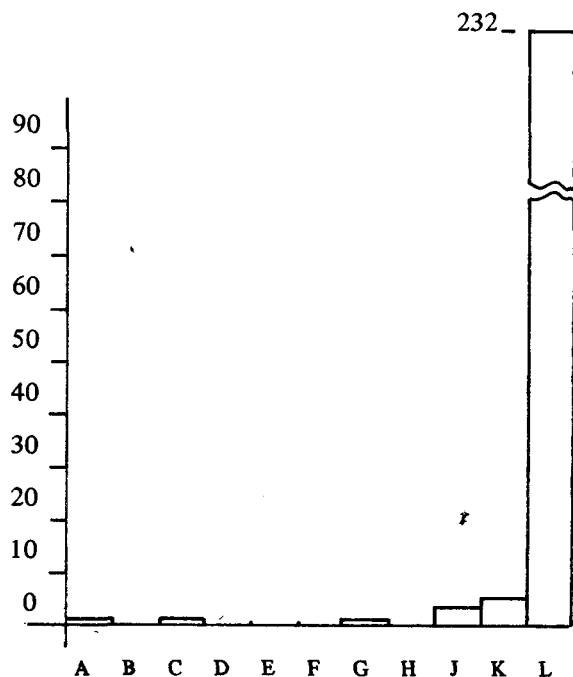


Fig. 8  
*Centromerita bicolor*  
Totals per habitat

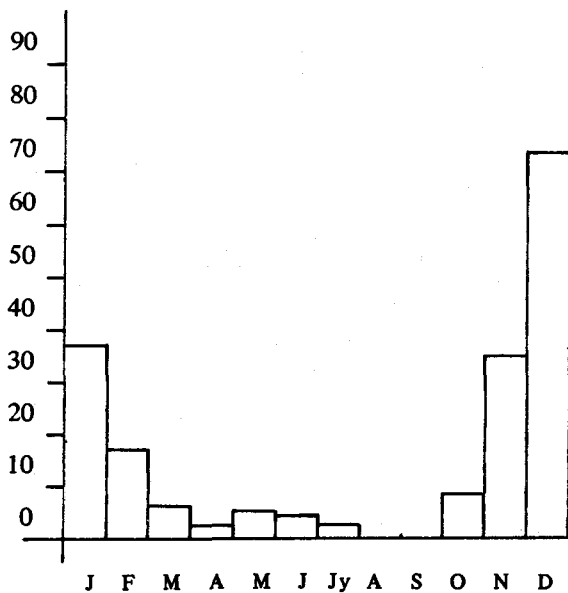


Fig. 9  
*Centromerita concinna*  
Totals per month

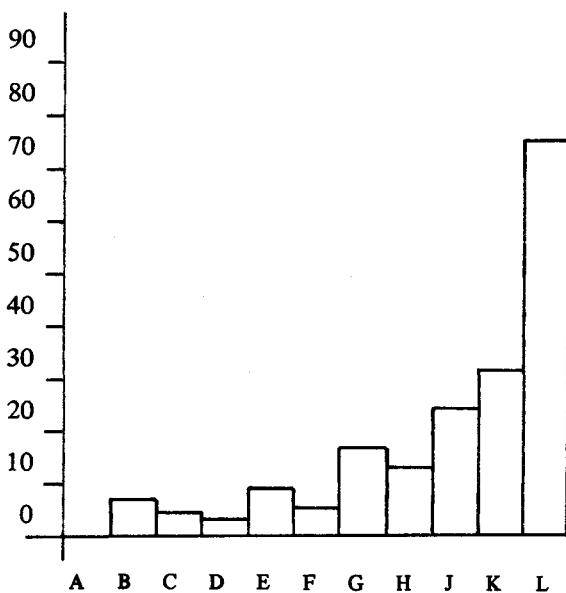


Fig. 10  
*Centromerita concinna*  
Totals per habitat

secondary peak in the dune slacks. We normally think of *H.bituberculatum* as a species which favours damp marshy habitats and indeed, experience agrees with Locket and Millidge (1953) where the habitat of this species is given as "In wet swampy areas, by the sides of streams or ponds". At first sight the fore-dunes at Tentsmuir were apparently dry and arid and not a habitat in which one would have expected this species to have been the most common spider. It may be that this dune system, situated on the East coast, adjacent to the North Sea, and subjected to heavy misty weather with low cloud cover and heavy moisture precipitation (North Sea 'haar') was in fact a very moist habitat for many months of the year. The occurrence of large areas of lichen species on certain parts of the Tentsmuir dunes indicates a heavy moisture precipitation over a portion of the year.

The population pattern of *Phaulothrix hardyi* differed considerably from that of *H.bituberculatum*. The former is a winter-maturing species and no adults were trapped during the summer months of May, June, July and August (Fig. 5). Adults began to appear at the end of September, numbers rose rapidly through October and reached a peak population during November. After this, the population dropped steadily through December, January and February and tapered off in March and April. The habitat distribution pattern of *P.hardyi* also differed radically. This species was scarce in the seaward habitats and fluctuated in numbers from place to place (Fig. 6). The peak population was in the most landward habitat, the dune slacks. As the dune slacks were more densely vegetated than any of the preceding habitats, the deeper litter probably providing a greater number and variety of smaller invertebrates on which spiders prey, it would appear natural that this habitat should carry the largest numbers of spiders. This proved to be the case for the remaining two species under consideration, viz: *Centromerita bicolor* and *C.concinna*.

Both these species are similar in size and appearance and both are winter-maturing species.

Figs. 7 and 9 show the monthly populations for these two species, both indicating a peak population in the month of November or December and a tapering off in numbers gradually for the other months. However, some differences are apparent in the habitat patterns of both species (Figs. 8 and 10). These show that very few adult *C.bicolor* were trapped in any habitat other than in the dune slacks, whereas in the case of *C.concinna* there was a gradual increase in numbers as one moved away from the sea. The peak was again in the dune slacks, but showed that *C.concinna* appeared to have a much wider habitat preference than *C.bicolor*.

Much has been written on the merits and demerits of regular trapping of spiders over a twelve-month period when compared with intensive hand-collecting over short selected periods throughout the year. Both methods obviously have their faults; pitfall trapping misses out many of the species that occupy the upper vegetation zones and tends to capture more males than females, as the males are more mobile. On the other hand, it does show more or less, the population pattern through each month of the year and how that population is distributed through the various habitats in the chosen area.

## References

- DUFFEY, E. 1968a: A survey of the sand dune Spider fauna at Tentsmuir N.N.R., Fife, June 16-22, 1966. *Bull Brit.Sp.Stud. Gr.* 37 : 1-3
- 1968b: An ecological analysis of the Spider fauna of sand dunes. *J.Anim.Ecol.* 37 : 641-674
- GORDON, N.J. 1963: *Tentsmuir Point N.N.R. Fife. Unpub. Management Plan.* The Nature Conservancy, Edinburgh
- LOCKET, G.H. and MILLIDGE, A.F. 1953: *British Spiders.* Vol. 2, Ray Soc. Lond.