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Seasonal activity and diversity of ground-living spiders in two African savanna habitats

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Introduction

The seasonal activity of ground-living spiders has been widely studied in temperate regions (e.g.Tretzel, 1954; Broen & Moritz, 1963; Merrett, 1967, 1968). By contrast little published information is available on the activity of spiders in tropical or sub-tropical areas. Such studies as have been undertaken in tropical areas (Blandin, 1971, 1972; Robinson *et al.*, 1974) have been concerned more with seasonal changes in numbers rather than activity of spider populations.

The object of the present study was to obtain information on the activity and diversity of the spider faunas of the ground layer of two contrasting habitats in the Okavango Delta, Botswana in relation to seasonal climatic variations. For this purpose pitfall trapping was used on a regular weekly basis throughout the study period.

Study area and methods

The Okavango swamps, in the NW of Botswana, form the inland delta of the Kubango river. This consists of approximately 14,000 km^2 of permanent and seasonal swamp set in a context of dry savanna grasslands and woodlands. The area in which the present studies were made, Maxwee, lies on the SW margin of the seasonal swamp (19°30′ S, 23°40′ E) and just to the south of the Moremi Wildlife Reserve. The area is one of almost flat relief intersected by occasional small stream valleys and overlies Kalahari sands and the alluvial deposits of the delta. Studies were carried out in two distinct habitats, Mopane woodland and floodplain grassland.

Mopane (*Colophospermum mopane* (Kirk)) is a deciduous woodland type widespread in central and southern Africa and unusual in that it is normally dominated by a single tree species. The trees form a closed canopy at 10-15 m and readily shoot from stumps to form coppices following fires or cutting by man. The trees are not noticeably fire resistant and are regularly burnt during dry season fires. After the rains end they begin to lose their leaves in May and by late September they are completely bare. New leaves develop about one month before the main rains commence in December. Beneath the canopy a sparse field layer of grasses and herbs develops during the rainy season, but for most of the year the ground is bare except for a carpet of dead leaves overlying the sandy soils.

The area of floodplain grassland studied was situated on one of the higher terraces of a small river, the Moggohelo, and was probably rather infrequently flooded, remaining dry throughout the period of study. The grasses were about 1 m high and grew rapidly at the onset of the rainy season. Following the rains they died back and by May only a layer of standing dead grass remained above ground. The grasses were dominated by *Eragrostis* spp., but other species (*Setaria* spp., *Cynodon dactylon* (L.) Pers.) were also frequent as were sedges (*Cyperus* spp.) and occasional forbs. The grassland was lightly grazed by Hippopotami, Red Lechwe and Impala but during the course of this study was not burnt.

The climate of the area is strongly seasonal with a wet season from mid-December to the end of March, a cold dry season from April to mid-August and a hot dry season from mid-August to the onset of the wet

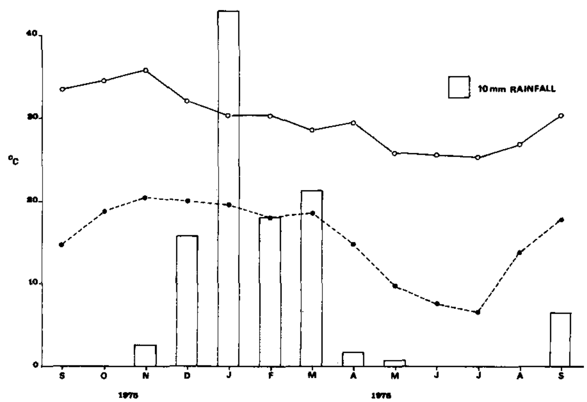


Fig. 1: Mean monthly maximum and minimum temperatures and mean monthly rainfall at Maun for the period September 1975 to September 1976.

season. Rainfall and mean monthly minimum and maximum temperatures for the period of study were obtained from the meteorological station at Maun approximately 40 km SW of the study site and are shown in Fig. 1. Average annual rainfall is 525 mm but is very variable in quantity and duration from year to year. Highest temperatures are recorded in November and the lowest in July, while 95% of precipitation falls between December and March.

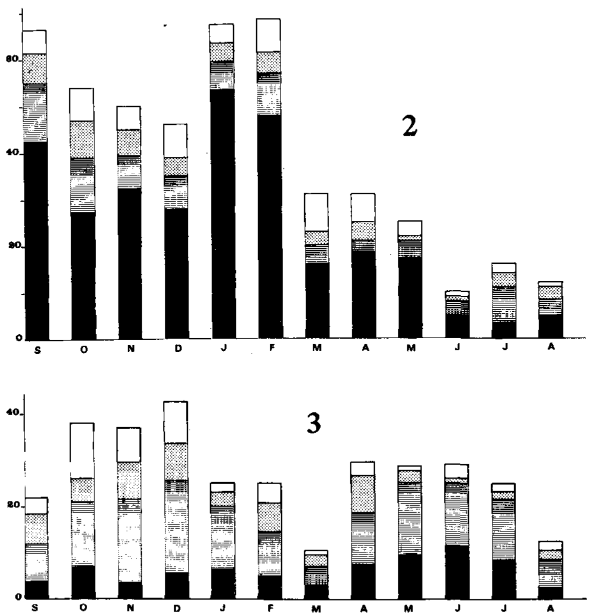
The pitfall traps used consisted of plastic plant pots 9.6 cm in external diameter and 8.5 cm deep. Ten traps were placed in a single line at 5 m intervals in each habitat, and in the grassland this line was at right angles to the margin of the adjacent swamp, the nearest trap approximately 10 m from the edge of the standing water. Each trap was placed in a shaft of plastic drainpipe 9.8 cm in internal diameter and 15 cm deep, with the lip of the trap flush with the soil surface. This helped to reduce disturbance of the surrounding soil when the traps were emptied. The traps were filled to one third of their depth with a killing fluid consisting of ethylene glycol diluted 50% with water. The traps were emptied and the killing fluid renewed at weekly intervals throughout the period September 1975 to October 1976.

Results

The activity of all spiders in both habitats is shown in Figs. 2-3, expressed as mean numbers per trap per month. In the floodplain grassland (Fig. 2) spiders were considerably more active during the warm months (September to March), at which time 74% of all spiders in this habitat were trapped. In Mopane woodland (Fig. 3) numbers trapped were more evenly distributed through the year, and only 58% of the total were trapped between September and March. Overall 33% fewer spiders were trapped in Mopane woodland than in floodplain grassland.

The proportions of the more abundant families trapped in each habitat are also shown in figs. 2-3. In floodplain grassland the family Lycosidae was dominant and accounted for 58.6% of all spiders trapped. Other important families included Gnaphosidae (18.2%) and Salticidae (11.7%), while the remaining 11 families constituted only 11.5% of all individuals. In Mopane woodland the dominant family was the Gnaphosidae which accounted for 44.1% of all spiders trapped, while Lycosidae (22.7%) and Salticidae (17.3%) were also abundant, The remaining 16 families accounted for only 15.9% of all individuals trapped.

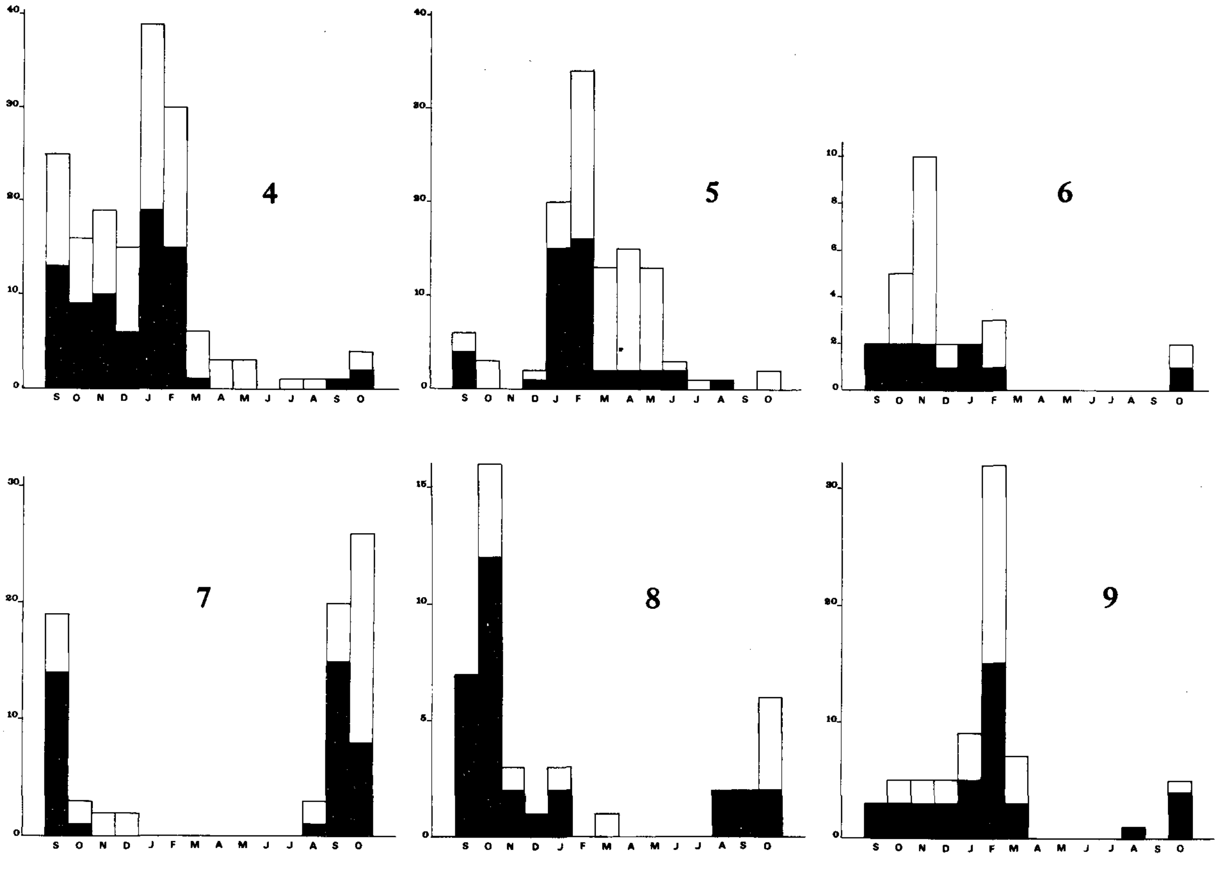
Among the 87 species collected from floodplain grassland in this study adults of 11 were sufficiently abundant in traps to record seasonal activity. Numbers trapped on a monthly basis are shown in Figs. 4-14. The most abundant species was the small lycosid *Pardosa crassipalpis* Purcell (Fig. 4) which was most active during the warm months from September to February, with a peak of activity about one month after the rains commenced. A second lycosid, *Lycosa* cf *oneili* Purcell (Fig. 5), was also abundant but had its main activity period from January to May and peak activity in February. *Lycosa lawrencei* Roewer (Fig. 6) was active from September to February with a peak in November but was never particularly abundant in traps. Five species of gnaphosid were trapped frequently in floodplain grassland. Two of these, *Upognampa* cf *parvipalpa* Tucker and *Drassodes*



Figs. 2-3: **2** Total numbers of spiders trapped on a monthly basis in floodplain grassland; **3** Total numbers of spiders trapped in Mopane woodland.
Solid columns = Lycosidae, hatched columns = Gnaphosidae, stippled columns = Salticidae, open columns = Others.

bechuanicus Tucker (Figs. 7, 8), had marked peaks of activity in the hot dry months of September and October and occasional specimens in the rainy season. *Camillina lutea* Tucker (Fig. 9) was active from September to March with a peak in February, while the larger and less abundant *C. cordifera* (Tullgren) (Fig. 10) was trapped throughout the year but in larger numbers during the rainy season. A second, unidentified, species of *Drassodes* (Fig. 11) was trapped only during the two coldest months, June and July. Two small salticids, both belonging to the *Bianor-Rhene* complex were trapped in the grassland. The first (Fig. 12) was trapped in small numbers throughout the year but was most active during the warm months, while the second was trapped from August to November with peak activity in September and October (Fig. 13). Finally the linyphiid *Ceratinopsis idanrensis* Locket & Russell-Smith was trapped only in the wet season with peak activity in March (Fig. 14).

Figures 15-17 show the numbers of *Pardosa crassipalpis* taken in each trap for the hot dry, warm wet and cold dry seasons separately. Trap one was closest to the margin of the swamp and there was a gradient of soil moisture from trap one to trap ten. During the hot dry months 65% of all adults of *Pardosa crassipalpis* were caught in traps 1 to 4 at the wet end of the transect (Fig. 15). During the wet season, however, only 31% of adults were trapped in traps 1 to 4 and 56% were caught in traps 7 to 10 at the dry end



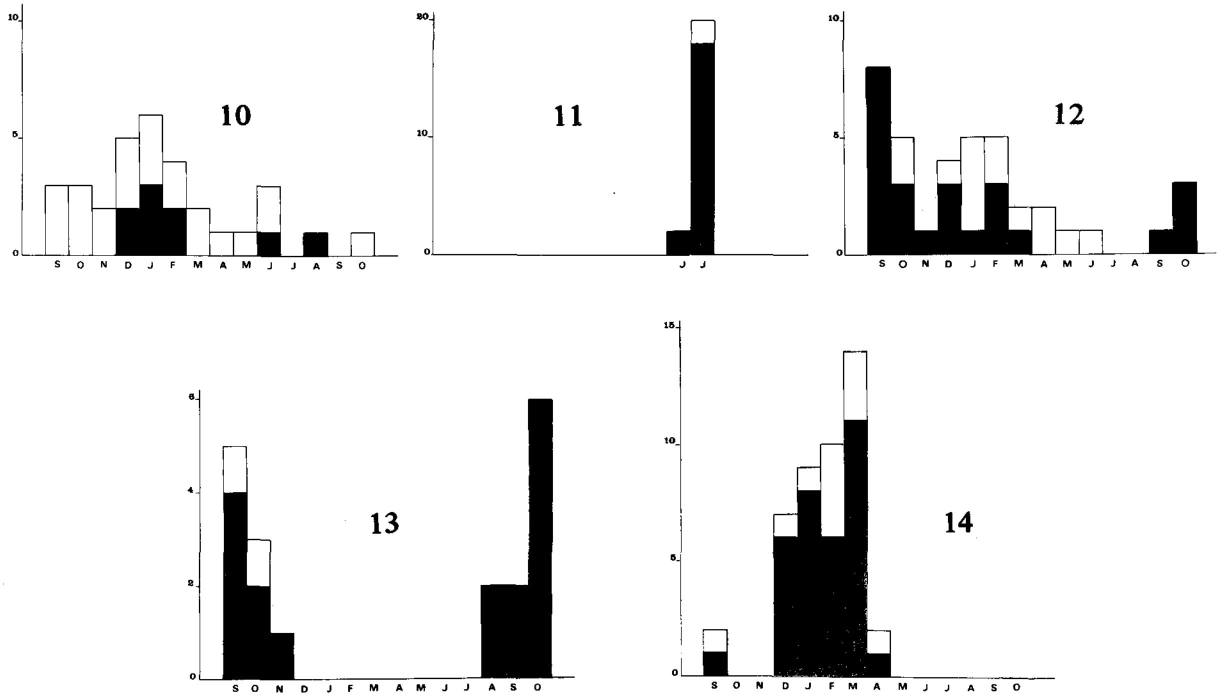
Figs. 4-9: Total numbers of individual species trapped in floodplain grassland. 4 *Pardosa crassipalpis* Purcell; 5 *Lycosa* cf *oneili* Purcell; 6 *Lycosa lawrencei* Roewer; 7 *Upognampa* cf *parvipalpa* Tucker; 8 *Drassodes bechuanicus* Tucker; 9 *Camillina lutea* Tucker. Solid columns = ♂♂, open columns = ♀♀.

of the transect (Fig. 16). In the cold dry season (April to August) insufficient adults were trapped to allow their distribution to be studied.

In Mopane woodland a total of 84 species was collected, but only six were sufficiently abundant to allow seasonal changes in activity to be observed. Among the Gnaphosidae two species of the genus *Asemesthes* were frequent in the traps (Figs. 18, 19). Both were trapped throughout the year but one had a peak of activity during the wet season while the second showed no clear activity peak. A third gnaphosid, *Camillina corrugata* (Purcell) (Fig. 20), was active between September and January. Three species of Salticidae were trapped regularly from Mopane woodland. Two belonged to the characteristically ground-active genus *Habrocestum,* one of which was active principally in November and December (Fig. 21) and the other was trapped in the period November to February with a peak at the beginning of the rains in December (Fig. 22). The third salticid, belonging to the genus *Stenaelurillus,* was active only in the cold months of April to July (Fig. 23).

Among the species from grassland as a whole, 56% of adults were active in the hot dry season and a little under half of these continued activity through either the whole or part of the rainy season. A further 30% showed adult activity confined to the wet season, but only 14% were active only in the cold winter months. In Mopane woodland 60% of all species were active in the hot dry season and a third of these continued some activity in the wet season. Twenty-eight per cent had activity confined to the wet season, 10% were active only in the cold dry season and 10% showed some activity throughout the year.

Because of the limitations of the technique and particularly of relating numbers trapped to actual densities of animals, no attempt has been made to calculate indices of diversity for the spider communities of the two habitats. Overall there was almost no



Figs. 10-14: Total numbers of individual species trapped in floodplain grassland. **10** *Camillina cordifera* (Tullgren); **11** *Drassodes* sp. B; **12** *Bianor – Rhene* sp. A; **13** *Bianor – Rhene* sp. B; **14** *Ceratinopsis idanrensis* Locket & Russell-Smith. Solid columns = ♂♂, open columns = ♀♀.

difference in the numbers of species trapped in the floodplain grassland (87) and Mopane woodland (84). However there were considerable differences in the proportions of species of different families in the two habitats (Table 1). In the floodplain grassland the families Lycosidae and Gnaphosidae each contributed about 20% of all the species trapped. Salticidae represented 28% of all species trapped in grassland in spite of their relatively low numerical representation (12% of individuals). In Mopane woodland lycosids contributed 10% and gnaphosids nearly 30% of all species trapped. Salticids represented 25% of all species in woodland, closer to the proportion of individuals trapped (17%). None of the remaining families in either habitat contributed more than 6% of all species. Three families, Pisauridae, Theridiidae and Araneidae, were found only in the grassland although the five species concerned were more likely members of the field layer fauna rather than ground-active. More significantly seven families, Dipluridae, Eresidae, Agelenidae, Sparassidae, Ammoxenidae, Zodariidae and Palpimanidae were represented only in the Mopane woodland, where they accounted for 12 species. The sparassid was probably a tree-living species but the others were all characteristic of the ground layer.

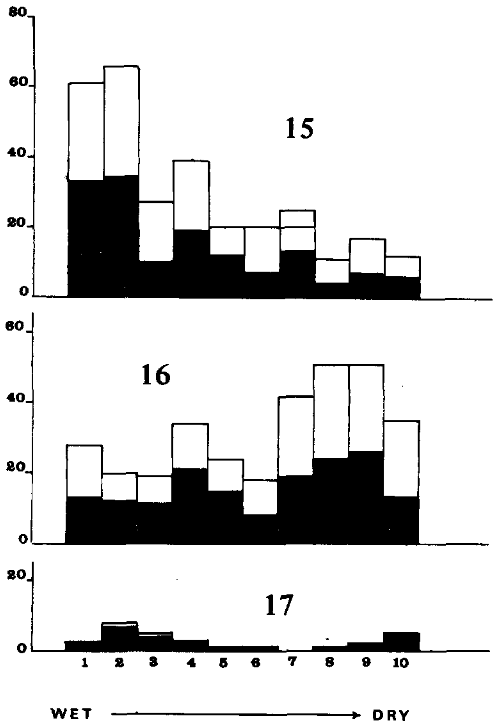
The numbers and proportions of species in the major families restricted to one or other of the two habitats are shown in Table 2. In woodland 47 species (56%) were restricted to that habitat while in the grassland 50 species (57%) were similarly restricted. More species of lycosid were restricted to the grassland than to the woodland, while the reverse applied to the gnaphosids. The spiders trapped in both habitats, together with their seasons of activity, are listed in Appendix I.

Family	Grassland		Woodland	
	No.	% of total	No.	% of total
Lycosidae	19	21.8	8	9.5
Gnaphosidae	16	18.4	25	29.8
Salticidae	24	27.6	21	25.0
Oxyopidae	5	5.7	4	4.8
Clubionidae	4	4.6	3	3.6
Pisauridae	1	1.2	–	–
Thomisidae	3	3.4	1	1.2
Scytodidae	1	1.2	1	1.2
Oonopidae	3	3.4	4	4.8
Caponiidae	1	1.2	1	1.2
Theridiidae	1	1.2	–	–
Araneidae	3	3.4	–	–
Linyphiidae	5	5.7	3	3.6
Zodariidae	–	–	4	4.8
Palpimanidae	–	–	2	2.4
Agelenidae	–	–	1	1.2
Sparassidae	–	–	2	2.4
Ammoxenidae	–	–	1	1.2
Eresidae	–	–	1	1.2
Dipluridae	–	–	1	1.2
Ctenizidae	1	1.2	1	1.2
TOTAL	87		84	

Table 1: Numbers and proportions of species in each family trapped in floodplain grassland and Mopane woodland during the course of a year.

Discussion

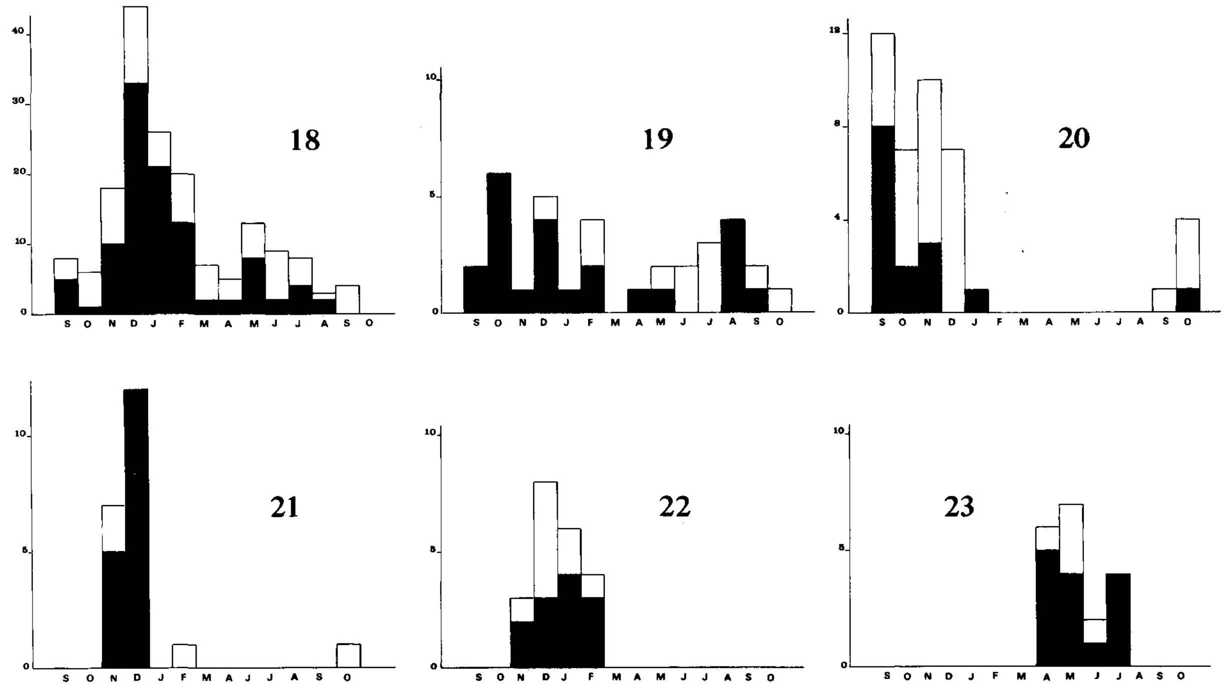
Workers in temperate regions have shown that most ground-active spiders have distinct seasonal peaks of



Figs. 15-17: Numbers of *Pardosa crassipalpis* in each trap in **15** the hot dry season, **16** the warm wet season and **17** the cold dry season. Solid columns = ♂♂, open columns = ♀♀.

adult activity. In some cases this activity has been correlated with either temperature or day-length, with thresholds above or below which little activity is observed (Pearson & White, 1964b). The results of the present study clearly show that such seasonal peaks in activity are shown by spiders in the sub-tropical climate of northern Botswana. The climatic data were taken from a site at some distance from the study area and are not adequate to establish correlations with periods of spider activity. Despite this 13 of the 17 species for which sufficient data were available had major peaks of activity during the hot months of the year (Sept.-March, temp. range 15-36°C) while only two had peaks of activity in the cold months (April-August, temp. range 6-27°C). Perhaps the most interesting feature of the results in the light of the dry climate of the region is the small proportion (2 out of 17) of species with activity confined to the rainy season and the high proportion (over half) showing substantial activity in the hottest and driest months of the year when day-time temperatures frequently exceed 40°C in the shade. These data suggest that in this area rising temperatures rather than rainfall are more important in relation to adult activity of spiders. Since day-length changes by only about one hour through the year at this latitude it is unlikely to be of major importance in relation to spider activity. The relationship between spider activity and rising temperatures may be indirect since numbers of insect prey also increased in the pitfall traps at the onset of the hot dry weather.

Some caution is needed in interpreting these results. With the exception of the lycosids *P. crassipalpis* and *L.* cf *oneili* and the gnaphosid *Asemesthes* sp. A, no species was represented by more than 100 individuals trapped in one year. Species represented by a few specimens may appear to have a more restricted period of activity than is actually the case. Despite this my field observations from hand



Figs. 18-23: Total numbers of individual species trapped in Mopane woodland. **18** *Asemesthes* sp. A; **19** *Asemesthes* sp. B; **20** *Camillina corrugata* (Purcell); **21** *Habrocestum* sp. A; **22** *Habrocestum* sp. B; **23** *Stenaelurillus* sp. C. Solid columns = ♂♂, open columns = ♀♀.

Family	Grassland Total	Grassland Restricted	Grassland %	Woodland Total	Woodland Restricted	Woodland %
Lycosidae	19	14	74	8	3	37
Gnaphosidae	16	6	37	25	15	60
Salticidae	24	16	67	21	13	62
Other families	28	14	50	30	16	53
TOTAL	87	50	57	84	47	56

Table 2: Total numbers of species in each habitat and proportion restricted to each habitat for the more abundant families.

collecting and limited quadrat sampling support the picture of activity indicated in Figs. 2-3, with higher numbers of adult spiders active during the 7 warm months. Figures 2-3 also show that there is relatively less difference in numbers active in warm and cold periods in Mopane woodland than in floodplain grassland. Whether this is due to the ameliorating effect of the tree canopy on the ground layer microclimate or to other factors is not known.

Dippenaar-Schoeman (1977) has studied the biology of *Pardosa crassipalpis* in northern Transvaal, an area climatically similar to the Okavango Delta. She found that there were considerable differences in population densities and in the proportion of adults present in each month from year to year. However during the period 1974/75 the highest proportion of adults were present in the period November to January with males most abundant in January, which agrees closely with the activity data obtained in this study.

Blandin (1971, 1972) studied the community of spiders in a savanna grassland in Ivory Coast using large quadrats of 50 and 100 m^2 surface area. Rainfall in this area was concentrated in the periods March-July and September/October with a dry season between November and February. Most species were identified only to family, and for most families peak densities (of both adults and young) were observed during the long rainy season. In the case of Thomisidae, which were identified to species, adults were normally most abundant at the beginning of the long rainy season and also in the short rainy season. In this

Woodland	No. of species	Reference	Comments
Oak/Hawthorn	39	Williams, 1962	3 large traps
Oak/Hornbeam	46	Polenec, 1974	8 traps
Beech	38	Polenec, 1964	12 traps
Beech (1st year)	37	Jocque, 1973	12 traps
Beech (2nd year)	56	Jocque, 1973	12 traps
Mixed coppice	61	Jocque, 1973	12 traps
Chestnut coppice	40	Russell-Smith & Swann, 1972	6 traps
Beech	35	Albert, 1976	30 traps
Grassland			
Brachypodium pinnatum	57	Duffey, 1962	10 traps
Festuca rubra	60	Duffey, 1962	10 traps
Nardus stricta	39	Duffey, 1963	12 traps
Festuca ovina	32	Duffey, 1963	12 traps
Agrostis/Deschampsia	57	Pearson & White, 1964a	30 traps
Anthoxanthum/Agrostis	32	Buchar, 1968	20 traps
Arrhenatherum	36	Buchar, 1968	20 traps
Deschampsia/Agrostis	35	Buchar, 1968	20 traps

Table 3: Numbers of ground-active spider species trapped during one year in various woodland and grassland sites in Europe.

climate, where seasonal temperature variations are relatively small, the onset of the rains appears to be important to the maturation of adult spiders.

Robinson *et al.* (1974) censused web-building spiders of the shrub layer of a tropical montane forest in New Guinea over the period of a year. Although exact climatic data were not available it was possible to divide the year (somewhat arbitrarily) into 6 months dry and 6 months wet season. Although in some cases there was evidence for distinct population peaks of adults during either wet or dry seasons, variations in numbers were less pronounced than in temperate climates.

No data are available for the numbers of species of spiders in different habitats in tropical or sub-tropical areas. It is of interest to compare the figures obtained here with similar data for surface-active spiders from woodlands and grasslands in temperate regions. Table 3 provides figures for total numbers of species trapped during a year in a range of European grassland and woodland sites. Some of the observed differences between sites are undoubtedly caused by differences in the numbers, dimensions and frequency of servicing of the traps used, but in both the deciduous woodland and the grassland sites total numbers trapped in a year varied between 30 and 60. The figures from Botswana are about 45% higher than the maximum from equivalent temperate habitats. It would be dangerous to generalise from such limited data but they do at least suggest that sub-tropical spider faunas are likely to be richer in species than those of equivalent temperate areas.

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Appendix I: List of adult spiders trapped from grassland (G) and woodland (W) together with the months in which they were active. * = species compared with type material.

	Habitat	Activity period
Gnaphosidae		
**Zelotes oneili* (Purcell)	G	IX
**Z. montanus* (Purcell)	W	XI, XII, IV
Z. cronwrighti (Purcell)	G	VIII
Zelotes sp.	W	VII
Upognampa cf *parvipalpa* Tucker	G	VIII-III
Upognampa sp.	W	IV, V
**Drassodes bechuanicus* Tucker	G W	VIII-III
Drassodes sp. A	G W	V, VI
Drassodes sp. B	G W	VI, VII
**Camillina corrugata* (Purcell)	G W	IX-I
**C. lutea* Tucker	G	VIII-III
**C. browni* Tucker	W	X
C. cordifera (Tullgren)	G W	I-XII
Camillina sp.	W	I
Asemesthes sp. A	G W	I-XII
Asemesthes sp. B	G W	I-XII
Asemesthes sp. C	W	V-VII
**Theuma fusca* Purcell	W	IX
Theuma sp. A	W	IX, X, IV
Theuma sp. B	W	XII
Megamyrmecion sp. A	G	IX
Megamyrmecion? sp. B	W	IV-VII
Setaphis sp.?	G	IX
Callilepsis cf *auris* Tucker	G W	X-I
Trephopoda sp.?	W	I
Echeminae sp. indet.	G W	I-XII
Zelotinae sp. indet.	G W	IX-XII
Poecilochroa group sp. indet.	W	X-IV
Gnaphosinae sp. indet.	W	II-VI
Prodidominae sp. indet.	W	IX
Echeminae sp. indet.	W	IX-XII, VI
Zodariidae		
Zodarion sp.	W	I, II
Diores sp.	W	XII
Mallinus sp.	W	II
Capheris sp.	W	IX
Clubionidae		
Castianeira sp. ?	G W	X-II
Apochinomma sp.	W	XII
Trachelinae sp. indet.	G W	IX-XII
Micariinae sp. indet.	G	IX
Gen. et sp. indet.	G	III
Lycosidae		
**Pardosa crassipalpis* Purcell	G	I-XII
**P. foveolata* Purcell	G	XII-VII
**P.* cf *clavipalpis* Purcell	W	I, II
P. lusingana Roewer?	G	IX
Pardosa sp. A	G W	X, XII
Pardosa sp. B	G	III, IV
Pardosa sp. C	G	IV
Xerolycosa sp. ? A	G W	XI-II
Xerolycosa sp. ? B	G W	XI-I
Malimbosa sp. ?	G	XII-V
**Lycosa bimaculata* Purcell	G	X-I
**L.* cf *oneili* Purcell	GW	I-XII
**L. lawrencei* Roewer	G	IX-II
Lycosa sp. sensu lato	G	XII
Lycosa sp. sensu lato	G W	IX-III
Lycosa sp. sensu lato	G	I
Lycosa sp. sensu lato	G	I
**Evippa squamulata* Simon	W	XII-II
**Amblyothele togona* Roewer	W	IV
Auloniella sp. ?	G	XII
Lycosinae sp. indet	G	XI
Lycosinae sp. indet.	G	I
Salticidae		
Heliophanus sp. A	G W	IX-I
Heliophanus sp. B	G	III
Bianor complex sp. A	G	IX-VI
Bianor complex sp. B	G	VIII-XI
Bianor sp.	G W	IX-XII
Paramodunda thyenioides Lessert	G	IX
Aelurillus sp. A	G	IX
Aelurillus sp. B	W	IV, X
Aelurillus sp. C	G	XI, I
Aelurillus sp. D	G	I, II
Aelurillus sp. E	G W	X, XII, II, IV
Phlegra cf *imperiosa* Peckham & Peckham	G	X
Phlegra sp. A	W	IX
Phlegra sp. B	G	IX
Phlegra group sp.	G W	IX, X
Plexippus sp.	W	IX
Stenaelurillus sp. A	G	IX
Stenaelurillus sp. B	W	X
Stenaelurillus sp. C	G W	IV-VIII
Pachypoessa sp. n.	G W	X, XII, II-IV
Hyllus moestus Peckham & Peckham	W	XI
H. dotatum (Peckham & Peckham)	G	II
H. brevitarsus Simon	G W	XII

H. perspicuus Peckham & Peckham	W	X, XII, I
H. natali Peckham & Peckham?	W	I
H. plexippoides Simon	G	II
Habrocestum sp. A	W	XI, XII
Habrocestum sp. B	W	XI, II
Habrocestum sp. C	W G	X, II
Partona sp.	W	XI
Thyene inflata (Gerstäcker)	W	XII
Hispo inermis (Caporiacco)	W	XII
Pellenes rufoclypeatus Peckham & Peckham	W	III
Gen. et sp. indet.	G	X
Gen. et sp. indet.	G	II
Gen. et sp. indet.	G	III
Gen. et sp. indet.	G	IV
Thomisidae		
Petricius sp.	G	IX-V
Xysticus sp. ?	G W	VIII, IX
Gen. et sp. indet.	G	X, III, V
Sparassidae		
Micrommata sp. ?	W	X, XI
Palystes sp.	W	XII
Ammoxenidae		
Ammoxenus psammodromus Simon	W	I, II
Palpimanidae		
Diaphorocellus sp.	W	X, XII
Palpimanus sp.	W	X
Agelenidae		
Agelena sp.	W	IX, X
Oxyopidae		
Oxyopes sp. A	G	IX-III
Oxyopes sp. B	G W	IX-XI
Oxyopes sp. C	G W	X-II
Oxyopes sp. D	G W	I, II
Oxyopes sp. E	G W	II-IV, X
Pisauridae		
Gen. et sp. indet.	G	V
Araneidae		
Singa sp. ?	G	X-IV
Araneus sp. sensu lato	G	VI
Gen. et sp. indet.	G	IX, IV
Theridiidae		
Coscinidia sp. ?	G	XII
Linyphiidae		
**Ceratinopsis idanrensis* Locket & Russell-Smith	G	IX-IV
Gen. et sp. indet.	G W	IV
Gen. et sp. indet.	W	I-III
**Metaleptyphantes perexiguus* (Simon & Fage)	G W	I, II
Gen. et sp. indet.	G	IV
Gen. et sp. indet.	G	IV
Caponiidae		
Caponia natalensis (Cambr.)	G W	XI-II
Oonopidae		
Gamasomorpha sp.	G W	IX, X
Dysderina sp.	G W	I-XII
Gamasomorpha sp.	G	X
Scaphiella sp. ?	W	IV-XI
Orchestina sp. ?	W	XII
Scytodidae		
Scytodes sp.	G W	XII, V, VIII, IX
Eresidae		
Dresserus sp.	W	XII, VI
Ctenizidae		
Gen. et sp. indet.	G W	IX, XI, I
Dipluridae		
Thelechoris karschi Bös. & Lenz	W	X, XI