COMPARISON OF GROUND-SURFACE SPIDER POPULATIONS IN PINYON-JUNIPER AND ARID-GRASSLAND ASSOCIATIONS IN SOUTHWESTERN NEW MEXICO[1,2]

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ABSTRACT

This comparison of ground-surface spider populations in pinyon-juniper and arid-grassland plant associations in southwestern New Mexico was based on a 20-month study and 40 accumulated can trap samples from 10 traps in each of 4 sample areas. Although the spider communities were essentially equal in size in the 2 associations, that in the pinyon-juniper was composed of a greater number of families, genera, and species than that in the arid-grassland. Gnaphosidae, Lycosidae, and Pholcidae dominated the pinyon-juniper, whereas Pholcidae and Gnaphosidae dominated the arid grassland. Thomisidae and Clubionidae were influent in the pinyon-juniper, but Theridiidae were distinctly influent in the arid-grassland. *Psilochorus imitatus* Gertsch and Mulaik, *Zelotes tuobus* Chamberlin, and *Schizocosa* n. sp. (nr. *avida* Walckenaer) were the dominant species in the pinyon-juniper, and *P. imitatus*, *Psilochorus utahensis* Chamberlin, and *Drassyllus mumai* Gertsch and Reichert were the dominants in the arid-grassland. Influent species varied in both incidence and density between the 2 plant associations and among the 4 sample areas, indicating restriction of certain species to 1 association, invasion of associations by certain species, and variation in spider populations of concrete plant communities within the abstract plant community.

This paper is concerned with ground-surface spider populations from 2 different plant associations that occupy 2 different altitudes in southwestern New Mexico. Only the aspects of population size and structure as expressed by species incidence and density, emphasized by Barnes (1953), are presented here. Adult activity is covered in another paper by Muma (in press).

Several publications have compared spider populations of similar or different plant communities or associations within certain geographic areas or ecosystems. These include Barnes (1953), Duffey (1962), Kajak (1960, 1962, 1971), Kajak et al. (1971), Lowrie (1942), Muma (1973, 1975a), Whitcomb et al. (1963) and Williams (1962). Most of these studies also have compared the spider populations of different strata within the associations. Only Whitcomb et al. (1963), Peck and Whitcomb (1978), Muma (1973, 1975a) have concentrated on the ground stratum or ground-surface spider populations. This concentration of effort should be particularly productive in xeric or arid-land plant communities, since few studies have been conducted on this stratum under such conditions. Fautin (1946) studied the ground

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stratum in a sagebrush desert. Chew (1961) excluded both the ground and herb strata from his study of spider ecology in a desert shrub community dominated by creosote bush, *Larrea tridentata* (D. C.) Coville, stating that he "felt that the spiders of these strata (subterranean, ground, and herb) are quantitatively much less important than those of the shrubs." Muma (1975a) investigated ground-surface arachnid populations in the Tularosa Basin of New Mexico and found that spider populations were significant and much larger than those of scorpions or solpugids, even during the vernal season.

Methods

Although Barnes' (1953) theory and Barnes and Barnes' (1955) findings concerning the stability of spider populations in a concrete, plant community (1 specific association) and the abstract plant community (all basically similar associations in an area) were accepted, 2 study areas were established in each plant association to test the thesis under arid-land conditions.

The study areas or plots were located near Silver City, NM, and in the Burro Mountains for the pinyon-juniper association, and near Hurley and Lordsburg, NM, for the arid-grassland association. They were the same as those utilized by Muma (1974) for analyzing solpugid populations, so critical data on plot location, elevation, soil, and plants can be obtained from that publication.

Killing-preserving can traps (see Muma 1970, 1975b) were the only specimen collection devices used. Ten traps were set in each study area on 1 April 1972, 5 in a north-south transect at about 10 m intervals and 5 in an east-west transect at similar intervals. Traps were visited every 2 weeks from 1 April 1972 to 1 December 1973, specimens were screened from the killing-preserving medium (1 part 70% isopropyl alcohol and 1 part commericial ethylene glycol), the medium was reconsitituted with a 3:1 mixture of alcohol and glycol, and traps were reset.

Spiders were sorted, identified, and counted in the laboratory. Although some spider genera and species are identifiable as immatures, many are not; so immatures, unless distinctive, were identified only to family. Species of certain genera, such as *Meioneta* of the Linyphiidae and *Micaria* of the Gnaphosidae, were not identified owing to a lack of adequate generic reviews. Dr. Willis J. Gertsch of Portal, AZ, identified or confirmed the identifications of most of the species recognized.

Luczak's (1960) terms *dominant, influent,* and *accessory* are recognized respectively for those species that were strikingly abundant, those that were regularly collected, and those that were rare, respectively.

Since Muma (1975b) has indicated that 30 traps per study area are required for precision limits within 30% of the mean ($\bar{x}$) number of specimens per trap, only those families or species with populations differing by 50% or more of their means are considered significantly different here.

Results

Quantitative data obtained during the study are presented for all species in the "List of ground-surface spiders collected in can traps in southwestern New Mexico during 1972 and 1973" (Table 1). Apparent population dif-

TABLE 1. LIST OF GROUND-SURFACE SPIDERS COLLECTED IN CAN TRAPS IN SOUTHWESTERN NEW MEXICO DURING 1972 AND 1973.

PINYON-JUNIPER ASSOCIATION—104 species, 59 genera, 17 families; B = Burro Mts., S = Silver City

Mygalomorphae
Theraphosidae—1 immature (B)
Araneomorphae
Oonopidae—no immatures
Orchestina moaba Chamberlin & Ivie—1 ♀ (S)
Pholcidae—72 immatures (S), 98 immatures (B)
Psilochorus imitatus Gertsch & Mulkaik—many ♂ and ♀ (BS)
Psysocyclus enaulus Crosby—1 ♂, 1 ♀ (B)
Mimetidae—no immatures
Mimetus hesperus Chamberlin—1 ♂ (B)
Theridiidae—13 immatures (D), 12 immatures (B)
Dipoena malkini Levi—1 ♂ (B)
Enoplognatha joshua Chamberlin & Ivie—1 ♂ (B)
Euryopis scriptipes Banks—7 ♀ (BS)
Euryopis spinigera O. P. Cambridge—11 ♂, 23 ♀ (B)
Latrodectus hesperus Chamberlin & Ivie—1 ♀ (S)
Steatoda medialis Banks—1 ♂, 1 ♀ (S)
Steatoda punctulata Bangs—1 ♂, 2 ♀ (B)
Theridion goodnightorum Levi—1 ♂ (B)
Linyphiidae—6 immatures (B)
Cochlembolus sp.—1 ♂, 1 ♀ (S)
Eperigone eschatologica Bishop & Crosby—1 ♀ (S)
Eridantes sp.—18 ♂, 10 ♀ (B)
Erigone autumnalis Emerton—1 ♂ (B)
Erigone sp.—3 ♂, 4 ♀ (BS)
Meioneta spp.—24 ♂, 10 ♀ (BS) (4 sp.)
Tennesseellum formicum (Emerton)—2 ♂, 9 ♀ (BS)
Araneidae—no immatures
Metallina sp.—1 ♀ (S)
Tetragnathidae—1 immature (S)
Dictynidae—6 immatures (B), 7 immatures (L)
Dictyna calcarata Banks—1 ♂, 4 ♀ (B)
Dictyna cholla Chamberlin & Gertsch—1 ♂, 2 ♀ (BS)
Dictyna oasa Ivie—4 ♂, 2 ♀ (BS)
Dictyna personata Gertsch & Mulaik—8 ♂, 6 ♀ (BS)
Dictyna reticulata Gertsch & Ivie—1 ♂, 2 ♀ (S)
Tricholathys n. sp.—3 ♂, 2 ♀ (S)
Agelenidae—4 immatures (S)
Agelenopsis longistylus (Banks)—6 ♂, 2 ♀ (BS)
Cicurina anderis Chamberlin—15 ♂, 1 ♀ (B)
Cicurina varians Gertsch & Mulaik—8 ♂, 9 ♀ (BS)
Hololena holo Chamberlin & Gertsch—1 ♂ (B)
Hahniidae—no immatures
Hahnia sanjuanensis Exline—1 ♀ (B)
Anyphaenidae—3 immatures (S), 16 immatures (B)
Anyphaena coloradensis Banks—1 ♂, 1 ♀ (S)
Anyphaena n. sp.—1 ♀ (B)
Clubionidae—9 immatures (S), 10 immatures (B)
Castianeira dorsata Banks—3 ♂ (BS)
Castianeira variata Gertsch—4 ♂, 4 ♀ (BS)
Corinna bicalcarata Simon—3 ♂, 3 ♀ (BS)
Piabuna n. sp.—3 ♂, 1 ♀ (BS)
Phrurotimpus alatus Ivie & Barrows—1 ♀ (S)
Phrurotimpus mormon Chamberlin & Gertsch—3 ♂, 19 ♀ (BS)
Scotinella schwarzi (Gertsch)—25 ♂, 25 ♀ (BS)
Scotinella n. sp. (nr. *fratrella* Gertsch)—1 ♂, 2 ♀ (B)
Scotinella fratrella (Gertsch)—1 ♂ (S)
Gnaphosidae—95 immatures (S),

TABLE 1. CONTINUED

277 immatures (S)
Callilepis chisos Platnick—6 ♂ (B)
Callilepis eremella Chamberlin—5 ♂, 5 ♀ (B)
Callilepis mumae Platnick—1 ♂ (B)
Cesonia sp. (poss. new, *classica* group)—1 ♀ (B)
Drassodes celes Chamberlin—1 ♀ (S)
Drassodes gosiutus Chamberlin—1 ♀ (S)
Drassodes robinsoni Chamberlin—4 ♂, 6 ♀ (BS)
Drassyllus mephisto Chamberlin—5 ♂, 9 ♀ (S)
Drassyllus mormon Chamberlin—15 ♂, 17 ♀ (BS)
Drassyllus mumai Gertsch and Reichert—2 ♂ (S)
Gnaphosa sericata (L. Koch)—46 ♂, 9 ♀ (BS)
Haplodrassus chamberlini Platnick and Shadab—23 ♂, 7 ♀ (BS)
Herpyllus propinquus Keyserling—24 ♂, 14 ♀ (BS)
Herpyllus hesperolus Chamberlin—14 ♂, 7 ♀ (BS)
Herpyllus sp. (poss. new)—2 ♂, 5 ♀ (B)
Poecilochroa panana Chamberlin—2 ♀ (S)
Micaria spp.—36 ♂, 24 ♀ (BS) (5 sp.)
Zelotes tuobus Chamberlin—many ♂, ♀ and immatures (BS)
Zelotes n. sp. (large)—17 ♂, 19 ♀ (BS)

Lycosidae—88 immatures (S), 144 immatures (B)
Arctosa sp.—1 ♂ (S)
Geolycosa raphaelana Chamberlin—1 ♂, 2 ♀ (BS)
Hesperocosa unica (Gertsch & Wallace)—11 ♂, 2 ♀ (BS)
Lycosa coloradensis Banks—3 ♂ (S)
Lycosa gosuita Chamberlin—1 ♀ (B)
Lycosa sp. (nr. *antelucana* Mont.)—3 ♂, 3 ♀ (BS)
Lycosa n. sp. (nr. *coloradensis* Banks)—6 ♂ (BS)
Lycosa n. sp.—76 ♂, 2 ♀ (BS)
Pardosa sternalis (Thorell)—2 ♂, 1 ♀ (S)
Pardosa sp. (*lapidicina* group)—4 ♂, 1 ♀ (S)
Pardosa sp. (large)—2 ♀ (S)
Schizocosa mimula Gertsch—41 ♂, 3 ♀ (BS)
Schizocosa sp.—2 ♂, 1 ♀ (B)
Schizocosa n. sp. (nr. *avida* Walckenaer)—many ♂, ♀, and immatures (BS)
Tarentula kochi Keyserling—19 ♂, 1 ♀ (BS)

Thomisidae—33 immatures (S), 20 immatures (B)
Apollophanes margareta (Lowrie & Gertsch)—7 ♂, 1 ♀ (BS)
Apollophanes texana (Banks)—9 ♂, 16 ♀ (BS)
Ebo pepinensis Gertsch—1 ♀ (B)
Misumenops coloradensis (Banks)—1 ♀ (B)
Thanatus coloradensis Keyserling—2 ♀ (S)
Tmarus angulatus Walckenaer—1 ♀ (B)
Xysticus apachecus Gertsch—2 ♂, 1 ♀ (B)
Xysticus aprilinus Bryant—3 ♂ (B, S)
Xysticus cunctator (Thorell)—55 ♂, 22 ♀ (B, S)
Xysticus lassanus Chamberlin—13 ♂, 7 ♀ (B, S)
Xysticus locuples Keyserling—2 ♂ (S)
Xysticus paiutus Gertsch—2 ♂, 1 ♀ (S)

Salticidae—16 immatures (S), 29 immatures (B)
Maevia poultoni Peck—2 ♂, 2 ♀ (B)
Metaphidippus n. sp.—3 ♂, 6 ♀ (B)
Metacyrba taeniola (Hentz)—1 ♂ (B)
Pellenes sp. (nr. *wrighti* Lowrie & Gertsch)—1 ♀ (S)
Pellenes sp.—1 ♀ (B)
Phidippus johnsoni Peckham—1 ♀ (S)
Phidippus reederi Gertsch and Reichert—5 ♂ (S)
Sitticus juniperi Gertsch & Reichert—1 ♂ (S)

TABLE 1. CONTINUED

ARID-GRASSLAND ASSOCIATION—67 species, 41 genera, 15 families; H = Hurley, L = Lordsburg.

Mygalomorphae
- Ctenizidae—immatures (H)
- Theraphosidae—immatures (H), 3 immatures (L)
  - *Dugesiella* sp.—2 ♀ (HL)

Araneomorphae
- Filistatidae—1 immature (H), 4 immatures (L)
  - *Filistata arizonica* Chamberlin & Ivie—2 ♂, 1 ♀ (L)
- Pholcidae—299 immatures (H), 472 immatures (L)
  - *Psilochorus imitatus* Gertsch & Mulaik—many ♂, ♀ (H)
  - *Psilochorus utahensis* Chamberlin—many ♂, ♀ (L)
  - *Physocyclus enaulus* Crosby—2 ♀ (L)
- Theridiidae—95 immatures (H), 71 immatures (L)
  - *Euryopis texanus* Banks—3 ♂, 3 ♀ (HL)
  - *Latrodectus hesperus* Chamberlin & Ivie— 26 ♂, 20 ♀ (HL)
  - *Steatoda fulva* Keyserling—9 ♂, 7 ♀ (HL)
  - *Steatoda americana* (Emerton)—2 ♂ (L)
- Linyphiidae—1 immature (H), 3 immatures (L)
  - *Eridantes* sp.—26 ♂, 10 ♀ (HL)
  - *Meioneta* spp.—5 ♂, 2 ♀ (HL)
  - *Tennesseellum formicum* (Emerton)—1 ♂, 2 ♀ (HL)
- Dictynidae—5 immatures (L)
  - *Dictyna cornupeta* Bishop and Ruderman—6 ♂ (HL)
  - *Dictyna oasa* Ivie—2 ♂ (L)
  - *Dictyna personata* Gertsch & Mulaik—7 ♂ (H)
  - *Dictyna* sp. (nr. *terranea* Ivie)—1 ♂, 1 ♀ (H)
- Amaurobiidae—no immatures
  - *Titanoeca* sp.—1 ♂ (H)
- Agelenidae—no immatures
  - *Cicurina anderis* Chamberlin—1 ♀ (H)
  - *Cicurina varians* Gertsch & Mulaik—4 ♂, 3 ♀ (HL)
- Clubionidae—4 immatures (H), 12 immatures (L)
  - *Castianeira dorsata* Banks—28 ♂, 12 ♀ (HL)
  - *Corinna bicalcarata* Simon—6 ♂, 1 ♀ (HL)
  - *Piabuna* n. sp.—7 ♂, 2 ♀ (HL)
  - *Phrurotimpus alata* Ivie and Barrows—1 ♀ (H)
  - *Scotinella schwarzi* (Gertsch)—1 ♀ (L)
- Gnaphosidae—231 immatures (H), 205 immatures (L)
  - *Cesonia sincera* Gertsch & Mulaik—3 ♂, 2 ♀ (HL)
  - *Drassodes gosiutus* Chamberlin—3 ♂ (H, L)
  - *Drassodes robinsoni* Chamberlin—4 ♂ (H, L)
  - *Drassyllus lamprus* Chamberlin—1 ♀ (H)
  - *Drassyllus mephisto* Chamberlin—1 ♀ (H)
  - *Drassyllus mormon* Chamberlin—1 ♂ (H)
  - *Drassyllus mumai* Gertsch & Reichert (pale)—112 ♂, 78 ♀ (H, L)
  - *Gnaphosa clara* (Keyserling)—1 ♀ (H)
  - *Haplodrassus chamberlini* Platnick & Shadab—6 ♂, 3 ♀ (HL)
  - *Herpyllus propinquus* Keyserling—12 ♂, 2 ♀ (HL)
  - *Herpyllus hesperolus* Chamberlin—7 ♂, 1 ♀ (L)
  - *Herpyllus schwarzi* Banks—1 ♀ (L)
  - *Herpyllus* sp. (poss. new)—1 ♀ (L)
  - *Micaria* spp.—172 ♂, 182 ♀ (H, L) (3 sp.)
  - *Neanographis pearcei* Gertsch—7 ♂, 2 ♀ (H, L)
  - *Nodocion arizonicus* Chamberlin—6 ♀ (H, L)
  - *Nodocion utus* Chamberlin—6 ♀ (H, L)
  - *Syspira eclectica* Chamberlin—31 ♂, 18 ♀ (L)
  - *Zelotes tuobus* Chamberlin—31 ♂, 18 ♀ (H, L)
  - *Zelotes* n. sp. (large)—7 ♂, 13 ♀ (H, L)
- Lycosidae—35 immatures (H), 9 immatures (L)
  - *Geolycosa raphaelana* Chamber-

TABLE 1. CONTINUED

lin—9 ♂, 1 ♀ (H)
Lycosa coloradensis Banks—69 ♂, 17 ♀ (H, L)
Lycosa n. sp. (nr. *coloradensis* Banks)—17 ♂, 1 ♀ (H, L)
Pardosa sternalis (Thorell)—3 ♀ (H, L)
Schizocosa mimula Gertsch—7 ♂, 2 ♀ (L)
Schizocosa parallela Banks—1 ♂, 2 ♀ (L)
Tarentula kochi Keyserling—2 ♂ (H)
Oxyopidae—1 immature (H)
Oxyopes apollo Brady—1 ♀ (L)
Thomisidae—6 immatures (H), 18 immatures (L)
Apollophanes margareta (Lowrie & Gertsch—5 ♀ (L)
Apollophanes texanus (Banks)—7 ♂ (L)
Xysticus cunctator (Thorell)—2 ♂ (H, L)
Xysticus lassanus Chamberlin—43 ♂, 12 ♀ (H, L)
Salticidae—18 immatures (H), 6 immatures (L)
Metaphidippus unicus Chamberlin & Gertsch—5 ♂, 1 ♀ (H)
Metaphidippus n. sp.—5 ♂, 8 ♀ (H, L)
Pellenes arizonensis Banks—2 ♀ (H, L)
Pellenes n. sp.—1 ♀ (L)
Sitticus juniperi Gertsch & Reichert—1 ♂, 1 ♀ (H)

ferences between the List and Tables 2 and 3 are the result of excluding December 1972 and January, February, and March 1973 data from the comparative data in the tables.

Pertinent quantitative data on dominant and influent families, including both immatures and adults, are presented in Table 2 and those on dominant and influent species, including only adults, in Table 3. Sampling was continuous for 20 months, but only the data from April through November are included in the tables so as to present uniform, comparative, quantitative data for both years.

DISCUSSION AND CONCLUSIONS

The most obvious conclusion to be drawn from the presented data is that the ground-surface spider community in the pinyon-juniper plant association was represented by a greater number of families, genera, and species than that of the arid-grassland (See List). This was expected because of the known greater annual rainfall and probable greater number of available niches in the mountains and foothills. However, a greater number of individuals was collected in the arid-grasslands (Table 2).

Special note should be taken of the fact that soil surface, web-building Pholcidae and Theridiidae were the most abundant family dominant and influent, respectively, in the arid-grasslands (Table 2). In the pinyon-juniper association, Gnaphosidae and Thomisidae were the most abundant family dominant and influent, respectively. Muma (1975a) also noted that Pholcidae, specifically *Psilochorus imitatus* Gertsch and Mulaik, were far more abundant than either the gnaphosids or lycosids, outside of the White Sands (gypsum) ecosystem, on the over-grazed grasslands of the Tularosa Basin in south-central New Mexico.

Population differences in incidence and density of species are reflected in the greater number of dominant and influent species in the pinyon-juniper association (Table 3). However, it should be noted that although the spider populations of the pinyon-juniper and arid-grassland associations were

TABLE 2. DOMINANT AND INFLUENT FAMILIES OF GROUND-SURFACE SPIDER COLLECTED BY CAN TRAPS IN PINYON-JUNIPER AND ARID-GRASSLAND PLANT ASSOCIATIONS IN SOUTHWESTERN NEW MEXICO BETWEEN MARCH AND DECEMBER OF 1972 AND 1973.

		Total no. spm. collected in 10 traps				$\bar{x} \pm 50\% \; \bar{x}$			
		Pinyon-juniper		Arid-grassland		Pinyon-juniper		Arid-grassland	
Spider families		Silver City	Burro Mts.	Hurley	Lordsburg	Silver City	Burro Mts.	Hurley	Lordsburg
DOMINANTS									
Pholcidae	Imm.	72	98	299	472	23.4±11.7	26.0±13.0	76.9±32.5	71.2±35.6
	Adults	161	161	470	241				
Gnaphosidae	Imm.	95	277	231	205	28.4±14.2	53.2±26.6	57.0±28.5	43.8±21.9
	Adults	189	255	339	233				
Lycosidae	Imm.	88	144	34	11	30.0±15.0	20.0±10.0	13.2±6.6	4.4±2.2
	Adults	211	156	98	33				
INFLUENTS									
Theridiidae	Imm.	13	12	95	71	2.1±1.1	5.2±2.6	13.7±6.9	10.2±5.1
	Adults	8	40	42	31				
Linyphiidae	Imm.		6	1	3	4.3±2.2	4.6±2.3	1.0±0.5	3.4±1.7
	Adults	43	40	9	31				
Dictynidae	Imm.	7	6		5	1.6±0.8	1.6±0.8	0.8±0.4	1.4±0.7
	Adults	8	10	7	8				
Clubionidae	Imm.	9	10	4	12	3.9±2.0	7.4±3.7	4.3±2.2	3.0±1.5
	Adults	30	64	39	19				
Thomisidae	Imm.	33	30	6	18	8.2±4.1	8.0±4.0	2.4±1.2	6.2±3.1
	Adults	48	49	7	43				
Salticidae	Imm.	16	29	21	21	2.2±1.1	4.0±2.0	4.0±2.0	2.8±1.4
	Adults	6	11	18	6				
	Totals	1041	1316	1724	1462	104.1±52.1	130.0±65.0	173.3±86.7	146.4±73.2

TABLE 3. Dominant and influent species of spiders collected by can traps in pinyon-juniper and arid-grassland plant associations in southwestern New Mexico between March and December in 1972 and 1973.

Spider species	Total no. spm. collected in 10 traps				$\bar{x} \pm 50\% \bar{x}$			
	Pinyon-juniper		Arid-grassland		Pinyon-juniper		Arid-grassland	
	Silver City	Burro Mts.	Hurley	Lordsburg	Silver City	Burro Mts.	Hurley	Lordsburg
Dominants								
Psilochorus imitatus Gertsch & Mulaik	161	161	470	—	16.1±8.1	16.1±8.1	47.0±23.5	—
Psilochorus utahensis Chamberlin	—	—	—	241	—	—	—	24.1±12.1
Drassyllus mumai Gertsch & Reichert	2	—	95	96	0.2±0.1	—	9.6±4.8	9.6±4.8
Zelotes tuobus Chamberlin	113	152	—	—	11.3±5.7	15.2±7.6	—	—
Schizocosa n. sp. (nr. *avida* Walckenaer)	126	56	—	—	12.6±6.3	5.6±2.8	—	—
Influents								
Euryopis spinigerus (O. P. Chamberlin)	—	34	—	—	—	3.4±1.7	—	—
Latrodectus hesperus Chamberlin & Ivie	1	—	32	14	0.1±0.05	—	3.2±1.6	1.4±0.7
Eridantes sp. (undet.)	—	28	6	25	—	2.8±1.4	0.6±0.3	2.5±1.3
Scotinella schwarzi (Gertsch)	12	34	—	1	1.2±0.6	3.4±1.7	—	0.1±0.05
Drassyllus mormon Chamberlin	15	17	1	—	1.5±0.8	1.7±0.9	0.1±0.05	—
Gnaphosa sericata (L. Koch)	12	43	—	—	1.2±0.6	4.3±2.2	—	—

TABLE 3. CONTINUED

Spider species	Total no. spm. collected in 10 traps				$\bar{x} \pm 50\% \bar{x}$			
	Pinyon-juniper		Arid-grassland		Pinyon-juniper		Arid-grassland	
	Silver City	Burro Mts.	Hurley	Lordsburg	Silver City	Murro Mts.	Hurley	Lordsburg
Haplodrassus chamberlini Platnick & Shadab	16	14	7	2	1.6±0.8	1.4±0.7	0.7±0.4	0.2±0.1
Herpyllus propinquus Keyserling	4	34	1	13	0.4±0.2	3.4±1.7	0.1±0.05	1.3±0.7
Zelotes tuobus Chamberlin	—	—	33	11	—	—	3.8±1.9	1.1±0.6
Zelotes n. sp. (large)	29	7	11	9	2.9±1.5	0.7±0.4	1.1±0.6	0.9±0.5
Lycosa coloradensis Banks	3	—	60	26	0.3±0.2	—	6.0±3.0	2.6±1.3
Lycosa n. sp.	16	62	—	—	1.6±0.8	6.2±3.1	—	—
Schizocosa mimula Gertsch	37	7	7	—	3.7±1.9	0.7±0.4	0.7±0.4	—
Apollophanes texanus Banks	10	15	—	7	1.0±0.50	1.5±0.75	—	0.7±0.35
Xysticus cunctator (Thorell)	9	8	—	2	0.9±0.5	0.8±0.4	—	0.2±0.1
Xysticus lassanus Chamberlin	4	4	—	33	0.4±0.2	0.4±0.2	—	3.3±1.7

distinctive, 2 dominant and 2 influent species were common to both associations, and the associational communities were essentially equal in size. Further, the 2 plots within each plant association varied from each other in both incidence and density of several influents. This seems to indicate that Barnes and Barnes' (1955) findings concerning the stability of spider populations in the concrete and abstract plant community do not apply to ground-surface forms in arid-land plant communities.

Lack of significant difference in total community levels between the 2 plant associations might have been the result of sampling inadequacy but also possibly was real. There is no reason to believe that spider species, well adapted to arid-land conditions, would not achieve population levels capable of utilizing most of the available microhabitats and adequately filling most of the available niches.

Differences between plot populations in essentially the same plant association are not so easily explained. For instance, there is no known explanation for the exclusive dominance of *P. imitatus* over other species of *Psilochorus* on the Hurley plot and its complete replacement by *Psilochorus utahensis* Chamberlin on the Lordsburg plot. Dr. W. J. Gertsch, in private conversation, has informed me that the 2 species apparently are sympatric in the San Simon Valley of southeastern Arizona and that the range of *P. imitatus* extends upward into the Chiricahua Mountains and westward into southern Utah. Further, I have individual collection records by Dr. D. M. Dennis of *P. rockefelleri* Gertsch from Pinos Altos, NM, at 7,000 ft (2135 m) elevation so the same lack of explanation applies to the exclusive dominance of *imitatus* on both of the pinyon-juniper plots.

There is a similar lack of explanation for the significant population of the theridiid influent *Euryopis spinigera* (O. P. Cambridge), on the Burro Mountain plot and its complete absence from the Silver City plot. The same is true for the linyphiid influent, *Eridantes* sp., in the pinyon-juniper association, and to a certain extent, the thomisid influent, *Xysticus lassanus* Chamberlin, in the arid-grassland association.

Similarities between plot populations in essentially the same plant association also need some explanation. Populations of gnaphosid dominants were so remarkably uniform between plots that there is little need for explanation. However, it should be pointed out that *Drassyllus mumai* Gertsch and Reichert was strongly restricted to the arid-grassland, whereas *Zelotes tuobus* Chamberlin was a pinyon-juniper dominant that can and does invade and live in the arid-grassland as an influent. In the latter association, there were indications that *Z. tuobus* may mature earlier (Muma in press).

Among the dominant family Lycosidae, only 1 species, *Schizocosa* n. sp. (near *avida* Walck.), was dominant, and it was strongly restricted to the pinyon-juniper association. This is reflected in the family data in Table 2, wherein the larger, immature, pinyon-juniper population unquestionably consisted largely of immatures of this species. On the other hand, the smaller, immature, arid-grassland population shown in that table must have been composed of immature influent and accessory species.

The population figures for the most significant arid-grassland influent, *Latrodectus hesperus* Chamberlin and Ivie, given in Table 3, become much more meaningful if it is pointed out that 81.0 to 89.0% of the immature, grassland Theridiidae in Table 2 also represented that species. Further, invasion of the pinyon-juniper association by the species was made more apparent by the fact that the same was true for 4.8 to 5.7% of the immature, pinyon-juniper Theridiidae in Table 2. The immatures of other influent species are not as readily segregated, but it seems reasonable to assume that all of the specific influent data would have been more meaningful and possibly more uniform if the percentage of specific immatures could have been calculated.

Although the factor of a shortened spring sampling period, mentioned in the results, may have influenced the level of the spring adult activity of *X. cunctator* and *X. lassanus* as reported by Muma (in press), it would not have materially altered the relative densities of these 2 species as recorded here.

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HOST PLANT PREFERENCE OF THE WHITEFLY, *ALEURODICUS DISPERSUS* RUSSELL[1,2]

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ABSTRACT

Ovipositional preference and survival of the whitefly, *Aleurodicus dispersus* Russell, was measured on 7 economically important species of host plants growing in southern Florida. A survey also measured frequency and abundance of *A. dispersus* infestation under field conditions. Ovipositional preference was significantly correlated (0.96) with survivorship. The overall field infestation was light in that although 35.3% of the trees sampled were infested, only a mean 1% of the leaves per infested tree had live *A. dispersus* present.

The whitefly, *Aleurodicus dispersus* Russell, was recently described (Russell 1965) and found to occur abundantly on many economically important host plants in Florida. Its spread on mainland Florida is of concern since it is a suspect vector of the coconut palm disease, lethal yellowing (Weems 1971). Cherry (1979) showed that range expansion of *A. dispersus* northward in Florida is limited by winter cold temperatures.

Although *A. dispersus* is highly polyphagous and has been recorded from 38 genera and 27 plant families (Weems 1971), little data exists on host plant preference and suitability of plants to support the insect's development. To evaluate the importance of various host plants of *A. dispersus*, data are needed on the attractiveness of plants to ovipositing females, survivorship of immatures on the plants, and frequency of host plant infestation throughout the pest's range. This information was determined for 7 species of economically important plants occurring in southern Florida.

MATERIALS AND METHODS

OVIPOSITION AND SURVIVAL: Seven economically important species of plants (Table 1) commonly found growing in southern Florida were selected from Weem's (1971) list. Potted plants without *A. dispersus* and ca. 2 m high

[1]Homoptera: Aleyrodidae.

[2]Florida Agricultural Experiment Station Journal Series No. 1952. Mention of a product name does not imply endorsement by the University of Florida.

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