

PITFALL COLLECTED INSECTS FROM VARIOUS LOWER RIO GRANDE
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ABSTRACT

Pitfall collections of arthropods were conducted for approximately 12 months in 11 primary Lower Rio Grande Valley habitats. Insect spp. diversity generally increased as plant spp. diversity increased. Species caught were identified and then listed corresponding to their seasonal habitats. This procedure helps define the Valley ecosystem and records species for future comparisons should the ecosystem undergo change.

INTRODUCTION

The Lower Rio Grande Valley, an extensively farmed area of 1.1 million ha, cultivates approximately 324,000 ha of cotton and grain sorghum annually. Vegetable crops are grown on about 27,000 ha during the winter months following other crops. Citrus (30,000 ha), sugarcane (15,000 ha), unimproved pastures (289,000 ha) and improved pasture (36,000 ha) comprise a further segment of Valley agriculture. Due to this extensive farming; drainage ditches, roadsides and other wasteland (about 26,000 ha) are undoubtedly important to maintenance of insect fauna. The diversity of animal species numbers has been shown to increase as plant species diversity increases within a habitat (MacArthur and MacArthur 1961, Miller 1967 and Price 1975).

Studies of above ground arthropod habitats have been conducted throughout the Valley in recent years to help define the ecosystem (Schuster and Dean 1957, Schuster et al. 1969, Schuster and Boling 1974, Fuchs and Harding 1976, Harding 1976, Harding and Dupnik 1976 and Harding et al. 1976). However, none of these studies specifically identified ground inhabiting arthropods. Therefore, pitfall trap studies of primary Valley habitats were begun in Dec., 1975.

Several recent arthropod studies have utilized pitfall traps as sampling tools. Thomas and Sleeper (1977) studied tenebrionid abundance in a desert habitat while Esau and Peters (1975) and Allen and Thompson (1977) have examined carabid populations in several habitats. It is generally agreed that quantitative estimates of species within or between habitats are unreliable due to various factors such as thatch density, rainfall and temperature (Greenslade

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1964 and Southwood 1968). However, pitfall traps do provide an indication of species located within various habitats and record an important part of the ecosystem not obtained by other sampling procedures.

METHODS AND MATERIALS

The primary habitats selected for study were within a 9.7 km radius of each other in the mid-section of the Lower Rio Grande Valley. Pesticidal usage was not documented for the habitats or adjacent ones because of the enormity of such a task. Habitat descriptions as well as a visual rank of plant diversity are listed in Table 1. Diversity was based on the number of different plants seen in the habitat area surrounding the traps.

Five wide-mouthed, glass, 946 ml jars, 7.5 cm. I.D., were randomly located in each habitat. Each jar was placed into the ground with the mouth flush with ground level. An isopropyl alcohol-kerosene mixture was used in each trap. Traps were inspected and contents removed weekly. Specimens were separated for identification within 24 hrs after collection.

Sampling of habitats 1-7 was begun on Dec. 4, 1975, 8-10 on Feb. 2, 1976 and 11 on Apr. 22, 1976. All sampling was discontinued Dec. 2, 1976, except for habitat 9 which was discontinued Sept. 2, 1976.

Insect identifications were made by Dr. Lloyd Knutson and staff, A.R.S., Systematic Entomology Laboratory, Beltsville, Maryland.

RESULTS AND DISCUSSION

During this study, the largest number of insect species were collected from the drainage ditch bank (#1) habitat which would be anticipated since this habitat had the most diverse plant flora (Table 1). Habitats 7 and 8 did not exhibit this relationship of plant and animal diversity clearly and cannot be explained.

TABLE 1.--Habitat Description and Number of spp. Collected from Pitfall Traps, 1975-76.

Habitat No.	Habitat Description	Primary Habitat Plants	Visual Rank ^a of Diversity	No. Spp. Collected
1	Bank of drainage ditch next to open field planted in grain sorghum during Spring and Summer.	johnsongrass, <u>Sorghum halepense</u> buffel grass, <u>Cenchrus ciliaris</u> cactus, <u>Opuntia vulgaris</u> mesquite, <u>Prosopis chilensis</u>	1	64
2	Roadside next to open field planted in cotton during Spring and Summer.	Kleberg bluestem, <u>Andropogon annulatus</u>	7	30
3	Pasture, hay and grazing land.	Kleberg bluestem African Star grass, <u>Cynodon dactylon</u> hyb.	6	19

TABLE 1.--(Continued).

Habitat No.	Habitat Description	Primary Habitat Plants	Visual Rank of Diversity ^a	No. Spp. Collected
4	Citrus orchard, mowed between rows.	citrus bermuda grass, <u>Cynodon dactylon</u> African Guinea grass, <u>Panicum maximum Afr.</u>	4	51
5	Roadside between citrus orchards.	ornamental date palm, <u>Phoenix carariensis</u> Kleberg bluestem African Guinea grass	3	51
6	Side of drainage ditch, open fields on both sides planted in cotton during Spring and Summer.	Kleberg bluestem buffel grass	8	33
7	Citrus, disked between rows.	citrus	9	41
8	Side of drainage ditch, citrus on one side and open field planted in cotton during Spring and Summer on other side.	buffel grass Kleberg bluestem cattails Paragrass, <u>Panicum purpurascens</u>	2	30
9	Cotton field adjacent to habitat 8.	cotton	11	20
10	Large mowed grass area between citrus orchards.	Kleberg bluestem bermuda grass	5	34
11	Sugarcane field.	sugarcane	10	13

^a1 = greatest plant diversity and 11 = least plant diversity.

Insects seasonal occurrence and habitats in which they were collected are listed in Table 2. Carabids, Pocillus sp. and Scarites subterraneus F., were the most abundant Coleoptera. The presence of certain unexpected species such as winged Diptera in the traps cannot be adequately explained. Recording of all species identified provides a base to assess habitat importance in a pest management system and changes in ecosystem quality sometime in the future.

TABLE 2.--Insect Fauna Collected from Pitfall Traps in Various Lower Rio Grande Valley Habitats, 1975-76.

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
HEMIPTERA				
Belostomatidae				
<u>Belostoma fusciventre</u> (Dufour)	7			
Miridae				
<u>Polymerus basalis</u> (Reut.)	6			
Lygaeidae				
<u>Ligyrocoris litigiosus</u> (Stal)		4		
<u>Pachybrachius basalis</u> (Dallas)			1	
Cydnidae				
<u>Dallasiellus lugubris</u> (Stal)			1,2	
<u>Pangaeus bilineatus</u> (Say)				1
HOMOPTERA				
Membracidae				
<u>Micrutalis calva</u> (Say)	8			
<u>Spissistilus festinus</u> (Say)	1			
Cicadellidae				
<u>Aceratagallia sordida</u> Oman	4			
<u>Balclutha hebe</u> (Kirkaldy)			5	
<u>Carneocephala sagittifera</u> (Uhler)	4,10		5,7	
<u>Chlorotettix scutellatus</u> Osborn	1			

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
<u>Draeculacephala portola</u> Ball	4			
<u>Deltocephalus sonorus</u> Ball			7	
<u>Empoasca</u> sp.	5			
<u>Graminella nigrifrons</u> (Forbes)			5	
<u>Homalodisca insolita</u> (Walker)	4,6			
<u>Negosiana dualis</u> (DeLong)	4			
<u>Paraphlepsius continuus</u> DeLong			7	
<u>Planicephalus flavicosta</u> (Stal)	1,4,5,7			
<u>Polyamia</u> sp.	6			
<u>Stirellus obtutus</u> (Van Duzee)	4,5			
<u>Texananus spatulatus</u> (Van Duzee)	6,7			
<u>Xestocephalus lunatus</u> Peters	6			
<u>X. pulicarius</u> Van Duzee	4,5			
<u>X. tessellatus</u> Van Duzee	4			
Delphacidae				
<u>Delphacodes pseudoseminigra</u> (Muir and Giffard)	10			
Cixiidae				
<u>Oliarus aridus</u> Ball			3	
<u>Oliarus</u> sp.		8		
<u>Pintalia dorsivittata</u> (Van Duzee)		5		
COLEOPTERA				
Carabidae				
<u>Aspidoglossa</u> sp.	7	8	10	
<u>Galerita</u> sp.				11

TABLE 2.--(Continued)

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
<u>Poecilus</u> sp.		1,4,8-10	1,3-5,9	2,5-7
<u>Scarites subterraneus</u> F.		1-3,6,8-11	1,2,11	1,2,5
<u>Selenophorus</u> sp.			2	4
Dyticidae				
<u>Laccophilus proximus</u> Say	5			
Histeridae				
<u>Hololepta cacti</u> LeC.	1			
<u>Phelister subrotundatus</u> (Say)		4		
<u>Xerosaprinus</u> sp.		10		
Hydrophilidae				
<u>Cercyon</u> sp.	1,3			
Scaphidiidae				
<u>Cyparium ater</u> Casey	1			
Cantharidae				
<u>Belotus</u> sp.		1		
<u>Chauliognathus marginatus</u> (F.)			8	2
<u>Silis</u> sp.		7		
Elateridae				
<u>Aeolus scutellatus</u> Schfr.			5	
<u>Conoderus amplicollis</u> (Gyllenhal)		1		
<u>Meristhus scobinula</u> Candeze		10		
<u>Neotrichophorus texanus</u> (LeConte)			5	
Ptilodactylidae				
<u>Ptilodactyla</u> sp. nr. <u>serricollis</u>			8	
Languriidae				
<u>Loberus</u> sp.	1			
Cucujidae				
<u>Ahasverus rectus</u> (LeConte)		10		
<u>Leptophloeus</u> sp.			10	

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
Phalacridae				
<u>Acylomus</u> sp.	4			
<u>Stilbus</u> sp.	6			
Nitidulidae				
<u>Carpophilus dimidiatus</u> (F.)	2	1	7	
<u>C. freemani</u> Dobs.	1,5		5	
<u>C. humeralis</u> (F.)	6		5,10	
<u>C. mutilatus</u> Er.	2-4,6,7		7	
<u>Carpophilus</u> sp.	1,3-7	7	7	
<u>Conotelus mexicanus</u> Murr.	4			
<u>Lobiopa insularis</u> (Cast.)	4		1,7	
<u>Stelidota ferruginea</u> Reitt.	1,5	5		
<u>S. geminata</u> (Say)		1,7	7	4
Coccinellidae				
<u>Hippodamia convergens</u> Guerin		9		
<u>Psyllobora renifer</u> Casey	4	8		
<u>Scymnus</u> (Pullus) <u>loewii</u> Mulsant		9		
Anthicidae				
<u>Anthicus</u> sp.	1,7,9	1,10	7,10	2
Mycetophagidae				
<u>Litargus balteatus</u> LeConte		7	7	
<u>Typhaea stercorea</u> (L.)	6			
Rhipiphoridae				
<u>Trigonodera schaefferi</u> Rivnay			1	
Tenebrionidae				
<u>Blapstinus fortis</u> LeConte	1,4,8	11		
<u>Blapstinus</u> sp.	1,2,10	4,10	10	
<u>Opatrinus aciculatus</u> LeConte	1,3	1,5	10	
<u>Platydema micans</u> Zimm.	5	5		
Bostrichidae				
<u>Amphicerus cornutus</u> (Pallas)	1,2,5,6	4		

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
Scarabaeidae				
<u>Aromala</u> sp.		1,8		
<u>Aphodius lividus</u> (Oliv.)	10	4,10	9	
<u>Ataenius cognatus</u> (LeConte)		11	8	
<u>Ataenius</u> sp.			9	
<u>Ochodaeus frontalis</u> LeConte			10	
<u>Phyllophaga crinita</u> (Burm.)		1-6,8,9,11		
<u>Pseudocanthus perplexus</u> (LeConte)		1	1	1
Cerambycidae				
<u>Dorcasta cinerea</u> (Horn)	7			
<u>Lepturges angulatus</u> (LeConte)			7	
<u>Lissonotus flavocinctus</u> Dup.		9		
Chrysomelidae				
<u>Chaetocnema pulicaria</u> Melsheimer or very nr.	8,10			
<u>Diachus auratus</u> F.		7		
<u>Kuschelina petaurista</u> (F.)	10			
<u>K. texana</u> Crotch or nr.	4			
<u>Lema texana</u> Crotch			10	
<u>Longitarsus</u> sp. nr. <u>Bicolor</u> Horn	10,7			
<u>Monomacra tibialis</u> (Oliver)	4,5			
<u>Monoxia sordida</u> LeConte			7	
<u>Myochrous denticollis</u> (Say) or nr.	6			
<u>Myochrous</u> sp. nr. <u>floridanus</u> Schaeffer	6			
<u>Myochrous</u> sp.	3,8	11		
<u>Phyllotreta</u> sp.	6			
Bruchidae				
<u>Caryobruchus gleditsiae</u> (L.)	5			
<u>Mimosestes sallaei</u> (Sharp)	1			
<u>Stator subaeneus</u> (Schaeffer)	1			
<u>S. vachelliae</u>		1,4		

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
Anthribidae		1,4		
<u>Araecerus fasciculatus</u> (DeG.)			8	
Curculionidae				
<u>Conotrachelus seniculus</u> LeConte		10		
<u>Cophes fallax</u> (LeConte)		8	1	
<u>Sitophilus zeamais</u> Mots.	1,2,4,5	10,11	5	
<u>Sphenophorus compressiro-</u> <u>tris</u> (Say)			2	
<u>Trichobaris texana</u> LeConte	8			
Scolytidae				
<u>Coccotrypes dactyliperda</u> (F.)	3		5	
<u>Coccotrypes</u> sp.	4	5	5	
DIPTERA				
Bibionidae				
<u>Dilophus orbatus</u> (Osten Sacken)		5		
Mycetophilidae				
<u>Allodia</u> sp.	2			
<u>Leia bivittata</u> Say		4		
<u>Leia</u> sp.		1		
<u>Orfelia</u> sp.	3			
Sciaridae				
<u>Bradysia</u> sp.	4,5	5		
<u>Lycoriella</u> sp.	5			
Stratiomyidae				
<u>Hoplitimyia mutabilis</u> (F.)				
Therevidae				
<u>Psilocephala</u> sp.				
Dolichopodidae				
<u>Condyllostylus longitalus</u> (Van Duzee)	4,5,7	1,3,5,8		

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
<u>Condylostylus</u> sp.	7	2,3,5,7,9, 10	2,5,7,8, 10,11	4-8,10,11
<u>Medetera nigripes</u> Loew	1		7	
Phoridae				
<u>Apocephalus</u> sp.		5	5	
<u>Dohnniphora incisuralis</u> (Tw.)	1,2,4-7		5,7	
<u>Dohnniphora</u> sp.	1-5,7,10	1-11	1-11	1-8,10,11
<u>Megaselia</u> sp.	6	7		
Conopidae				
<u>Zodion americanum</u> Wiedemann		4		
Sepsidae				
<u>Palaeosepsis</u> sp.	4			
Sphaeroceridae				
<u>Leptocera</u> sp.	1,2,4-6	1	8	
<u>Sphaerocera varipes</u> Malloch				
Ephydriidae				
<u>Gastrops niger</u> Williston	5			
Drosophilidae				
<u>Drosophila bromeliae</u> Sturt. or nr.			7	
<u>D. falleni</u> Wheeler	1,4,5,7			
<u>D. melanogaster</u> Meigen	4,7			
<u>Drosophila</u> sp.	1,3,4,6,7	4,5,7-10	1-10	1,4,5,7,8,10,11
Chloropidae				
<u>Hippelates dissidens</u> (Tucker)	2			
<u>H. pusio</u> Loew	2,4			
<u>Conioscinella</u> sp.	7			
Heleomyzidae				
<u>Pseudoleria</u> sp.	1,5,10			
Muscidae				
<u>Atherigona orientalis</u> Schiner	1,2,5,8,10	1,9-11	1,2,5,8-11	1,2,8,10,11

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
<u>Atherigona</u> sp.	5-7	5-7	5-7	5-7
<u>Coenosia</u> sp.	1,2			
<u>Limnophora narona</u> (Walker)	1-4			
<u>Limnophora</u> sp.	3,4	3-5	3,4	3,4
Calliphoridae				
<u>Cochliomyia macellaria</u> (F.)	1,2,4,5,7, 9,10	1	1,4,6,7	
Sarcophagidae				
<u>Sarcophaga</u> sp.			7	
Tachinidae				
<u>Gonia</u> sp.		9		
<u>Gymnoclytia unicolor</u> Brks.		1		
HYMENOPTERA				
Braconidae				
<u>Apanteles</u> sp.	1,4,5	5,10		
<u>Ichneutidea proteroptoides</u> Vier.		9		
<u>Orgilus</u> sp.	5	5,7	8	
Ichneumonidae				
<u>Enicospilus merdarius</u> (Grav.)	3			
<u>Mesochorus</u> sp.	1			
Chalcididae				
<u>Dirhinus texanus</u> (Ashm.)	10			
Eucoilidae				
<u>Hexacola</u> sp.	4	7		
Proctotrupidae				
<u>Cryptoserphus</u> sp.		4		
Diapriidae				
<u>Pantoclis</u> sp.		4		
<u>Trichopria</u> sp.	1	7		
Scelionidae				
<u>Calotelea</u> sp.	7	4		
<u>Ceratobaeus</u> sp.	6		5	
<u>Scelio</u> sp.		1		

TABLE 2.--(Continued).

	Habitat Designation ^{a/}			
	Winter (Dec.-Feb.)	Spring (Mar.-May)	Summer (June-Aug.)	Fall (Sept.-Nov.)
Bethylidae				
<u>Holepyris</u> sp.		8		
Dryinidae				
<u>Neogonatopus</u> sp.	6			
Mutillidae				
<u>Sphaerophthalma</u> sp.	4			
Pompilidae				
<u>Ageniella obscura</u> Banks		2	2	
<u>Anoplius</u> sp.		10		10
<u>Dipogon melanocephalus</u> (Cam.)	5	8		
<u>Priocnemis cornica</u> (Say)	2			
Sphecidae				
<u>Pluto</u> sp.		9		
Andrenidae				
<u>Perdita lacteipennis</u> Swenk and Cockerell			4	
Halictidae				
<u>Agapostemon texanus</u> Cr.		10		
Megachilidae				
<u>Megachile policularis</u> Say		5		
Anthophoridae				
<u>Melissodes</u> sp.		6	1	

^{a/}Habitat descriptions listed in Table 1.

Formicidae (Table 3) were collected year-round in each habitat and are therefore shown in a separate table. Campanotus abnominalis transvectus Wheeler, Pachycondyla harpax (F.) and Pogonomyrmex barbatus (F. Smith) occurred in almost all habitats while Solenopsis geminata (F.) was collected from 7 habitats. Schuster and Dean (1957) reported Solenopsis geminata and Pogonomyrmex barbatus as pests of citrus orchards due to their interfering with predators and parasites of scale insects.

TABLE 3.--Formicidae Collected from Pitfall Traps in Various Lower Rio Grande Valley Habitats, 1975-76.

	Habitats Designation ^{a/}
<u>Camponotus abnominalis transvectus</u> Wheeler	1-10
<u>Camponotus</u> sp.	8
<u>Iridomyrmex pruinosus</u> (Roger)	6
<u>Iridomyrmex</u> sp.	10
<u>Labidus coecus</u> (Latreille)	1
<u>Leptogenys elongata</u> (Buckley)	1,2,5,8
<u>Monomorium minimum</u> (Buckley)	2,6
<u>Pachycondyla harpax</u> (F.)	1-8,10,11
<u>Pachycondyla</u> sp.	1,3
<u>Paratrechina</u> sp.	6
<u>Pheidole ridicula</u> Wheeler	5
<u>Pheidole</u> sp.	1,5-7,11
<u>Pogonomyrmex barbatus</u> (F. Smith)	1-10
<u>Smithistruma</u> sp.	5
<u>Solenopsis geminata</u> (F.)	1-7
<u>Solenopsis</u> sp.	3,5-7
<u>Tapinoma sessile</u> (Say)	1

^{a/}Habitat descriptions listed in Table 1.

Large numbers of labidurids, staphylinids and spiders were collected from all habitats. No taxonomist was available for identification of these arthropods and therefore they are not presented.

Habitat preference of several species as well as their place in ecosystem dynamics warrants further intensive investigations based on this study. The importance of some wastelands for species reservoirs has been shown therefore providing a basis for more precise monitoring of the environment.

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