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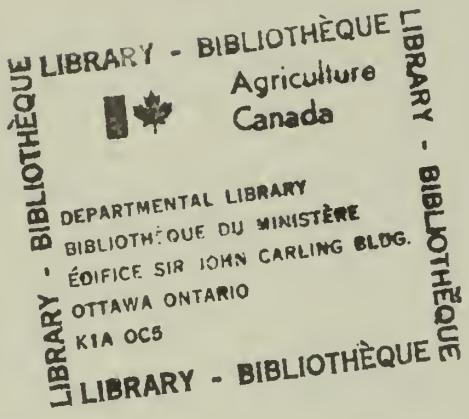
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The arthropod fauna of potato fields: composition and abundance



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The arthropod fauna of potato fields: composition and abundance

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SUMMARY

One of the basic requirements for high yield and high quality potatoes is good insect control. This in turn necessitates an understanding of the crop environment and more particularly of the arthropod community. This technical bulletin contains a complete list of the more than 565 different species of arthropods collected in a survey of New Brunswick potato fields carried on between 1979 and 1981. The total yearly catches of each species or group-species and the seasonal abundance of common or important groups are presented in tabular form. It will provide extension specialists, entomologists and quarantine officers with a checklist of insect species that can be found on potatoes and data on the relative abundance and seasonality of these arthropods.

Résumé

Pour obtenir des pommes de terre de haute qualité et un rendement élevé il faut, entre autres, bien contrôler les insectes nuisibles. Ceci requiert une bonne compréhension du milieu de culture et plus particulièrement de la communauté arthropodienne. Ce bulletin technique contient une liste complète des quelque 565 différentes espèces d'arthropodes recueillies lors d'un inventaire des champs de pomme de terre du Nouveau-Brunswick réalisé de 1979 à 1981. Les captures annuelles totales de chaque espèce ou groupe d'espèces et l'abondance saisonnière des groupes communs ou importants sont présentées sous forme de tableaux. Ce bulletin fournira aux spécialistes de l'extension, aux entomologistes et aux officiers en charge de la quarantaine une liste de contrôle des espèces d'insectes susceptibles de se trouver sur pommes de terre et des données sur l'abondance relative et saisonnière de ces arthropodes.

INTRODUCTION

The potato is a solanaceous plant which originated from the Andes in Peru. Introduced in Canada in 1623, it is now planted in 108,300 ha of which 22,000 are in New Brunswick (CIP 1980, NBDA 1981). Due to the importance of export markets--36% of the province's total production (New Brunswick Department of Agriculture 1981)--particularly high standards of seed quality have been set for New Brunswick potatoes.

One of the basic requirements for high yield and high quality potatoes is good insect control. Insect pests are well known (Hodgson et al. 1974, MacGillivray 1979 a, b, Radcliffe 1982) but the rest of the arthropod community has never been fully surveyed (Shands and Landis 1964, Shands et al. 1965, 1972). It is important to know the entire fauna because all species are linked together by their effects on one another and the environment they share. Insect control methods do not affect only the target species but all the other ones that depend on it or simply inhabit the same immediate space.

A faunal survey of New Brunswick potato fields was carried out during the 1979, 1980 and 1981 growing seasons and has identified more than 565 different species or group species from the more than 477,150 specimens collected. To our knowledge this is the first comprehensive survey of arthropods in potato fields in North America. This bulletin provides a complete listing of the species collected each year. In a second part, the seasonal abundance of important or common arthropods (generally at the family level) is presented in a tabular form for each sampling method. Four sampling procedures were used to get as complete a picture as possible of the whole community, gather some information on their habitat preference (e.g. foliage or ground species) and their ability to disperse by flight (yellow water pan catches). The structure of the community has been described elsewhere (Boiteau 1983).

Specimens of each taxon are maintained in the potato reference collection at the Fredericton Research Station.

MATERIALS AND METHODS

Except for Charlotte, Saint John and Albert, all counties of New Brunswick were surveyed in the 1979 and 1980 growing seasons. In 1981 the survey was limited to the major potato growing areas of Carleton, Victoria and Madawaska. All fields belonged to growers participating in the New Brunswick potato pest management program. Some fields were insecticide free but most received between 1 and 6 spray applications. This was not considered detrimental, but on the contrary, an integral part of the artificial environment of the potato field. Fields were sampled by sweepnet, ground cloth, pitfall traps and yellow water pans.

Sweepnet samples were taken from a 60 x 60 m area approximately 60 m from the edge of each field. A scout walked between 2 rows swinging a 38 cm diam sweepnet upward alternatively on each row synchronized with successive steps. Four sets of 50 sweeps randomly selected were taken in each field. Samples were taken weekly from the time plants reached 38 cms to top kill or the end of August. Forty three, 45 and 6 fields were sampled in 1979, 1980 and 1981 respectively.

The location and timing of ground cloth samples were similar to those used in the sweepnet procedure. A 1 meter square cloth was unfolded between 2 rows and about 2 m of foliage from each side vigorously shaken over the cloth. Four samples were collected randomly in each of 43, 35 and 6 fields in 1979, 1980 and 1981 respectively.

Pitfall traps consisted of a 0.5 L plastic cup (31 cm perimeter, 12 cm depth) sunk into the top of the row and 1/3 filled with a 50% solution of ethylene glycol and water as preservative. A 15 x 15 cm aluminum shade cover mounted on 15 cm nails was positioned approximately 5 cms above the cup to protect its contents from precipitation. Traps were emptied once a week from the time of planting to the end of August. Ten to twenty traps were placed in each of 21, 16 and 7 fields in 1979, 1980 and 1981 respectively.

Yellow water pans measured 35 x 47 cm. Two pans were located in the center of a 60 x 60 m area adjacent to the access road but halfway between the sidelines of each field. The first trap was 15 m from the edge and the second one 30 m further on the same row. Traps were emptied twice a week. Traps were operated in 51 fields in 1979, 51 in 1980 and 9 in 1981.

All samples were brought back to the laboratory for identification and counting. Collections were sorted into morpho-species which were pinned and assigned a reference number. Representative specimens of every putative species were then submitted to specialists at the Agriculture Canada Biosystematic Research Institute, Ottawa, for identification.

ARTHROPODS ASSOCIATED WITH POTATOES

This list contains all of the arthropod species or group-species collected in potato fields throughout the province of New Brunswick during three successive years. The list is arranged according to the classification of Borror et al. (1976) except for the families and genera that are arranged alphabetically. The total number of specimens collected is given for each taxon and each year.

Class

Order		Total catch		
Family		1979	1980	1981
Species				
Arachnida		3,521	4,001	1,870
Diplopoda		109	993	667
Chilopoda		62	662	141
Insecta				
Collembola		208 ¹	69 ¹	34 ¹
Ephemeroptera		15	21	0
Orthoptera		165	155	41
Plecoptera		17	75	2
Thysanoptera		10,364	1,259	- ²
Hemiptera				
Alydidae				
Alydus eurinus (Say)		0	3	0
Anthocoridae				
Anthocoris sp.		29	14	0
Orius sp.		33	17	0
Aradidae				
Aradus sp.		0	1	0
Berytidae (?)		18	11	0
Corizidae				
Corizus sp.		0	9	0
Cryptocerata		12	0	18
Cydnidae				
Corimelaena pulicaria (Germar)		3	16	0
Sehirus cinctus (P.B.)		10	39	0

Order

Family	Species	Total catch		
		1979	1980	1981
Lygaeidae				
	Corythucha sp.	10	0	0
	Cymus sp.	9	1	0
	Geocoris sp.	8	10	0
	Nysius sp.	2	0	0
	Ortholomus sp.	1	1	0
	Stygnorocoris pedestris (Fallen)	12	0	0
	Unidentified	29	4	2
Miridae				
	Adelphocoris lineolatus (Goeze)	12	3	6
	Adelphocoris rapidus (Say)	1	0	0
	Capsus ater (Linn.)	0	2	0
	Dicyphus sp.	1	1	0
	Halticus sp.	132	20	0
	Irbisia reuter	0	4	0
	Leptopterna dolbratus (Linn.)	1	1	0
	Lygocoris sp.	1	1	0
	Lygus sp.	909	650	0
	Monalocoris americanus Wards.	32	1	0
	Phytocoris sp.	12	0	0
	Plagiognathus sp.	40	24	0
	Plagiognathus chrysanthemi (Wolff)	0	19	0
	Poecilocapsus lineatus (Fab.)	4	6	0
	Stenodema sp.	46	5	0
	Stenodema vicinum (Prov.)	5	3	0
	Trigonotylus sp.	43	42	0
	Unidentified	34	14	0

Order		Total catch		
Family	Species	1979	1980	1981
Nabidae				
	<i>Nabis</i> sp.	19	0	0
	<i>Nabis ferus</i> (Linn.)	4	15	0
	<i>Nabis flavomarginatus</i> Scholtz	13	1	0
	<i>Nabis rufusculus</i> Reuter	20	22	0
Pentatomidae				
	<i>Cosmopepla bimaculata</i> (Thomas)	6	64	0
	<i>Euschistus tristigmus</i> (Say)	6	3	0
	<i>Picronerus bidens</i> (L.)	2	0	0
	<i>Sciocoris microphthalma</i> Flor.	1	1	0
Reduviidae				
	<i>Sinea diadema</i> (Fab.)	1	1	0
Saldidae				
	Unidentified	8	11	0
Tingidae				
	<i>Acalypta</i> sp.	1	0	0
Aleyrodidae		331	26	0
Psyllidae		1,030	6,075	3
Aphididae				
	<i>Myzus persicae</i>	1,670	646	15
	<i>Macrosiphum euphorbiae</i>	13,044	6,981	247
	<i>Aphis nasturtii</i>	6,162	3,270	112
	Unidentified	69,586	41,986	1,559
Cercopidae				
	Unidentified	951	1,748	21
Cicadellidae				
	<i>Agallia quadripunctata</i> (Prov.)	5	-	-
	<i>Anoscopus</i> sp.	6	-	-

Order		Total catch	
Family			
Species	1979	1980	1981
<i>Anoscopus flavostriata</i> (Don.)	1	-	-
<i>Aphrodes bicinctus</i> (Schr.)	1	-	-
<i>Arboridia (Erythridula) crataegi</i>	4	-	-
<i>Athysanus argentarius</i> Metc.	1	-	-
<i>Draeculacephala antica</i> (Wlk.)	4	-	-
<i>Elymana</i> sp.	84	-	-
<i>Empoasca copula</i> Dec.	1	-	-
<i>Eupteryx atropunctata</i> (Goeze)	43	-	-
<i>Eupteryx flavoscuta</i> Gill.	1	-	-
<i>Evacanthus interruptus</i> (L.)	2	-	-
<i>Graphocephala coccinea</i> (Forst.)	5	-	-
<i>Graphocraerus ventralis</i> (Fall.)	5	-	-
<i>Helochara communis</i> Fitch	52	-	-
<i>Idiocerus lunaris</i> Ball	3	-	-
<i>Latalus (Errastunus) ocellaris</i> (Fall.)	219	-	-
<i>Macrophis basalis</i> (Van D.)	19	-	-
<i>Macrophis canadensis</i> (Van D.)	9	-	-
<i>Macrosteles fascifrons</i> Complex	736	-	-
<i>Oncopsis citra</i> Hmlt. (ms name)	29	-	-
<i>Oncopsis flavidorsum</i> (Am. and Serv.)	56	-	-
<i>Oncopsis sobria</i> (Wlk.)	58	-	-
<i>Ophiola osborni</i> Ball	16	-	-
<i>Scaphoideus</i> sp.	96	-	-
<i>Scaphytopius latus</i> (Bak.)	49	-	-
<i>Thamnotettix confinis</i> (Zett.)	15	-	-
Unidentified	219	2,486	2,050
<i>Delphacidae</i>			
<i>Liburnia incerta</i> Van D.	18	0	0

Order		Total catch		
Family	Species	1979	1980	1981
Membracidae		107	206	3
Fulgoroidea		56	2,067	23
Neuroptera				
Chrysopa sp.		20	2	0
Hemerobius sp.		12	36	0
Coleoptera				
Alleculidae				
Isomira quadristriata Couper		1	281	0
Anthicidae				
Anthicus sp.		12	2	0
Notoxus sp.		1	20	0
Biphyllidae				
Diplocoelus sp.		2	5	0
Buprestidae				
Agrilus sp.		2	2	0
Anthaxia sp.		0	3	0
Buprestis sp.		0	1	0
Chrysobothris sp.		0	4	0
Byrrhidae				
Byrrhus sp.		1	11	0
Simplocaria sp.		12	22	1
Syncalypta spinosa Ross		1	0	12
Cantharidae				
Cantharis sp.		16	12	1
Cantharis rufa L.		131	581	89
Chauliognathus pennsylvanicus DeGeer		8	1	0
Malthodes sp.		4	0	0
Podabrus sp.		8	2	17

Order		Total catch		
Family		1979	1980	1981
Species				
Podabrus modestus Say		10	0	0
Podabrus rugosulus Lec.		3	4	0
Podabrus simplex Coup.		0	2	7
Carabidae				
Amara sp.		28	105	33
Anisodactylus sanctaecrucis F.		6	51	10
Agonum sp.		85	74	421
Agonum cupripenne Say		0	111	0
Agonum octopunctatum F.		0	19	1
Agonum placidum Say		1,978	4,379	67
Bembidion 4-Maculatum oppositum Say		941	995	278
Bradyceillus sp.		23	150	0
Clivina sp.		194	578	96
Calosoma calidum F.		0	2	0
Carabus granulatus L.		3	243	18
Carabus nemoralis Mull.		2	805	13
Chlaenius sericeus Forst.		0	12	12
Chlaenius tricolor DeGeer		0	14	1
Dyschirius sp.		2	25	11
Elaphrus sp.		0	3	0
Harpalus sp.		86	29	92
Harpalus affinis Schr.		36	335	499
Harpalus rufipes DeGeer		1,022	18,671	1,803
Lebia sp.		4	52	1
Notiophilus sp.		3	3	0
Pterostichus lucublandus Say and Pterostichus melanarius Ill.		1,255	1,164	3,431
Sphaeroderus sp.		1	4	0

Order

Total catch

Family

Species

1979

1980

1981

<i>Stenolophus comma</i> F.	5	24	40
<i>Tachys</i> sp.	1	2	3
Unidentified	5	50	0
Cephaloidea			
<i>Cephaloon</i> sp.	66	0	0
Cerambycidae			
<i>Bellamira scalaris</i> (Say)	1	1	0
<i>Brachysomida bivittata</i> (Say)	0	1	-
<i>Clytus ruricola</i> (Oliv.)	1	0	-
<i>Cosmosalia chrysocoma</i> (Kby.)	2	2	-
<i>Monochamus scutellatus</i> Say	0	1	-
<i>Psenocerus supernotatus</i> (Say)	0	1	-
<i>Pygolectura nigrella nigrella</i> (Say)	0	1	-
<i>Saperda tridentata</i> Oliv.	0	1	-
<i>Trachysida mutabilis</i> (Newm.)	2	1	1
<i>Typocerus velutinus</i> (Oliv.)	1	0	-
Chrysomelidae			
<i>Acalymma vittatum</i> (Fabricius)	0	1	0
<i>Altica</i> sp.	0	5	-
<i>Bromus obscurus</i> (L.)	0	1	-
<i>Calligrapha</i> sp.	0	1	-
<i>Calligrapha californica coreopsivora</i>	0	3	2
<i>Capraita subvittata</i> (Horn)	21	9	-
<i>Chartocnema confinis</i> Crotch	105	142	-
<i>Chrysomela</i> sp.	0	4	1
<i>Crepidodera</i> sp.	53	448	1,052
<i>Diachus auratus</i> (Fabricius)	2	5	-
<i>Dibolia borealis</i> Chevrolat	18	182	73
<i>Disonycha xanthomelas</i> (Dalman)	0	3	-

Order		Total catch		
Family		1979	1980	1981
Species				
Donacia aequalis Say		1	19	2
Donacia emarginata Kirby		0	3	7
Donacia sulciollis Lacordaire		0	5	0
Epitrix sp.		192	77	0
Epitrix cucumeris (Harris)		16,082	12,899	21
Glyphuroplata porcata (Melsheimer)		1	1	0
Leptinotarsa decemlineata (Say)		569	317	229
Longitarsus sp.		28	69	0
Metriona bicolor Fabricius		2	6	1
Orsodacne atra Ahrens		21	6	0
Pachybrachis sp.		0	2	0
Phratora sp.		1	1	2
Phyllotreta cruciferae Goeze		53	57	1
Phyllotreta robusta LeConte		2	0	1
Phyllotreta striolata (Fab.)		2	18	0
Psylliodes napi (Fabricius)		4	24	85
Psylliodes punctulata Melsheimer		1	1	0
Pyrrhalta sp.		1	1	0
Scelolyperus cyanellus (LeConte)		4	9	0
Sumitrosis inaequalis (Weber)		0	1	0
Systema frontalis (Fab.)		45	3	0
Trirhabda borealis Blake		1	0	0
Trirhabda canadensis (Kirby)		1	0	0
Unidentified		0	1	7
Cleroidea				
Unidentified		1	1	0
Cleridae				
Necrobia sp.		0	3	0

Order		Total catch		
Family	Species	1979	1980	1981
Coccinellidae				
	<i>Adalia bipunctata</i> L.	3	4	0
	<i>Anatis quindecimpunctata</i> (Olivier)	0	2	0
	<i>Brachyacantha ursina</i> (Fab.)	2	2	0
	<i>Chilocorus stigma</i> (Say)	0	2	0
	<i>Coccinella novemnotata</i> Herbst	0	20	3
	<i>Coccinella transversoguttata</i>	690	520	38
	<i>Coccinella trifasciata</i> L.	2	28	1
	<i>Hippodamia parenthesis</i> (Say)	2	0	-
	<i>Hippodamia tridecimpunctata tibialis</i> (Say)	77	335	5
	<i>Hyperaspis</i> sp.	2	0	-
	<i>Hyperaspis undulata</i> (Say)	0	10	-
	<i>Hyperaspis uniformis</i>	1	0	-
	<i>Mulsantina picta</i> (Randall)	43	36	-
	<i>Psylllobora virgintimaculata</i> (Say)	0	12	1
	<i>Scymnus</i> sp.	2	24	-
	<i>Stethorus punctillum</i> WS	5	0	2
	Larvae	63	-	-
Cryptophagidae				
	<i>Anchicera</i> sp.	213	8	0
	<i>Atomaria</i> sp.	13	4	0
	Unidentified	2	8	0
Cucujidae				
	Unidentified	2	3	0
Curculionidae				
	<i>Acalles</i> sp.	3	0	0
	<i>Anthonomus</i> sp.	1	0	0
	Unidentified	1	0	1

Order

Total catch

Family

Species

1979

1980

1981

Barypithe sp.	0	4	-
Ceutorhynchus sp.	77	368	2
Grypus equisetii F.	0	4	12
Gymnaetron sp.	1	1	6
Hylobius sp.	0	62	14
Hypera sp.	0	1	-
Hyperodes sp.	36	13	-
Magdalis sp.	4	0	2
Microtrogus sp.	42	8	-
Otiorhynchus sp.	30	21	13
Philopedon sp.	28	21	5
Phyllobius sp.	1	1	8
Rhinoncus sp.	65	411	6
Sitona sp.	33	12	1
Trachyphloeus sp.	3	6	-
Tychius sp.	15	0	-
Dermestidae			
Unidentified	1	0	0
Dytiscidae			
Agabus sp.	0	1	8
Laccophilus sp.	1	0	0
Elateridae			
Agriotes sp.	3	1	0
Agriotes mancus (Say)	0	37	12
Agriotes sputator (L.)	92	1	17
Ctenicera sp. and Hypolithus sp.	292	476	6
Dalopius sp.	2	1,097	3
Hemicrepidius sp.	1	1	3

Order		Total catch		
Family	Species	1979	1980	1981
	Melanotus sp.	2	3	14
	Negastrius sp.	7	33	0
	Oestodes sp.	1	4	0
	Unidentified	5	0	0
Elmidae				
	Optioservus trivittatus (Brown)	1	0	0
	Stenelmis sp.	2	0	0
Endomychidae				
	Mycetina sp.	0	1	0
Erotylidae				
	Triplax sp.	1	2	0
Helodidae				
	Cyphon sp.	3	8	0
Heteroceridae				
	Heterocerus sp.	0	6	0
Histeridae				
	Unidentified	2	6	5
Hydrophilidae				
	Anacaena limbata F.	19	17	0
	Cercyon sp.	2	4	0
	Cercyon analis Payk.	2	0	0
	Cercyon quisquilius L.	1	0	0
	Cymbiodyta sp.	0	20	1
	Helophorus sp.	40	214	0
	Helophorus grandis Ill.	15	48	19
	Hydrobius fuscipes L.	3	13	1
	Paracymus subcupreus Say	4	0	0

Order		Total catch		
Family	Species	1979	1980	1981
Lagriidae				
	<i>Arthromacra aenea</i> Say	0	2	0
Lampyridae				
	<i>Lucidota atra</i> F.	3	0	1
	<i>Ellychnia corrusca</i> L.	0	5	6
Lathridiidae				
	<i>Corticaria</i> sp., <i>Melanopthalma</i> sp., others	324	83	9
Leiodidae		7	2	7
Limnebiidae				
	<i>Hydraena</i> sp.	0	158	0
Melandryidae				
	<i>Emmesa labiata</i> Say	0	8	0
	<i>Orchesia castanea</i> Melsh	1	0	0
Meloidae				
	<i>Epicauta</i> sp.	1	23	0
	<i>Lytta</i> sp.	0	3	0
Melyridae				
	<i>Malachius</i> sp.	0	2	0
Mordellidae				
	<i>Glipa</i> sp. (?)	2	0	0
	<i>Mordella</i> sp.	0	7	0
	Unidentified	0	2	0
Nitidulidae				
	<i>Brachypterus pulicarius</i> (L.)	2	1	0
	<i>Colopterus</i> sp.	0	1	0
	<i>Epuraea flavomaculata</i> Maxlin	1	0	0
	<i>Glischrochilus quadrisignatus</i> (Say)	765	883	792

Order		Total catch		
Family	Species	1979	1980	1981
	Meligethes sp.	78	2,231	6
	Omosita colon (L.)	0	6	1
Oedemeridae				
	Ditylus caeruleus (Rond.)	0	1	0
	Nacerdes melanura (L.)	1	0	0
Orthoperidae				
	Unidentified	2	0	0
Pedilidae				
	Unidentified	1	1	0
Ptiliidae				
	Unidentified	5	0	0
Ptinidae				
	Ptinus sp.	0	29	0
Salpingidae				
	Salpingus sp.	1	0	0
Scarabeidae				
	Aphodius sp.	13	14	103
	Aphodius distinctus Mull.	0	1	1
	Aphodius erraticus L.	0	2	0
	Dichelonyx subuittata Lec.	0	6	1
	Diptotaxis tristis Kby.	3	2	23
	Onthophagus nuchicornis L.	0	2	3
	Trichiotinus assimilis (Kby.)	3	14	0
	Unidentified	9	2	14
Scolytidae				
	Dryocoetes sp.	17	3	0
	Hylurgops sp.	0	3	1

Order		Total catch		
Family	Species	1979	1980	1981
	Hylurgopinus sp.	0	12	0
	Polygraphus sp.	2	2	0
Scydmaenidae				
	Euconnus sp.	0	1	0
Silphidae				
	Nicrophorus sp.	2	27	7
	Oiceoptoma novaboracensis Forst.	0	4	0
	Silpha surinamensis Fab.	0	1	0
Staphylinidae				
	Aclylophorus sp.	55	225	24
	Aleochara sp.	1	0	3
	Aleocharinae s. fam.	49	48	1
	Erichsonius sp.	2,031	1,432	109
	Eusphalerum sp.	14	22	0
	Hypnogyrus hamatus Say	86	417	932
	Ontholestes cingulatus Grav.	1	0	0
	Oxytelus sp.	2	0	9
	Philonthus sp.	2,302	1,767	1,084
	Philonthus cyanipennis Fab.	4	0	0
	Platystethus sp.	19	20	1
	Tachinus sp.	1	2	2
	Tachinus limbatus Melsh	21	67	0
	Tachyporus sp.	71	64	1
	Tachyporus nitidulus (Fab.)	5	5	0
	Staphylinus badipes Lec.	8	8	303
Throscidae				
	Throscus sp.	23	90	0
	Aulanothroscus sp.	9	1	0

Order		Total catch		
Family	Species	1979	1980	1981
Coleoptera larvae		157	1,254	1,089
Mecoptera		5	5	0
Trichoptera		93	1	1
Lepidoptera		646	984	-
Diptera				
Nematocera		44,011	16,347	2,674
Brachycera				
Asilidae				
Asilus sp.		-	81	0
Laphria sp.		-	8	0
Laphria sadales Walker		-	1	0
Neoitamus orphne (Walker)		-	1	0
Unidentified spp.		472	24	0
Dolichopodidae				
Condylostylus nigrofemoratus (Walk.)		100	925	0
Condylostylus sp. or spp.		186	516	0
Chrysotus sp. or spp.		152	757	0
Dolichopus sp.		0	103	0
Dolichopus spp.		127	2,676	0
Dolichopus cuprinus Wied.		0	147	0
Dolichopus gratus Lw.		0	6	0
Medetera spp.		180	5	2
Thrypticus sp.		83	0	0
Tabanidae				
Chrysops ater MacQ.		32	2	-
Chrysops excitans Walk.		8	17	-

Order		Total catch		
Family	Species	1979	1980	1981
	<i>Chrysops furcatus</i> Walk.	0	2	-
	<i>Chrysops mitis</i> O.S.	40	3	-
	<i>Hybomitra affinis</i> (Kirby)	1	22	-
	<i>Hybomitra epistates</i> O.S.	1	0	-
	<i>Hybomitra illota</i> (O.S.)	0	2	-
	<i>Hybomitra lasiophthalma</i> (MacQ.)	25	9	-
	<i>Hybomitra zonalis</i> (Kirby)	0	1	-
	<i>Chetogena</i> sp.			
	<i>Cryptomeigenia simplex</i> Curran			
	<i>Euxorista futilis</i> (O.S.)			
	<i>Euxorista mella</i> (Wlk.)			
	<i>Eulasiona comstocki</i> Tns.			
	<i>Oswaldia assimilis</i> (Tns.)			
	<i>Phryxe</i> sp.			
	<i>Ptilodexia</i> sp.			
	<i>Voria ruralis</i> (Fallén)			
	<i>Winthemia fumiferanae</i> Tothill			
Cyclorrhapha		81	99	-
Anthomyiidae				
	<i>Hylemya alcathoe</i> Walker	14	6	0
Calliphoridae				
	<i>Cynomopsis cadaverina</i> (R.D.)	90	-	0
	<i>Phormia regina</i> (Meig.)	14	-	0
	<i>Pollenia rudis</i> (Fab.)	502	-	0
Muscidae				
	<i>Musca autumnalis</i>	50	-	0
	<i>Musca domestica</i> Linne	14	-	0
	<i>Ophyra aenescens</i> Wied.	1	-	0

Order	Total catch			
Family	1979	1980	1981	
Species				
Sarcophagidae				
<i>Agria housei</i> Shewell and <i>Ravinia latisetosa</i> Park.	756	-	-	
<i>Bellieria melanura</i> (Mg.)	286	-	-	
<i>Helicobia rapax</i> (Walk.)	5	-	-	
<i>Ravinia</i> sp.	53	-	-	
<i>Ravinia querula</i> (Walk.)	248	-	-	
<i>Sarcophaga aldrichi</i> Park.	136	-	-	
<i>Sarcophaga nearctica</i> Park.	25	-	-	
<i>Sarcophaga sinuata</i> Mg.	15	-	-	
Scatophagidae				
<i>Scatophaga stercoraria</i> (L.)	18	1	-	
Syrphidae				
<i>Carposcalis obscurus</i> (Say)	31	0	0	
<i>Chalcosyrphus vecors</i> O.S.	0	3	0	
<i>Cheilosia</i> sp.	0	2	0	
<i>Eristalis</i> sp.	2	11	0	
<i>Eristalis arbustorum</i> (L.)	5	33	0	
<i>Eumerus strigatus</i> (Fallen)	425	400	0	
<i>Helophilus fasciatus</i> Walk.	2	1	0	
<i>Melanostoma</i> sp.	15	0	0	
<i>Metasyrphus americanus</i> (Wd.)	0	1	0	
<i>Metasyrphus perplexus</i> (Osb.)	0	1	0	
<i>Parasyrphus</i> sp.	0	1	0	
<i>Platycheirus</i> spp.	26	13	0	
<i>Platycheirus scambus</i> Staeg.	0	5	0	
<i>Polydontomyia curvipes</i> (Wied.)	1	2	0	
<i>Sericomyia militaris</i> Walk.	0	2	0	

Order		Total catch		
Family		1979	1980	1981
Species				
Sphaerophoria sp. or spp.		0	24	0
Sphaerophoria philanthus (Mg.)		138	612	2
Syritta pipiens (L.)		1	2	0
Syrphus ribesii (L.)		9	6	0
Syrphus torvus O.S.		0	31	0
Temnostoma sp.		2	14	0
Temnostoma alternans Lw.		0	4	0
Toxomerus germinatus (Say)		27	93	0
Tropidia quadrata (Say)		22	37	0
Xylota sp.		0	2	0
Xylota segnis (L.)		12	40	0
Xylota subfasciata Lw.		0	4	0
Unidentified sp.		5	0	0
Unidentified		34,286	59,843	5,018
Larvae		177	9	134
Hymenoptera				
Braconidae				
Braconinae				
Bracon sp.		18	8	0
Helconinae				
Helcon sp.		23	1	0
Euphorinae				
Dinocampus coccinellae		3	2	0
Meteorus sp.		6	8	0
Peristenus sp.		17	6	0
Syntretus sp.		23	8	0
Macrocentrinae				
Macrocentrus sp.		33	0	0

Order		Total catch		
Family		1979	1980	1981
Species				
Microgastrinae				
Apanteles sp.		23	1	0
Microplitis sp.		71	14	0
Opiinae				
Opium sp.		1	0	109
Sigalphinae				
Chelonus sp.		25	0	0
Ichneumonidae				
Anomaloninae				
Therion sp.		1	0	78
Trichionotus sp. (Agrypon sp.)		2	0	0
Banchinae				
Lissonota acrobasidis Ashmead		13	2	0
Banchus flavescens Cresson		1	1	0
Lissonota laevigata Cresson		8	0	0
Campopleginae				
Enytus sp.		6	48	0
Campoplegini sp.		0	14	4
Diadegma sp.		13	0	0
Cryptinae				
Gelis sp.		9	197	0
Medophron sp.		43	642	0
Atractodes sp.		99	106	0
Cryptus albitarsis (Cress.)		1	0	0
Dichrogaster crassa (Prov.)		3	3	0
Endasys sp.		76	110	0
Hemiteles sp.		84	203	0
Mastrus sp.		2	27	0

Order		Total catch		
Family	Species	1979	1980	1981
	Phygadeuon sp.	12	225	0
	Polytribax crotchii (Cress.)	2	0	0
	Pycnocryptus director (Thbg.)	33	0	0
	Trychosis sp.	0	1	0
Diplazontinae				
	Diplazon laetatorius Fab.	5	0	0
	Homotropus sp.	0	5	0
Ichneumoninae				
	Phaeogenes cacoeciae Vier.	29	16	0
	Phaeogenes hariolus (Cresson)	0	23	0
	Vulgichneumon brevicinctor (Say)	3	0	0
	Exephanes terminalis (Prov.)	34	0	0
	Centeterus sp.	0	1	0
	Cratichneumon pilosulus (Prov.)	1	0	0
	Cratichneumon sp.	0	1	0
	Diphyus sp.	4	0	0
	Ichneumon sp.	0	1	0
	Ichneumon versabilis Cress.	2	0	0
	Ischnus inquisitorius atricollaris (Walsh)	1	1	0
Labeninae				
	Eclytus sp.	9	8	0
Mesocharinae				
	Mesochorus sp.	4	0	0
Ophioninae				
	Enicospilus sp.	8	19	0
Pimplinae				
	Pimpla tenuicornis (Cress.)	7	0	0
	Scambus (Scambus) canadensis Walley	5	0	0

Order		Total catch		
Family	Species	1979	1980	1981
Xoridinae				
Odontocolon sp.		1	0	0
Orthocentrinae				
Stenomacrus sp.		0	1	0
Unidentified spp.		51	6	0
Chalcidoidea				
Encyrtidae				
Coccidencyrus sp.		27	14	0
Copidosoma sp.		554	7	0
Discodes sp.		4	2	0
Encarsia sp.		9	0	0
Encyrtus sp.		4	0	0
Microterys sp.		42	18	0
Eulophidae				
Chrysocharis malaenis (Walker)		22	2	0
Chrysonotomyia formosa (Westwood)		9	0	0
Cirrospilus sp.		10	47	0
Omphale sp.		55	23	0
Pnigalio sp.		2	0	0
Tetrastichus sp.		154	13	0
Eurytomidae				
Eudecatoma sp.		9	0	0
Eurytoma sp.		71	34	0
Harmolita sp.		359	186	0
Miscogasteridae				
Cyrtogaster sp.		0	2	0
Mymaridae				
Gonatocerus sp.		90	19	0

Order		Total catch		
Family	Species	1979	1980	1981
	Mymar sp.	2	0	0
	Polynema sp.	380	29	0
Pteromalidae				
	Asaphes vulgaris Walker	134	3	0
	Halticoptera sp.	100	7	0
	Homoporus sp.	8	4	0
	Gastracanthus sp.	21	4	0
	Gastracancistrus sp.	2	1	4
	Lamprotatus sp.	75	12	0
	Sceptrothelys sp.	11	8	0
	Seladerma sp.	28	13	0
	Spalangia sp.	24	3	0
Torymidae				
	Megastigma sp.	3	8	0
	Torymus sp.	36	8	0
Trichogrammatidae				
	Aphelinoidea sp.	84	0	0
Cynipoidea				
Alloxystidae				
	Alloxysta sp.	114	4	0
Eucoilidae				
	Kleidotoma sp.	14	14	0
	Pseudoeucoila sp.	84	2	0
	Trybliographa sp.	6	1	0
Figitidae				
	Xyalophora sp.	3	5	0
Cynipidae				
	?Saphonecrus sp.	10	2	0

Order	Total catch			
Family	1979	1980	1981	
Species				
Proctotrupoidea				
Diapriidae				
Aneurhynchus sp.	29	1	0	
Basalys sp.	17	0	0	
Belyta sp.	36	308	0	
Idiotypa sp.	1	0	0	
Miota sp.	399	1,239	0	
Polypeza sp.	16	3	0	
Psilus sp.	11	1	0	
Spilomicrus sp.	2	2	0	
Trichopria sp.	2,151	463	0	
Zygota sp.	17	0	0	
Platygastridae				
Inostemma sp.	31	1	0	
Leptacis sp.	52	5	0	
Metaclisis sp.	31	6	0	
Platygaster sp.	87	101	0	
Synopeas sp.	206	102	0	
Proctotrupidae				
Codrus sp.	16	3	0	
Scelionidae				
Asolcus sp.	55	0	0	
Telenomus sp.	213	359	0	
Telenomus podisi Ashmead	122	125	0	
Trimorus sp.	196	23	0	
Unidentified	165	2	0	
Sundholmiella sp.	8	15	0	

Order		Total catch		
Family	Species	1979	1980	1981
Bethyloidea				
Bethylidae				
Pseudisobrachium sp.		4	0	0
Chrysidiidae				
Omalus sp.		37	1	0
Dryinidae				
Anteon sp.		36	5	0
Aphelopus so.		2	13	0
Unidentified spp.		14	20	0
Ceraphronoidea				
Ceraphronidae				
Aphanogmus sp.		265	2	0
Ceraphron sp.		382	90	0
Megaspilidae				
Dendrocerus sp.		872	38	0
Dendrocerus niger (How.)		1	1	0
Sphecoidea				
Sphécidae				
Pemphredon sp.		36	0	
Craproninae				
Lesticas sp.		14	3	0
Pemphredoninae				
Mimesa sp.		9	13	0
Passaloecus sp.		16	10	0
Trypoxyloninae				
Trypoxylon sp.		4	1	0
Crabroninae				
Ectemnius sp.		2	5	0

Order

Total catch

Family

Species

1979

1980

1981

Crossocerus sp.	41	6	0
Gorytinae			
Ochleroptera bipunctata (Say)	12	7	0
Nyssoninae			
Nysson sp.	10	0	0
Unidentified	-	-	1,271
Apoidea			
Halictidae			
Lasioglossum athabascense Sand.	19	-	-
Halictinae			
Dialictus sp.	123	-	-
Halictus sp.	51	-	-
Halictus confusus Smith	248	-	-
Sphecodes sp.	1	-	-
Andrenidae			
Panurginae			
Perdita octomaculata (Say)	1	-	-
Andreninae			
Andrena sp.	24	-	-
Aphidae			
Apinae			
Apis mellifera L.	11	-	-
Bombinae			
Bombus sp.	15	-	-
Collectidae			
Hylaeinae			
Hylaeus sp.	23	0	-
Unidentified	451	1,709	-

Order		Total catch		
Family		1979	1980	1981
Species				
Formicoidea				
Formicidae		2,227	2,507	3,147
Vespoidea				12
Eumenidae				
Eumeninae				
Odynerus sp.		1	1	-
Vespidae				
Vespinae				
<i>Vespula (Dolichovespula) arenaria</i> F.	23	23	-	
<i>Vespula (V.) consobrina</i> (Sauss.)	0	7	-	
<i>Vespula (Dolichovespula) maculata</i> (L.)	0	2	-	
Unidentified	49	46	-	
Bethyloidea				
Chrysididae				
Chrysididinae				
<i>Chrysis</i> sp.	1	2	-	
Unidentified sp.	0	2	-	
Pompiloidea				
Pompilidae				
Pepsinae				
<i>Priocnemis germana</i> (Cresson)	1	0	-	
Tenthredinidae	355	2,653	169	
Scolioidea		0	0	10

¹Number of samples in which they were present.

²No data.

SEASONAL ABUNDANCE OF ARTHROPODS

The following table contains data on the seasonal abundance of selected groups of potato arthropods for 1979, 1980 and 1981 and for each sampling method. Years when groups were present in less than five sampling dates have not been included. Figures refer to the average number of arthropods per pitfall trap, yellow water pan, 50 sweeps or one ground cloth in positive samples. The number of positive samples (number of fields with at least one arthropod) is given in brackets. Sampling started around the first of June and ended at topkill or in September.

Arachnida

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	0 (0)	0 (0)	-
154	0 (0)	5.74(7)	6.8 (5)	0 (0)	2.67(24)	0.75(2)
157	0 (0)	0 (0)	-	0.5 (1)	1.20(18)	-
161	0.70(2)	3.23(9)	6.13(13)	1.47(17)	1.42(24)	2.5 (1)
164	1.34(5)	3.17(4)	-	0.92(6)	1.19(16)	-
168	1.61(8)	4.24(9)	4.71(14)	1.04(12)	1.24(21)	1.0 (1)
171	1.93(4)	2.44(5)	-	1.0 (2)	1.16(19)	-
175	3.04(13)	6.87(6)	5.14(12)	0.75(4)	1.48(20)	0.75(6)
178	1.45(9)	3.62(6)	-	0.50(1)	1.52(26)	-
182	2.44(9)	0 (0)	3.19(14)	1.5 (3)	0.90(5)	0.75(2)
185	2.0 (14)	3.55(14)	-	0.70(5)	1.0 (9)	-
189	1.3 (15)	5.02(10)	3.89(15)	0.64(7)	1.4 (5)	0.75(2)
192	1.38(8)	2.44(13)	-	0.5 (2)	0.71(7)	-
196	1.44(9)	1.62(9)	3.35(13)	0 (0)	0.59(11)	0.50(1)
199	3.62(12)	1.32(8)	-	1.25(2)	0.75(8)	-
203	1.58(16)	3.83(9)	2.44(13)	0.57(7)	0.69(8)	0 (0)
206	2.46(8)	1.23(9)	-	0 (0)	0.57(7)	-
210	2.24(16)	4.26(11)	1.66(9)	0.67(3)	0.50(2)	0 (0)
213	2.15(6)	1.36(9)	-	1.0 (1)	0.75(2)	-
217	1.41(12)	2.2 (2)	1.24(6)	0.75(2)	0 (0)	0 (0)
220	8.66(8)	1.89(16)	-	0.5 (3)	0.58(6)	-
224	0.48(5)	3.18(9)	1.65(2)	0 (0)	0.50(3)	0.50(1)
227	1.08(7)	0.72(9)	-	0.5 (2)	0.50(2)	-
231	0.69(9)	4.07(9)	1.15(4)	1.0 (3)	0.50(2)	0 (0)
234	1.85(8)	0.68(9)	-	1.0 (3)	0 (0)	-
238	1.5 (8)	3.53(7)	0.5 (2)	0.75(4)	0 (0)	-
241	4.39(6)	0.69(6)	-	1.17(3)	1.00(1)	-
245	0.5 (1)	0.50(1)	1.2 (2)	0 (0)	-	-
248	4.65(6)	-	-	0.5 (1)	-	-
252	6.09(2)	-	-	0 (0)	-	-
255	3.47(3)	-	-	0 (0)	-	-
259	0 (0)	-	-	0.5 (1)	-	-

Arachnida

Day	Sweepnet		Ground cloth	
	1979	1980	1979	1980
150	-	-	-	-
154	-	-	-	-
157	-	-	-	-
161	-	-	-	-
164	-	-	-	-
168	-	-	-	-
171	-	-	-	-
175	-	-	-	-
178	-	0.25(1)	-	0 (0)
182	-	-	-	-
185	0 (0)	0.29(5)	0 (0)	0.50(1)
189	-	-	-	-
192	0.56(4)	0.37(6)	0.33(3)	0.50(2)
196	-	-	-	-
199	0.28(8)	0.57(7)	0.44(4)	0.33(6)
203	-	-	-	-
206	0.42(6)	0.25(3)	0.25(3)	0.25(1)
210	-	-	-	-
213	0.72(9)	0.38(4)	0.63(2)	0.33(3)
217	-	-	-	-
220	0.45(13)	0.32(8)	0.53(11)	0.25(4)
224	-	-	-	-
227	0.25(4)	0.25(4)	0.44(4)	0.25(2)
231	-	-	-	-
234	0.75(4)	0.31(4)	0.33(3)	0.25(1)
238	-	-	-	-
241	0.63(3)	0 (0)	0.75(1)	0 (0)
245	-	-	-	-
248	0.25(1)	-	0.25(1)	-
252	-	-	-	-
255	0 (0)	-	0 (0)	-
259	-	-	-	-

Aphididae

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	22.00(3)	0	-
154	0 (0)	.10(1)	0 (0)	0 (0)	1.13(4)	0 (0)
157	0 (0)	0 (0)	-	0 (0)	1.36(7)	-
161	0 (0)	0 (0)	0 (0)	5.83(24)	3.82(19)	.75(2)
164	2.27(3)	.18(7)	-	2.80(10)	1.83(27)	-
168	0 (0)	.20(3)	0 (0)	6.12(25)	6.62(30)	4.25(2)
171	.80(2)	0 (0)	-	26.00(4)	15.10(43)	-
175	.85(2)	.18(4)	.20(4)	4.53(28)	22.67(36)	1.42(6)
178	.60(6)	1.55(4)	-	5.57(7)	51.00(45)	-
182	.57(3)	0 (0)	.27(3)	6.59(22)	18.32(11)	4.42(6)
185	.59(9)	.33(4)	-	50.81(21)	27.27(28)	-
189	.46(9)	.64(5)	.68(7)	5.46(34)	16.75(39)	10.75(6)
192	3.78(7)	.32(9)	-	33.50(4)	16.04(50)	-
196	.48(6)	.10(2)	3.34(7)	21.96(33)	16.27(31)	.50(1)
199	.92(9)	.10(1)	-	21.90(5)	40.34(37)	-
203	1.10(9)	.50(4)	6.81(10)	22.49(37)	40.52(35)	40.00(4)
206	2.53(8)	.94(5)	-	20.50(3)	53.32(39)	-
210	1.10(15)	2.7 (6)	2.0 (2)	34.67(36)	59.19(34)	11.17(6)
213	1.58(6)	4.3 (6)	-	42.00(3)	35.05(31)	-
217	2.60(10)	2.4 (1)	0 (0)	35.73(32)	14.00(1)	17.75(2)
220	1.39(11)	1.57(10)	-	29.01(8)	41.58(48)	-
224	.34(5)	2.0 (2)	7.6 (1)	19.40(21)	27.98(63)	5.67(3)
227	9.91(4)	2.05(2)	-	13.68(11)	19.22(45)	-
231	2.10(8)	1.80(3)	3.6 (1)	24.45(22)	19.15(37)	0 (0)
234	.84(7)	0 (0)	-	9.11(18)	8.89(35)	-
238	10.33(4)	0 (0)	0 (0)	18.57(27)	5.27(28)	0 (0)
241	.20(1)	0 (0)	-	10.25(8)	0 (0)	-
245	0 (0)	0 (0)	0 (0)	0 (0)	-	-
248	.6 (2)	-	-	7.88(4)	-	-
252	0 (0)	-	-	4.00(3)	-	-
255	.20(1)	-	-	6.33(3)	-	-
259	0 (0)	-	-	1.00(2)	-	-

Aphidiidae

Day	Sweepnet		Ground cloth	
	1979	1980	1979	1980
150	-	-	-	-
154	-	-	-	-
157	-	-	-	-
161	-	-	-	-
164	-	-	-	-
168	-	-	-	-
171	-	-	-	-
175	-	-	-	-
178	-	1.00(2)	-	0 (0)
182	-	-	-	-
185	1.00(1)	.30(5)	2.75(1)	1.13(2)
189	-	-	-	-
192	22.88(4)	1.06(4)	24.78(8)	4.68(7)
196	-	-	-	-
199	4.61(17)	11.03(16)	21.69(17)	9.54(13)
203	-	-	-	-
206	9.27(19)	21.46(6)	4.99(16)	77.83(3)
210	-	-	-	-
213	8.12(22)	13.90(15)	36.38(12)	23.58(17)
217	-	-	-	-
220	14.25(34)	11.00(7)	22.15(37)	40.13(19)
224	-	-	-	-
227	.95(5)	6.03(8)	2.79(6)	3.50(12)
231	-	-	-	-
234	3.86(9)	8.97(10)	11.53(8)	.50(7)
238	-	-	-	-
241	1.25(2)	0 (0)	.63(3)	160.00(1)
245	-	-	-	-
248	1.67(3)	-	1.67(3)	-
252	-	-	-	-
255	6.00(1)	-	2.00(1)	-
259	-	-	-	-

Cercopidae

Day	Pitfall		Yellow pans		Sweepnet	
	1979	1980	1979	1980	1979	1980
150	0 (0)	0 (0)	6.50(1)	0 (0)	-	-
154	0 (0)	.15(2)	0 (0)	1.63(12)	-	-
157	0 (0)	0 (0)	0 (0)	.90(5)	-	-
161	0 (0)	.13(3)	1.75(2)	1.56(8)	-	-
164	.25(2)	0 (0)	.67(3)	1.71(7)	-	-
168	.17(3)	.60(1)	1.13(15)	.63(4)	-	-
171	0 (0)	0 (0)	2.00(2)	.75(2)	-	-
175	.35(2)	0 (0)	.96(13)	.50(1)	-	-
178	0 (0)	0 (0)	2.50(3)	.75(4)	-	0 (0)
182	0 (0)	0 (0)	.79(7)	0 (0)	-	-
185	.1 (1)	0 (0)	.88(8)	0 (0)	0 (0)	0 (0)
189	0 (0)	0 (0)	.73(13)	0 (0)	-	-
192	0 (0)	0 (0)	.50(1)	0 (0)	.25(2)	0 (0)
196	0 (0)	0 (0)	1.89(14)	0 (0)	-	-
199	0 (0)	.10(1)	.75(2)	1.13(4)	6.60(13)	1.00(1)
203	.1 (1)	0 (0)	2.03(37)	1.09(18)	-	-
206	.15(2)	.10(1)	1.00(1)	1.28(16)	1.13(14)	0 (0)
210	0 (0)	0 (0)	2.10(21)	4.32(28)	-	-
213	.1 (2)	.45(2)	1.0 (2)	2.00(39)	.63(15)	1.20(14)
217	0 (0)	1.8 (1)	1.66(19)	1.00(1)	-	-
220	0 (0)	.36(5)	2.25(4)	3.29(40)	1.01(23)	1.06(12)
224	0 (0)	0 (0)	1.40(5)	2.13(42)	-	-
227	0 (0)	1.10(2)	.83(3)	1.05(21)	0 (0)	2.39(11)
231	0 (0)	.94(5)	.86(11)	1.96(10)	-	-
234	0 (0)	.93(3)	1.88(4)	1.09(16)	.25(1)	1.05(10)
238	.10(2)	0 (0)	.95(11)	1.75(16)	-	-
241	.08(2)	.20(1)	2.0 (2)	1.40(15)	.75(1)	1.63(2)
245	0 (0)	0 (0)	0 (0)	-	-	-
248	0 (0)	-	1.50(2)	-	.50(2)	-
252	0 (0)	-	.50(1)	-	-	-
255	0 (0)	-	.50(1)	-	0 (0)	-
259	0 (0)	-	0 (0)	-	-	-

Cicadellidae

Day	Pitfall		Yellow pan		Sweepnet	
	1979	1980	1979	1980	1979	1980
150	0 (0)	0 (0)	5.00(1)	0 (0)	-	-
154	0 (0)	.10(2)	0 (0)	1.82(19)	-	-
157	0 (0)	0 (0)	0 (0)	2.72(9)	-	-
161	.20(1)	.10(2)	1.09(11)	1.22(21)	-	-
164	.27(3)	.10(1)	0 (0)	2.17(3)	-	-
168	1.63(4)	0 (0)	2.47(15)	.50(3)	-	-
171	.15(2)	.20(1)	2.67(3)	1.87(8)	-	-
175	.53(10)	.60(1)	2.48(19)	1.47(16)	-	-
178	.38(6)	.6 (2)	1.70(5)	2.58(31)	-	.88(2)
182	.55(10)	0 (0)	1.73(11)	.50(1)	-	-
185	.53(8)	.33(3)	1.85(17)	1.29(22)	.25(1)	0 (0)
189	.81(10)	.55(6)	1.72(23)	1.82(25)	-	-
192	.53(6)	.20(4)	4.5 (3)	2.47(30)	.42(3)	1.55(5)
196	.36(7)	.28(4)	1.97(15)	1.38(13)	-	-
199	.87(4)	.57(6)	2.00(2)	2.98(23)	.40(10)	.44(8)
203	.62(6)	1.20(6)	2.52(21)	1.73(28)	-	-
206	.35(6)	.36(8)	1.75(2)	1.73(21)	.53(7)	0 (0)
210	.52(10)	6.87(3)	2.64(11)	1.82(22)	-	-
213	0 (0)	.42(6)	.50(1)	2.27(19)	.76(8)	.95(9)
217	1.04(7)	1.00(1)	1.18(20)	.50(1)	-	-
220	.40(6)	1.18(8)	3.75(4)	1.84(28)	1.26(23)	.61(9)
224	.25(2)	1.88(5)	2.31(8)	1.09(33)	-	-
227	.15(3)	.46(5)	1.50(1)	1.05(21)	2.50(5)	.38(4)
231	1.06(7)	.40(2)	3.04(12)	1.07(14)	-	-
234	.28(8)	.87(3)	1.07(15)	2.40(29)	.65(5)	.35(8)
238	.20(3)	.91(7)	3.58(20)	1.86(18)	-	-
241	.18(2)	.57(9)	3.25(6)	1.15(13)	2.09(3)	2.25(1)
245	0 (0)	.30(1)	0 (0)	-	-	-
248	0 (0)	-	1.13(4)	-	.85(5)	-
252	0 (0)	-	.50(1)	-	-	-
255	.20(1)	-	2.25(2)	-	0 (0)	-
259	0 (0)	-	0 (0)	-	-	-

Day	Cicadellidae		Membracidae			Miridae		
	Ground	Cloth	1979	1980	Yellow	Pan	1979	Pitfall
150	-	-	.50(1)	0 (0)	0	(0)	0	(0)
154	-	-	0 (0)	.79(7)	0	(0)	0	(0)
157	-	-	0 (0)	1.00(1)	0	(0)	0	(0)
161	-	-	.50(1)	.50(4)	0	(0)	0	(0)
164	-	-	0 (0)	1.00(1)	0	(0)	0	(0)
168	-	-	.50(1)	.50(1)	0	(0)	0	(0)
171	-	-	0 (0)	.50(1)	.20(1)	0	(0)	
175	-	-	0 (0)	.50(1)	0	(0)	0	(0)
178	-	0 (0)	0 (0)	0 (0)	0	(0)	0	(0)
182	-	-	0 (0)	0 (0)	.10(2)	0	(0)	
185	0 (0)	0 (0)	0 (0)	0 (0)	0	(0)	0	(0)
189	-	-	0 (0)	0 (0)	.10(1)	0	(0)	
192	0 (0)	.25(1)	0 (0)	0 (0)	0	(0)	0	(0)
196	-	-	0 (0)	0 (0)	.10(1)	0	(0)	
199	.50(2)	.38(2)	0 (0)	0 (0)	.20(1)	.13(3)		
203	-	-	.50(1)	0 (0)	.10(3)	1.2 (2)		
206	.25(1)	0 (0)	0 (0)	0 (0)	.40(2)	.20(1)		
210	-	-	1.17(6)	1.00(3)	.13(3)	0 (0)		
213	.25(2)	.25(2)	0 (0)	.50(1)	.15(2)	.15(2)		
217	-	-	.61(9)	0 (0)	.20(1)	0 (0)		
220	.50(8)	.25(1)	.90(5)	.92(6)	0 (0)	0 (0)		
224	-	-	.67(6)	.54(13)	.10(1)	0 (0)		
227	.25(2)	0 (0)	.67(3)	.75(8)	0 (0)	0 (0)		
231	-	-	1.00(1)	.89(9)	.13(3)	.40(1)		
234	.94(4)	.38(3)	1.08(6)	1.21(14)	0 (0)	0 (0)		
238	-	-	1.07(7)	1.00(14)	0 (0)	0 (0)		
241	.25(1)	0 (0)	1.50(3)	1.72(9)	0 (0)	0 (0)		
245	-	-	0 (0)	-	0 (0)	0 (0)		
248	.50(2)	-	1.00(2)	-	0 (0)	-		
252	-	-	0 (0)	-	0 (0)	-		
255	0 (0)	-	.75(2)	-	0 (0)	-		
259	-	-	0 (0)	-	0 (0)	-		

Miridae

Day	Yellow pan		Sweepnet		Ground cloth	
	1979	1980	1978	1980	1979	1980
150	2.00(1)	0 (0)	-	-		
154	0 (0)	0 (0)	-	-		
157	0 (0)	0 (0)	-	-		
161	5,50(1)	0 (0)	-	-		
164	0 (0)	0 (0)	-	-		
168	0 (0)	0 (0)	-	-		
171	0 (0)	0 (0)	-	-		
175	.50(1)	0 (0)	-	-		
178	0 (0)	1.00(3)	-	0 (0)		0 (0)
182	.67(3)	0 (0)	-	-		-
185	.50(3)	.50(1)	.50(1)	0 (0)	0 (0)	0 (0)
189	.81(8)	.50(2)	-	-	-	-
192	.75(2)	0 (0)	.57(7)	.88(2)	.75(2)	.25(1)
196	.97(17)	.50(1)	-	-	-	-
199	0 (0)	.71(7)	1.42(23)	1.31(12)	1.00(14)	.25(1)
203	1.10(14)	.40(5)	-	-	-	-
206	.50(2)	.92(6)	1.02(21)	.25(2)	.30(5)	0 (0)
210	.73(11)	1.00(5)	-	-	-	-
213	.50(1)	.67(3)	1.25(20)	1.25(3)	.45(5)	.25(1)
217	.78(9)	0 (0)	-	-	-	-
220	1.00(3)	.50(5)	2.65(29)	1.15(5)	.88(21)	.50(1)
224	1.50(3)	2.50(1)	-	-	-	-
227	1.25(2)	.50(1)	.34(3)	.75(6)	.25(2)	.25(1)
231	.86(7)	0 (0)	-	-	-	-
234	.50(3)	0 (0)	1.25(1)	.69(8)	.70(5)	.25(1)
238	.75(6)	0 (0)	-	-	-	-
241	.75(2)	0 (0)	1.42(5)	1.67(3)	0 (0)	0 (0)
245	0 (0)	-	-	-	-	-
248	0 (0)	-	.70(5)	-	1.25(2)	-
252	.50(2)	-	-	-	-	-
255	.50(2)	-	1.00(1)	-	.50(1)	-
259	0 (0)	-	-	-	-	-

Nabidae

Day	Pitfall		Yellow pan 1980	Sweepnet	
	1979	1980		1979	1980
150	0 (0)	0 (0)	0 (0)	-	-
154	0 (0)	0 (0)	0 (0)	-	-
157	0 (0)	0 (0)	.50(2)	-	-
161	.0 (0)	0 (0)	.50(1)	-	-
164	0 (0)	.10(1)	.50(1)	-	-
168	.10(1)	0 (0)	0 (0)	-	-
171	.20(1)	0 (0)	0 (0)	-	-
175	0 (0)	0 (0)	0 (0)	-	-
178	0 (0)	0 (0)	0 (0)	-	0 (0)
182	.20(1)	0 (0)	0 (0)	-	-
185	.15(2)	0 (0)	0 (0)	0 (0)	0 (0)
189	.13(3)	0 (0)	.50(1)	-	-
192	.20(1)	.10(1)	0 (0)	0 (0)	.50(1)
196	.15(2)	0 (0)	0 (0)	-	-
199	.13(2)	0 (0)	.50(2)	.25(2)	.50(1)
203	.15(2)	0 (0)	1.00(1)	-	-
206	0 (0)	.20(2)	0 (0)	0 (0)	.25(1)
210	.08(2)	0 (0)	0 (0)	-	-
213	0 (0)	0 (0)	.50(1)	.25(2)	.25(5)
217	0 (0)	0 (0)	0 (0)	-	-
220	.10(1)	.10(2)	0 (0)	.34(3)	.42(3)
224	0 (0)	0 (0)	0 (0)	-	-
227	0 (0)	0 (0)	0 (0)	0 (0)	.33(3)
231	0 (0)	0 (0)	0 (0)	-	-
234	0 (0)	0 (0)	0 (0)	0 (0)	.25(3)
238	0 (0)	0 (0)	0 (0)	-	-
241	0 (0)	.20(1)	0 (0)	.63(2)	.25(1)
245	0 (0)	0 (0)	-	-	-
248	0 (0)	-	-	.25(1)	
252	0 (0)	-	-	-	
255	0 (0)	-	-	0 (0)	
259	0 (0)	-	-	-	

Pentatomidae

Day	Pitfall		Yellow pan		Sweepnet 1979	Ground cloth 1979
	1980	1979	1979	1980		
150	0 (0)	0 (0)	0 (0)	0 (0)	-	-
154	0 (0)	0 (0)	0 (0)	0 (0)	-	-
157	0 (0)	0 (0)	0 (0)	0 (0)	-	-
161	.0 (0)	0 (0)		.50(2)	-	-
164	0 (0)	0 (0)	0 (0)	0 (0)	-	-
168	0 (0)		.63(4)	1.00(3)	-	-
171	0 (0)	0 (0)		.50(1)	-	-
175	0 (0)		.50(1)	.83(3)	-	-
178	0 (0)	0 (0)		1.25(4)	-	-
182	0 (0)	0 (0)	0 (0)		-	-
185	.20(1)	0 (1)	1.00(2)	0 (0)		.50(1)
189	2.43(3)		.50(1)	.50(1)	-	-
192	.85(2)	0 (0)	2.00(1)		.67(3)	.50(2)
196	0 (0)		.50(1)	1.50(1)	-	-
199	0 (0)	0 (0)	1.25(2)		.75(1)	.25(1)
203	.10(1)	0 (0)		.67(3)	-	-
206	.30(2)	0 (0)		.50(1)	.38(2)	.25(2)
210	0 (0)	0 (0)	2.00(3)		-	-
213	0 (0)	0 (0)	0 (0)		.25(3)	.33(3)
217	0 (0)	0 (0)	0 (0)		-	-
220	.10(1)	0 (0)		.75(2)	3.82(14)	1.46(16)
224	0 (0)	0 (0)		.50(1)	-	-
227	0 (0)	0 (0)	0 (0)		.75(4)	.25(2)
231	.40(1)	0 (0)	0 (0)	0 (0)	-	-
234	0 (0)	0 (0)	0 (0)		2.38(4)	2.21(6)
238	0 (0)	0 (0)	0 (0)		-	-
241	0 (0)	0 (0)	0 (0)		3.75(3)	.50(2)
245	0 (0)	0 (0)		-	-	-
248	-		.50(1)	-	.70(5)	1.00(4)
252	-	0 (0)		-	-	-
255	-	0 (0)		-	.75(2)	1.50(1)
259	-	0 (0)		-	-	-

Day	Psyllidae				Pyrrhocoridae	
	Pitfall		Yellow pan		Sweepnet	Yellow pan
	1979	1979	1980	1979	1979	1979
150	0 (0)	1.67(3)	0 (0)	-	0 (0)	
154	0 (0)	0 (0)	3.20(22)	-	0 (0)	
157	0 (0)	0 (0)	7.97(27)	-	0 (0)	
161	.10(1)	5.78(36)	14.86(26)	-	0 (0)	
164	.10(1)	1.83(12)	1.85(21)	-	0 (0)	
168	2.7 (1)	7.38(21)	2.33(20)	-	1.50(1)	
171	0 (0)	2.88(4)	6.67(31)	-	0 (0)	
175	8.5 (1)	3.29(23)	7.94(31)	-	.50(1)	
178	20.05(2)	2.25(2)	3.26(30)	-	.50(1)	
182	1.0 (1)	1.14(14)	1.30(5)	-	.75(2)	
185	.10(1)	1.31(13)	3.70(27)	.50(1)	1.00(2)	
189	0 (0)	1.13(16)	2.22(32)	-	.63(4)	
192	0 (0)	1.50(2)	1.69(26)	0 (0)	0 (0)	
196	.50(1)	.88(8)	1.75(8)	-	0 (0)	
199	0 (0)	3.50(1)	163.72(9)	.25(4)	0 (0)	
203	.10(2)	.96(14)	.80(17)	-	0 (0)	
206	.15(2)	1.75(2)	.67(3)	.25(2)	.50(1)	
210	.06(1)	1.17(6)	0 (0)	-	.50(1)	
213	0 (0)	1.00(1)	.83(3)	.50(1)	0 (0)	
217	.90(1)	1.00(6)	0 (0)	-	.50(2)	
220	.20(1)	.83(3)	.75(2)	.50(1)	0 (0)	
224	.20(1)	.75(4)	0 (0)	-	0 (0)	
227	0 (0)	.50(2)	.75(2)	.25(2)	0 (0)	
231	0 (0)	.81(8)	0 (0)	-	.50(1)	
234	0 (0)	1.50(5)	0 (0)	.25(1)	.50(1)	
238	0 (0)	.90(5)	0 (0)	-	.50(3)	
241	.06(1)	.50(3)	0 (0)	0 (0)	0 (0)	
245	0 (0)	0 (0)	-	-	0 (0)	
248	0 (0)	1.50(1)	-	0 (0)	0 (0)	
252	0 (0)	0 (0)	-	-	0 (0)	
255	0 (0)	1.00(1)	-	0 (0)	0 (0)	
259	0 (0)	.50(1)	-	-	0 (0)	

Carabidae

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	3.00(1)	0 (0)	-
154	0 (0)	5.46(7)	7.0(4)	0 (0)	2.84(19)	0 (0)
157	0 (0)	0 (0)	-	0 (0)	10.85(7)	-
161	2.40(2)	6.51(8)	8.65(13)	1.78(20)	1.97(15)	1.25(2)
164	1.41(10)	4.72(5)	-	1.86(7)	1.57(8)	-
168	4.23(8)	5.69(8)	3.31(17)	1.73(15)	.78(9)	.50(1)
171	2.12(6)	2.66(5)	-	2.5 (4)	1.77(11)	-
175	3.21(16)	8.6 (6)	8.04(16)	.63(4)	1.25(20)	0.87(1)
178	1.65(10)	5.2 (6)	-	.50(1)	1.37(23)	-
182	4.69(11)	0 (0)	14.43(15)	.50(2)	.50(1)	1.2 (5)
185	3.31(16)	9.03(15)	-	.50(3)	2.75(10)	-
189	3.64(17)	7.0 (10)	8.04(17)	.50(2)	1.00(8)	0.83(3)
192	3.84(8)	7.4 (11)	-	1.50(1)	.92(13)	-
196	4.95(13)	6.21(11)	5.05(17)	.50(3)	.75(4)	0 (0)
199	4.11(12)	14.1 (9)	-	.50(1)	.81(8)	-
203	4.53(18)	13.05(13)	6.35(14)	.50(3)	.38(4)	1.25(2)
206	1.88(8)	21.3 (11)	-	0 (0)	.67(9)	-
210	5.18(20)	13.15(11)	4.72(13)	.75(2)	.88(4)	0.5 (2)
213	3.16(7)	8.67(10)	-	0 (0)	.60(5)	-
217	4.99(15)	5.85(2)	2.96(8)	.50(1)	0 (0)	0 (0)
220	2.72(12)	11.95(20)	-	.50(2)	1.08(6)	-
224	1.66(5)	14.94(11)	3.86(5)	0 (0)	.72(9)	0 (0)
227	2.22(9)	9.36(13)	-	0 (0)	1.33(4)	-
231	2.15(13)	13.93(12)	2.46(8)	.50(1)	.75(2)	0 (0)
234	2.33(11)	11.66(10)	-	.50(2)	1.45(10)	-
238	2.32(11)	8.67(9)	.52(6)	.83(3)	.94(8)	0 (0)
241	1.15(6)	14.69(10)	-	.50(2)	.69(8)	-
245	.40(1)	4.1 (1)	.35(4)	0 (0)	-	-
248	1.06(7)	-	-	0 (0)	-	-
252	.27(4)	-	-	0 (0)	-	-
255	.35(2)	-	-	0 (0)	-	-
259	0 (0)	-	-	0 (0)	-	-

Coccinellidae

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	0 (0)	0 (0)	-
154	0 (0)	0.3 (1)	0.2 (1)	0 (0)	1.61(19)	0 (0)
157	0 (0)	0 (0)	-	0 (0)	1.2 (5)	-
161	.0.1 (1)	0.1 (2)	0.13(3)	.67(3)	1.18(11)	.50(1)
164	0.43(3)	0 (0)	-	.50(2)	1.23(11)	-
168	0.2 (1)	0.1 (1)	0.2 (4)	.56(9)	.88(8)	0 (0)
171	0.1 (1)	0.4 (1)	-	.50(1)	.84(13)	-
175	0 (0)	0.1 (2)	.30(3)	.50(1)	.58(6)	0 (0)
178	2.0 (2)	1.15(2)	-	83.83(3)	.95(18)	-
182	0.35(2)	0 (0)	2.7 (1)	.50(1)	1.00(1)	.75(2)
185	0.3 (4)	0.2 (3)	-	.50(2)	.80(5)	-
189	0.37(3)	0.2 (3)	.17(3)	.50 (3)	.63(4)	.83(3)
192	0.27(4)	0.83(4)	-	.75(2)	.63(4)	-
196	0 (0)	0.2 (3)	.15(2)	1.00(1)	.50(2)	1.00(3)
199	0.23(5)	.15(2)	-	.50(2)	.81(13)	-
203	0.2 (1)	.97(3)	.20(1)	.50(1)	1.00(9)	0 (0)
206	0.22(6)	.30(2)	-	1.50(2)	1.57(8)	-
210	0.1 (1)	.37(3)	.20(1)	0 (0)	1.00(4)	.75(2)
213	0.61(6)	.20(4)	-	.50(1)	.78(9)	-
217	0.35(2)	0 (0)	0 (0)	.50(1)	0 (0)	0.5 (1)
220	0.53(8)	.35(4)	-	.61(5)	2.42(12)	-
224	0.15(2)	.15(2)	0 (0)	.63(4)	.86(14)	0 (0)
227	0.45(5)	.20(4)	-	.63(4)	.50(4)	-
231	1.0 (3)	3.4 (1)	0 (0)	0 (0)	.67(6)	0 (0)
234	0.20(4)	0 (0)	-	1.00(1)	.77(13)	-
238	0.15(2)	.10(1)	0 (0)	.70(5)	.91(5)	0 (0)
241	0.29(4)	.10(2)	-	.67(3)	.75(2)	-
245	0 (0)	0 (0)	0 (0)	0 (0)	-	-
248	0 (0)	-	-	1.00(1)	-	-
252	0 (0)	-	-	0 (0)	-	-
255	0.2 (1)	-	-	0 (0)	-	-
259	0 (0)	-	-	0 (0)	-	-

Coccinellidae

Day	Sweepnet		Ground cloth	
	1979	1980	1979	1980
150	-	-	-	-
154	-	-	-	-
157	-	-	-	-
161	-	-	-	-
164	-	-	-	-
168	-	-	-	-
171	-	-	-	-
175	-	-	-	-
178	-	0.25(2)	-	0 (0)
182	-	-	-	-
185	0 (0)	.63(2)	0 (0)	.75(1)
189	-	-	-	-
192	0 (0)	.33(3)	0 (0)	0 (0)
196	-	-	-	-
199	.35(5)	.50(2)	.38(2)	.25(1)
203	-	-	-	-
206	0 (0)	.25(1)	.25(1)	1.75(1)
210	-	-	-	-
213	.50(2)	1.65(5)	.25(3)	.30(5)
217	-	-	-	-
220	.75(12)	.83(15)	.61(7)	1.35(5)
224	-	-	-	-
227	.34(3)	1.72(9)	.25(1)	1.00(4)
231	-	-	-	-
234	.25(1)	1.69(4)	.50(3)	.50(2)
238	-	-	-	-
241	1.25(1)	.50(3)	0 (0)	.25(1)
245	-	-	-	-
248	0.25(1)	-	0 (0)	-
252	-	-	-	-
255	.38(2)	-	0 (0)	-
259	-	-	-	-

Elateridae

Day	Pitfall			Yellow pan	
	1979	1980	1981	1979	1980
150	0 (0)	0 (0)	-	0 (0)	0 (0)
154	0 (0)	.88(4)	.8 (1)	0 (0)	.86(14)
157	0 (0)	0 (0)	-	0 (0)	.50(4)
161	4.8 (2)	1.48(5)	1.17(10)	.50(1)	.82(11)
164	.40(7)	.80(1)	-	.75(2)	.83(3)
168	.70(5)	4.7 (5)	.71(10)	1.07(7)	1.36(7)
171	.98(4)	.25(2)	-	.83(3)	2.92(6)
175	1.79(7)	3.22(6)	.59(12)	.50(1)	1.00(2)
178	.27(7)	.20(4)	-	1.00(1)	1.33(21)
182	1.18(4)	0 (0)	.40(1)	0 (0)	.50(1)
185	.57(5)	.38(7)	-	.50(1)	1.67(3)
189	.49(8)	.45(6)	.30(2)	.80(4)	.50(1)
192	.05(2)	.68(6)	-	1.00(1)	.83(3)
196	.78(4)	.89(1)	.20(1)	1.50(1)	0 (0)
199	.34(4)	.35(4)	-	.50(1)	.67(3)
203	.09(3)	.43(4)	.10(1)	.50(1)	.75(2)
206	.20(4)	.40(1)	-	1.00(1)	.60(5)
210	0 (0)	.10(1)	.20(1)	.50(1)	.50(2)
213	0 (0)	.25(2)	-	0 (0)	.67(3)
217	0 (0)	0 (0)	0 (0)	.50(1)	0 (0)
220	.20(1)	.35(2)	-	0 (0)	.83(3)
224	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
227	0 (0)	1.4 (1)	-	.50(1)	0 (0)
231	.20(1)	0 (0)	0 (0)	0 (0)	0 (0)
234	.10(1)	0 (0)	-	0 (0)	0 (0)
238	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
241	0 (0)	.2 (1)	-	0 (0)	0 (0)
245	0 (0)	0 (0)	0 (0)	0 (0)	-
248	0 (0)	-	-	0 (0)	-
252	0 (0)	-	-	0 (0)	-
255	0 (0)	-	-	0 (0)	-
259	0 (0)	-	-	0 (0)	-

Halticidae

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	45.75(2)	0 (0)	-
154	0 (0)	1.40(5)	.80(1)	0 (0)	5.82(25)	4.50(2)
157	0 (0)	0 (0)	-	41.00(1)	6.39(18)	-
161	2.4 (2)	.43(4)	2.20(5)	23.53(31)	11.73(28)	34.50(3)
164	.3 (4)	2.10(4)	-	10.04(12)	21.71(23)	-
168	.2 (2)	2.75(2)	.28(5)	10.41(23)	3.08(26)	10.17(3)
171	.15(2)	1.72(5)	-	33.38(4)	10.29(29)	-
175	.18(4)	.33(3)	.96(11)	2.25(30)	7.53(30)	8.57(7)
178	.3 (6)	4.62(5)	-	9.09(6)	17.51(41)	-
182	.18(4)	0 (0)	.78(5)	3.29(14)	1.50(4)	5.60(5)
185	.21(5)	.68(5)	-	17.83(12)	14.40(24)	-
189	.42(3)	.10(2)	.34(8)	4.53(17)	5.02(19)	4.36(7)
192	.15(2)	.67(11)	-	2.12(4)	7.84(34)	-
196	.10(1)	0 (0)	.37(8)	2.56(8)	5.63(15)	0 (0)
199	1.0 (3)	.65(4)	-	125.83(3)	5.5 (29)	-
203	.08(2)	0 (0)	1.01(7)	1.07(7)	10.44(26)	2.15(7)
206	.60(2)	.68(4)	-	.50(2)	10.20(27)	-
210	.54(5)	.4 (1)	.93(7)	2.90(10)	4.61(19)	3.00(2)
213	.97(3)	.65(4)	-	1.00(1)	5.27(14)	-
217	0 (0)	0 (0)	1.3 (6)	3.06(18)	0 (0)	0 (0)
220	.87(4)	.20(4)	-	108.50(5)	3.05(19)	-
224	0 (0)	0 (0)	2.23(4)	1.63(4)	4.05(31)	7.00(1)
227	.34(5)	.10(2)	-	49.33(2)	4.75(28)	-
231	2.83(5)	0 (0)	2.07(7)	17.54(12)	8.21(24)	0 (0)
234	.12(5)	.30(1)	-	8.54(13)	8.64(33)	-
238	1.45(4)	0 (0)	.83(3)	5.42(18)	16.73(29)	0 (0)
241	.3 (1)	.8 (3)	-	5.07(7)	17.60(29)	-
245	0 (0)	0 (0)	.80(6)	0 (0)	-	-
248	.48(7)	-	-	11.50(4)	-	-
252	.13(3)	-	-	1.50(2)	-	-
255	.40(1)	-	-	2.00(1)	-	-
259	0 (0)	-	-	.50(1)	-	-

Halticidae

Day	Sweepnet		Ground cloth	
	1979	1980	1979	1980
150	-	-	-	-
154	-	-	-	-
157	-	-	-	-
161	-	-	-	-
164	-	-	-	-
168	-	-	-	-
171	-	-	-	-
175	-	-	-	-
178	-	26.63(4)	-	0 (0)
182	-	-	-	-
185	.25(1)	6.94(4)	.50(1)	0 (0)
189	-	-	-	-
192	.50(1)	2.67(3)	.25(1)	1.42(3)
196	-	-	-	-
199	1.00(5)	9.22(8)	.38(6)	2.32(3)
203	-	-	-	-
206	.25(1)	2.00(2)	0 (0)	0 (0)
210	-	-	-	-
213	2.25(15)	3.39(12)	2.13(4)	.75(5)
217	-	-	-	-
220	27.08(27)	1.55(10)	11.9 (24)	1.00(5)
224	-	-	-	-
227	66.05(5)	5.92(9)	31.19(4)	.54(6)
231	-	-	-	-
234	27.63(6)	6.62(17)	4.67(6)	5.3 (5)
238	-	-	-	-
241	38.25(3)	10.71(6)	26.00(2)	0 (0)
245	-	-	-	-
248	10.11(7)	-	7.12(4)	-
252	-	-	-	-
255	3.38(2)	-	.50(1)	-
259	-	-	-	-

Staphylinidae

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	.75(2)	0 (0)	-
154	0 (0)	3.0 (7)	4.5 (4)	0 (0)	4.96(25)	0 (0)
157	0 (0)	0 (0)	-	1.50(1)	110.38(13)	-
161	1.1 (3)	2.7 (8)	3.7 (13)	1.41(27)	2.00(22)	.50(1)
164	.87(8)	1.2 (4)	-	.94(6)	1.45(10)	-
168	1.36(7)	1.7 (9)	2.2 (14)	2.04(23)	1.28(18)	.67(3)
171	1.44(5)	.66(5)	-	1.75(1)	1.11(14)	-
175	1.82(14)	1.7 (6)	1.7 (15)	.88(20)	1.41(23)	1.25(6)
178	1.9 (8)	1.1 (6)	-	.60(5)	2.09(27)	-
182	2.3 (11)	0 (0)	1.4 (13)	.78(9)	.50(1)	.75(4)
185	3.6 (15)	2.0 (10)	-	1.58(12)	.83(9)	-
189	3.3 (16)	1.1 (8)	4.3 (16)	1.11(27)	.77(13)	.63(4)
192	8.1 (9)	.74(13)	-	2.00(4)	.75(12)	-
196	7.6 (13)	2.3 (9)	4.3 (13)	1.26(17)	.89(9)	.50(1)
199	1.9 (11)	.95(8)	-	1.50(4)	1.14(14)	-
203	7.8 (17)	2.2 (13)	2.2 (15)	1.07(15)	.86(7)	.50(1)
206	6.4 (8)	1.3 (8)	-	.50(1)	1.50(2)	-
210	4.5 (19)	2.0 (9)	2.7 (12)	1.60(5)	1.17(3)	0 (0)
213	1.6 (5)	1.5 (9)	-	.50(2)	1.00(5)	-
217	5.8 (14)	0 (0)	.78(6)	.94(8)	0 (0)	0 (0)
220	1.4 (10)	1.5 (18)	-	1.75(2)	1.58(6)	-
224	9.2 (4)	.76(8)	1.1 (3)	.60(5)	1.36(7)	0 (0)
227	4.5 (7)	1.2 (7)	-	.92(6)	.50(1)	-
231	2.1 (12)	1.6 (10)	1.6 (5)	1.44(9)	1.00(1)	0 (0)
234	.79(10)	.88(9)	-	1.50(4)	1.00(1)	-
238	2.8 (10)	1.0 (3)	.4 (2)	1.50(15)	.67(3)	0 (0)
241	.65(3)	1.3 (8)	-	.80(5)	1.25(4)	-
245	.3 (1)	0 (0)	.4 (2)	1.33(3)	-	-
248	.86(4)	-	-	0 (0)	-	-
252	.28(2)	-	-	2.00(1)	-	-
255	.85(2)	-	-	1.17(3)	-	-
259	0 (0)	-	-	0 (0)	-	-

Syrphidae

Day	Pitfall				Yellow pan		
	1979		1980		1979	1980	1981
150	0	(0)	0	(0)	6.0 (1)	0	(0)
154	0	(0)	0	(0)	0	(0)	-
157	0	(0)	0	(0)	0	(0)	-
161	0	(0)	0	(0)	0.50(2)	0.5 (2)	0.5 (2)
164	0.1	(1)	0.2	(1)	0	(0)	0.5 (1)
168	0	(0)	0	(0)	1.5 (2)	0.5 (3)	1.0 (1)
171	1.8	(1)	0	(0)	1.0 (1)	0	(0)
175	0	(0)	0	(0)	0.5 (2)	0.67(3)	2.11(9)
178	0	(0)	0	(0)	0	(0)	0.75(6)
182	0	(0)	0	(0)	0	(0)	1.43(7)
185	0	(0)	0.1	(2)	1.0 (1)	1.0 (1)	-
189	0.2	(2)	0.1	(1)	1.79(7)	0.67(6)	2.81(8)
192	0.1	(1)	0.2	(1)	1.5 (1)	1.4 (5)	-
196	0	(0)	0	(0)	0.94(8)	0.88(4)	2.68(11)
199	0	(0)	0.1	(2)	0.5 (1)	0.85(10)	-
203	0	(0)	0	(0)	1.21(14)	1.1 (6)	2.6 (5)
206	0	(0)	0.13	(3)	1.0 (1)	1.43(15)	-
210	0.4	(2)	0.20	(1)	1.42(12)	1.07(15)	2.71(7)
213	5.6	(1)	0.15	(2)	0	(0)	1.42(25)
217	0.1	(1)	0.20	(1)	1.86(22)	0	(0)
220	0.6	(1)	0.10	(2)	1.88(4)	2.50(26)	-
224	0	(0)	0.0	(0)	1.04(12)	3.04(49)	3.25(3)
227	0	(0)	0.13	(4)	1.50(4)	2.79(26)	-
231	0.1	(1)	0.20	(1)	2.46(12)	2.57(28)	0
234	0.0	(0)	0.15	(2)	0.85(13)	2.95(31)	-
238	5.0	(1)	0.10	(1)	3.32(22)	2.98(18)	0.5 (2)
241	0	(0)	0.60	(1)	2.21(7)	9.98(20)	-
245	0	(0)	0.10	(1)	0	(0)	-
248	0	(0)	-		2.0 (1)	-	-
252	0.1	(1)	-		0.67(3)	-	-
255	0	(0)	-		7.25(2)	-	-
259	0	(0)	-		0	(0)	-

Braconidae

Day	Pitfall			Yellow pan		
	1979	1980	1981	1979	1980	1981
150	0 (0)	0 (0)	-	1.00(2)	0 (0)	-
154	0 (0)	.15(2)	0 (0)	0 (0)	.75(8)	.50(1)
157	0 (0)	0 (0)	-	.50(1)	.50(4)	-
161	0 (0)	0 (0)	0 (0)	.91(16)	.75(2)	1.50(1)
164	.10(2)	0 (0)	-	.83(3)	0 (0)	-
168	.30(1)	0 (0)	0 (0)	1.17(6)	.50(1)	1.38(4)
171	2.40(1)	0 (0)	-	.83(3)	.75(2)	-
175	.25(2)	0 (0)	.20(1)	.73(11)	.50(1)	1.32(8)
178	.25(1)	0 (0)	-	.50(1)	0 (0)	-
182	0 (0)	0 (0)	.10(1)	.88(8)	.50(1)	1.25(4)
185	.18(4)	.10(1)	-	.83(12)	1.00(6)	-
189	.10(3)	0 (0)	.20(1)	.89(18)	1.00(2)	1.21(7)
192	.30(1)	.20(1)	-	.83(2)	.75(2)	-
196	1.13(3)	0 (0)	.40(1)	.79(21)	.50(1)	.64(7)
199	.13(3)	0 (0)	-	.88(4)	2.25(2)	-
203	.55(2)	0 (0)	0 (0)	1.25(22)	.67(3)	1.00(3)
206	.40(2)	0 (0)	-	1.25(2)	.50(2)	-
210	.20(3)	0 (0)	0 (0)	1.40(15)	.50(1)	1.50(5)
213	.45(2)	.40(1)	-	3.00(1)	1.06(8)	-
217	.40(1)	0 (0)	0 (0)	1.94(24)	0 (0)	.5 (1)
220	.13(2)	.10(3)	-	2.59(6)	.71(2)	-
224	.20(1)	0 (0)	0 (0)	8.95(21)	.93(7)	0 (0)
227	0 (0)	0 (0)	-	4.63(8)	.70(5)	-
231	.22(6)	0 (0)	.15(2)	6.41(21)	0 (0)	1.00(2)
234	.27(5)	0 (0)	-	3.62(17)	.75(2)	-
238	.20(7)	0 (0)	0 (0)	6.15(26)	.75(2)	1.00(1)
241	0 (0)	0 (0)	-	3.06(8)	1.17(3)	-
245	0 (0)	0 (0)	.30(1)	0 (0)		
248				1.5 (4)		
252	0 (0)			.75(2)		
255	0 (0)			.50(1)		
259	0 (0)			.50(1)		

Day	Braconidae		Yellow pan 1980	Chalcididae		
	Sweepnet 1979	Ground cloth 1979		Pitfall 1979	1980	1981
150	-	-	0 (0)	0 (0)	0 (0)	-
154	-	-	.67(3)	0 (0)	.10(3)	0 (0)
157	-	-	0 (0)	0 (0)	0 (0)	-
161	-	-	0 (0)	.15(2)	0 (0)	0 (0)
164	-	-	0 (0)	.30(1)	.10(1)	-
168	-	-	.50(2)	.37(3)	.20(2)	.60(1)
171	-	-	.50(2)	1.40(1)	0 (0)	-
175	-	-	.60(5)	.17(3)	0 (0)	.20(1)
178	-	-	.50(2)	.33(4)	0 (0)	-
182	-	-	.50(1)	.65(2)	0 (0)	.10(1)
185	0 (0)	0 (0)	.50(1)	.41(5)	0 (0)	-
189	-	-	.50(1)	.45(2)	.20(2)	.20(1)
192	.33(3)	.25(1)	.50(1)	.15(4)	.15(2)	-
196	-	-	.50(2)	.45(4)	0 (0)	0 (0)
199	.69(4)	.25(1)	.50(1)	.57(7)	0 (0)	-
203	-	-	0 (0)	.50(5)	.10(1)	0 (0)
206	.41(8)	.50(1)	.50(1)	.36(4)	0 (0)	-
210	-	-	1.00(1)	.39(8)	0 (0)	0 (0)
213	1.47(8)	.56(4)	.50(1)	.15(3)	0 (0)	-
217	-	-	0 (0)	.44(7)	0 (0)	.20(1)
220	1.11(25)	.68(21)	0 (0)	.21(7)	.10(1)	-
224	-	-	0 (0)	.20(3)	0 (0)	0 (0)
227	.34(3)	.25(1)	0 (0)	.28(2)	0 (0)	-
231	-	-	0 (0)	.68(10)	0 (0)	0 (0)
234	.55(5)	.25(1)	0 (0)	.26(5)	.20(1)	-
238	-	-	0 (0)	.33(4)	0 (0)	0 (0)
241	.75(2)	0 (0)	0 (0)	.12(2)	0 (0)	-
245	-	-	-	.30(1)	0 (0)	0 (0)
248	.25(2)	.25(1)	-	.17(4)	-	-
252	-	-	-	.10(1)	-	-
255	0 (0)	0 (0)	-	0 (0)	-	-
259	-	-	-	0 (0)	-	-

Chalcididae

Day	Yellow pan			Sweepnet		Ground cloth	
	1979	1980	1981	1979		1979	
150	9.00(2)	0 (0)	-	-	-	-	-
154	0 (0)	1.19(24)	1.25(2)	-	-	-	-
157	0 (0)	1.34(9)	-	-	-	-	-
161	.3.05(30)	.80(10)	2.5 (2)	-	-	-	-
164	1.47(18)	.77(11)	-	-	-	-	-
168	5.11(28)	1.19(8)	1.50(2)	-	-	-	-
171	9.63(4)	.67(6)	-	-	-	-	-
175	1.71(33)	1.21(12)	.89(7)	-	-	-	-
178	1.21(7)	.79(7)	-	-	-	-	-
182	2.57(23)	.50(2)	2.17(3)	-	-	-	-
185	2.88(20)	1.38(12)	-	0 (0)	0 (0)	0 (0)	-
189	2.96(36)	1.41(24)	1.94(8)	-	-	-	-
192	2.70(5)	1.77(13)	-	.75(1)	.25(3)	.25(3)	-
196	2.02(31)	1.50(9)	.79(7)	-	-	-	-
199	8.67(3)	.91(11)	-	.60(10)	.50(4)	.50(4)	-
203	2.31(29)	.58(6)	.79(7)	-	-	-	-
206	1.00(1)	.88(4)	-	.57(10)	.25(2)	.25(2)	-
210	3.08(20)	.75(2)	1.00(5)	-	-	-	-
213	3.25(2)	.75(4)	-	.45(14)	.25(1)	.25(1)	-
217	1.71(26)	0 (0)	1.75(2)	-	-	-	-
220	5.31(8)	.75(4)	-	.58(17)	.99(12)	.99(12)	-
224	5.50(15)	.50(3)	2.00(1)	-	-	-	-
227	1.5 (7)	2.50(1)	-	.50(1)	.60(5)	.60(5)	-
231	8.24(21)	.63(4)	1.00(2)	-	-	-	-
234	2.10(20)	.88(4)	-	.67(3)	2.75(2)	2.75(2)	-
238	9.96(27)	0 (0)	1.25(2)	-	-	-	-
241	3.94(8)	0 (0)	-	.63(2)	.25(2)	.25(2)	-
245	0 (0)	-	-	-	-	-	-
248	3.30(5)	-	-	0 (0)	0 (0)	0 (0)	-
252	2.38(4)	-	-	-	-	-	-
255	9.33(3)	-	-	.50(1)	0 (0)	0 (0)	-
259	.50(1)	-	-	-	-	-	-

Formicidae

Day	Pitfall			Yellow pan		Sweepnet
	1979	1980	1981	1979	1980	1980
150	0 (0)	0 (0)	-	0 (0)	.50(1)	-
154	0 (0)	1.47(6)	14.10(2)	0 (0)	.67(3)	-
157	0 (0)	0 (0)	-	0 (0)	.70(5)	-
161	3.6 (2)	2.39(7)	6.84(12)	.50(4)	.50(4)	-
164	5.07(8)	.37(3)	-	.50(2)	.67(3)	-
168	2.06(8)	1.47(9)	1.78(12)	.70(5)	.67(3)	-
171	2.17(3)	.20(4)	-	0 (0)	1.00(2)	-
175	1.48(11)	1.53(6)	4.87(13)	.50(4)	.75(6)	-
178	1.92(7)	8.37(3)	-	1.00(1)	.60(5)	.25(1)
182	1.60(9)	0 (0)	4.87(10)	0 (0)	.83(3)	-
185	1.26(9)	.91(12)	-	1.00(1)	1.00(4)	0 (0)
189	.88(14)	1.57(9)	7.49(13)	.50(4)	.75(6)	-
192	.30(7)	3.26(8)	-	.75(2)	.50(1)	.50(1)
196	1.53(10)	1.93(7)	2.73(11)	.50(5)	0 (0)	-
199	1.48(10)	.82(6)	-	1.00(2)	.67(3)	.25(1)
203	1.05(10)	1.27(7)	2.47(11)	.56(8)	.50(1)	-
206	1.79(8)	.55(9)	-	0 (0)	0 (0)	.25(1)
210	1.50(13)	.68(9)	2.4 (9)	.75(2)	1.00(1)	-
213	.25(4)	.28(6)	-	.50(1)	.50(1)	.25(1)
217	1.89(7)	8.4 (1)	.7 (5)	.50(1)	0 (0)	-
220	.54(8)	.57(12)	-	0 (0)	3.25(2)	0 (0)
224	.15(2)	.57(7)	14.6 (1)	0 (0)	.50(2)	-
227	.15(2)	1.65(8)	-	1.00(1)	1.00(2)	0 (0)
231	2.17(6)	.85(4)	7.2 (1)	1.08(6)	.50(1)	-
234	.97(5)	.28(4)	-	1.10(10)	.75(4)	2.00(2)
238	.10(3)	.53(3)	.33(3)	1.06(17)	0 (0)	-
241	.38(2)	.64(5)	-	.94(8)	0 (0)	.25(1)
245	0 (0)	0 (0)	.30(1)	0 (0)	0 (0)	-
248	.25(2)	-	-	.50(1)	-	-
252	0 (0)	-	-	.75(2)	-	-
255	.10(1)	-	-	.50(1)	-	-
259	0 (0)	-	-	0 (0)	-	-

Ichneumonidae

Day	Pitfall				Yellow pan			Sweepnet 1980	
	1979		1980		1979	1980	1981		
150	0	(0)	0	(0)	.50(1)	0	(0)	-	
154	0	(0)	.30(2)		0	(0)	3.96(24)	0	(0)
157	0	(0)	0	(0)	0	(0)	1.23(11)	-	-
161	.10(1)		.16(5)		1.05(22)	1.70(18)	1.00(1)	-	
164	.40(1)		0	(0)	.75(10)	1.5 (12)	-	-	
168	.30(2)		.10(1)		1.00(12)	1.00(16)	1.25(2)	-	
171	.20(1)		.20(1)		1.00(2)	1.07(14)	-	-	
175	.10(1)		.23(3)		.73(18)	1.32(17)	2.17(3)	-	
178	.60(1)		.15(2)		1.33(3)	1.21(28)	-	0 (0)	
182	.20(1)		0	(0)	.50(6)	.88(4)	.50(3)	-	
185	0	(0)	1.48(4)		1.31(13)	.86(11)	-	.25(1)	
189	.13(2)		.20(2)		.91(23)	.91(16)	.50(4)	-	
192	.20(1)		6.44(5)		1.13(4)	1.11(18)	-	0 (0)	
196	.80(3)		.10(1)		.96(14)	.77(11)	.63(4)	-	
199	.13(3)		.10(1)		.75(2)	1.21(12)	-	.25(2)	
203	.06(1)		.60(1)		.88(13)	.60(10)	.70(5)	-	
206	.20(3)		.20(1)		.75(2)	.75(14)	-	0 (0)	
210	.06(1)		.15(2)		.73(13)	.71(12)	1.34(6)	-	
213	0	(0)	.17(3)		1.00(1)	1.08(18)	-	.40(5)	
217	.10(2)		0	(0)	.72(18)	.50(1)	1.00(1)	-	
220	.20(1)		0	(0)	.80(5)	.89(22)	-	.63(2)	
224	.20(1)		.10(1)		1.06(9)	.77(22)	0 (0)	-	
227	0	(0)	2.50(2)		.50(3)	.56(8)	-	.25(4)	
231	.40(1)		0	(0)	.67(9)	1.10(10)	1.00(1)	-	
234	0	(0)	.17(3)		1.00(8)	1.15(17)	-	.31(4)	
238	.40(1)		0	(0)	1.24(17)	1.39(15)	2.00(1)	-	
241	0	(0)	0	(0)	.50(4)	.65(14)	-	0 (0)	
245	0	(0)	0	(0)	0	(0)	-	-	
248	.20(1)		-		1.00(2)	-	-	-	
252	0	(0)	-		0	(0)	-	-	
255	0	(0)	-		1.00(1)	-	-	-	
259	0	(0)	-		0	(0)	-	-	

Day	Proctotrupoidea					
	Pitfall 1980	Yellow pan		Sweepnet 1979	Ground cloth 1979	
	1980	1979	1980			
150	0 (0)	4.50(3)	0 (0)	-	-	-
154	.10(1)	0 (0)	2.02(21)	-	-	-
157	0 (0)	.50(1)	1.50(10)	-	-	-
161	.15(2)	2.83(33)	1.59(18)	-	-	-
164	0 (0)	.94(16)	1.14(11)	-	-	-
168	0 (0)	3.52(29)	1.78(29)	-	-	-
171	0 (0)	5.17(3)	1.85(27)	-	-	-
175	.67(3)	1.53(23)	3.69(29)	-	-	-
178	.25(2)	.90(5)	2.63(29)	-	-	-
182	0 (0)	2.82(19)	1.36(11)	-	-	-
185	2.57(3)	3.28(20)	.90(15)	0 (0)	0 (0)	-
189	.35(4)	2.20(38)	1.38(20)	-	-	-
192	.20(3)	1.30(5)	.91(11)	.25(3)	.25(1)	-
196	.10(2)	1.80(28)	1.08(6)	-	-	-
199	0 (0)	7.5 (3)	.63(4)	1.17(3)	.25(1)	-
203	0 (0)	2.47(33)	.60(5)	-	-	-
206	.10(1)	.50(1)	.64(7)	.25(3)	.25(2)	-
210	0 (0)	2.02(26)	.75(4)	-	-	-
213	.10(1)	2.75(2)	.50(3)	.99(9)	.56(4)	-
217	0 (0)	2.45(30)	0 (0)	-	-	-
220	0 (0)	4.22(7)	1.50(4)	.75(20)	.70(13)	-
224	.10(1)	8.11(19)	2.71(19)	-	-	-
227	0 (0)	3.66(9)	1.73(13)	.38(2)	.38(2)	-
231	0 (0)	10.82(22)	1.85(17)	-	-	-
234	.20(3)	3.65(20)	1.93(14)	.69(4)	2.00(5)	-
238	0 (0)	21.71(26)	2.43(16)	-	-	-
241	.20(1)	8.33(9)	1.50(9)	.54(6)	.25(1)	-
245	0 (0)	0 (0)	-	-	-	-
248	-	4.90(5)	-	.50(1)	.25(1)	-
252	-	2.17(3)	-	-	-	-
255	-	12.17(3)	-	.25(1)	0 (0)	-
259	-	.50(1)	-	-	-	-

¹ Julian date for 1980 (e.g. 1979 = 151; 1980 = 150; 1981 = 151).

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