

# Cooperative National Park Resources Studies Unit

## ARIZONA

TECHNICAL REPORT NO. 23

A PRELIMINARY INVESTIGATION OF THE ARTHROPOD  
FAUNA OF QUITOBAQUITO SPRINGS AREA,  
ORGAN PIPE CACTUS NATIONAL MONUMENT, ARIZONA

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University of Arizona/Tucson - National Park Service

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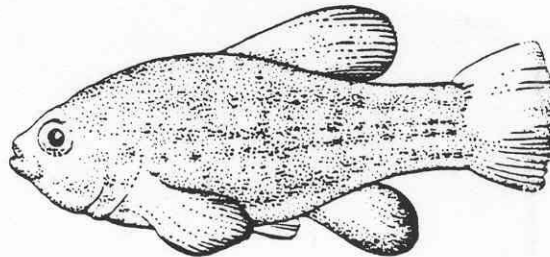
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## ABSTRACT

Insects were collected during seven field trips to Quitobaquito Springs. Several different techniques for collecting were used, including blacklight trapping, aerial and sweep netting, and hand capture. The collection reflects the interests of the investigators and is not a thorough sampling of all taxa that might be found or all microhabitats that are available. A total of 559 species-level taxa in 134 families representing 12 orders were collected. Many of these are identified to species level.

The study area is probably the only United States breeding habitat of the butterfly Ascia howarthi (commonly named Giant White) which is dependent upon the plant Atamisquea emarginata (no common name) which grows at no other location in the U.S. Protection of this rare plant is called for if the butterfly is to remain part of the fauna. The insect fauna is probably typical of Sonoran desert habitats where permanent water is present. No significant threats to insect populations were apparent or are in need of management consideration at this time.

## INTRODUCTION

Quitobaquito Springs in Organ Pipe Cactus National Monument has been intensively studied over a period of many years as the most biologically diverse in the monument. Cole and Whiteside (1965) gave a brief description of the habitat, including some of the arthropod fauna. Johnson et al. (1983) discussed avian use of the area. Brown and Warren (1986) described the woody riparian vegetation at the springs. Bowers (1980) included references to the flora at Quitobaquito. Crieghton (1952) surveyed the ants of Organ Pipe Cactus National Monument, including Quitobaquito Springs. Increasing understanding and proper management of the resources calls for continued research into some of the lesser known components of the community.

Despite the facts that most of the animals in the world are insects and that the arthropod fauna plays a major part in the functioning of any ecosystem, basic inventories of arthropods are scarce to nonexistent for National Park Service areas. This preliminary survey of the arthropods of the Quitobaquito Springs area is part of an ongoing ecological study being conducted by the National Park Service.

Insects are part of the diet of the Quitobaquito pupfish (Cyprinodon macularius eremus). Insects and spiders are an important food source for many of the birds and bats that visit or reside at Quitobaquito. Native insects may be the sole pollinators of some of the unique native plants found in the area. The relative abundance and species composition of arthropods may be an index of pesticide drift from the agricultural area around Sonoyta, Mexico, which is a problem of increasing concern. This study is a first step toward gathering baseline data on these important animals, and should be of assistance in the development of a management plan for Quitobaquito.

## METHODS

This study was limited to the collection and identification of members of the class Insecta. Seven field trips were taken to the area between April 23, 1983 and December 31, 1984. On each trip, insects observed were collected by standard methods such as aerial and sweep netting and hand capture. Efforts were made to sample each of the habitats present in the area, focusing primarily on the examination of individual plants that were in bloom. Blacklight trapping was done at night on each trip. Adjacent areas, including the hills north of the springs and Aguajita Was were examined also. Little effort was made to sample for certain groups that were difficult to find or require specialized techniques, such as soil arthropods, aquatic benthos arthropods in the pond, wood borers, leaf miners, etc. The resulting collection reflects the interests of the investigators and the limitations of time and techniques, and should not be considered a truly exhaustive or complete inventory of the fauna present in the area. Identifications were made by means of use of keys in the literature, comparison with labeled specimens in the University of Arizona insect collection, and consultation with local taxonomists, Dr. Floyd Werner and Mr. Carl Olson of the University of Arizona Department of Entomology.

Specimens collected were deposited with the permanent collection at the University of Arizona Department of Entomology and with Organ Pipe Cactus National Monument.

## RESULTS

Table 1 lists the insect fauna collected. The order and nomenclature of the higher groups (orders, families, subfamilies) generally follows that of Borror et al. (1981). Within the list, orders are capital letters in BOLDFACE; families are in capitals; subfamilies are indented once and in capitals and lowercase; and genus and species are indented twice and underlined. Example:

### ORDER

#### FAMILY

##### Subfamily

Genus species Author/(Author)

In general, order names end with "-optera," family names end with "-idae," subfamily names end with "-inae," tribe names end with "-ini." Where possible, specimens were identified to the lowest taxonomic level (species). Species names are identified, all other levels of classification are not. The species names are followed by the name (or names) of the author or first describer of the species in the scientific literature. When an author's name appears in parenthesis, this means that the original description had the species placed in another genus. Advances are continuously being made in insect taxonomy and identification, so names change with some frequency,.

Many specimens were not identified to the genus and species level. This means only that we were unable to identify them, for any one of a number of reasons. Insect identification is a complex science, even an art form; and, even a specialist in a particular group may not be able to readily identify all specimens in that group. Lack of a name in this list does not mean that the specimen represents an undescribed species, although such may be possible. Where we have identified a specimen to the lowest taxonomic level we could, but not to species, the lowest level name is followed by the abbreviation "lisp." In some cases, it was evident that we had specimens representing more than one species of a genus or higher taxonomic level, but we could not positively identify them to lower taxonomic levels. Then the lowest level to which we could identify the specimens is given, followed by "sp.," and a number (1, 2, 3, etc.). In the submitted collection, specimens were grouped by taxonomic groupings, and labeled with the lowest level we could ascertain with surety. The numbers used as identifiers in this list are not part of the specimen labels, but only serve to indicate how many apparently different species were collected.



**TABLE 1. Insects Collected at Quitobaquito Springs, Organ Pipe Cactus National Monument, Arizona.**

**ODONATA**

GOMPHIDAE

Progomphus borealis MacLachlan  
Erpetogomphus compositus Hagen

AESHNIDAE

Anax junius (Drury)

LIBELLULIDAE

Libellula saturata Uhler  
Erythemis simplicicollis Say  
Sympetrum madidum (Hagen)  
Brachymesia furcata Hagen  
Perithemis domitia Drury  
Tramea sp.\*  
Pachydiplax longipennis (Burmeister)  
Orthemis ferruginea (Fabricius)  
Pontala hymenaea (Say)

COENAGRIONIDAE

Chromagrion sp.  
Argia sp.\*  
Telebasis salva (Hagen)  
Neoneura sp.\*  
Tellealagma sp.\*  
Other species: 1

**NEUROPTERA**

CHRYSOPIDAE

Chrysopa sp. 1  
Chrysopa sp. 2  
Chrysopa sp. 3  
Chrysoya sp. 4  
Eremochrysa punctinervis McLachlan

MYRMELEONIDAE

Hesperoleon sp. 1  
Hesperoleon sp. 2  
Hesperoleon sp. 3  
Eremoleon nigribasis Banks  
Vella hesperus Banks

HEMEROBIIDAE Species: 1

\* denotes species throughout table were also collected by Cole and Whiteside, 1965.

\*\*denotes species collected by W.S. Creighton in 1952 (note found only on page 18).

## DERMAPTERA

### LABIDURIDAE

Labidura riparia (Pallas)

### CARCINOPHORIDAE

Euborellia sp.

### TRICHOPTERA

### LEPTOCERIDAE

Oecetis sp.

### THYSANOPTERA

### AELOTHRIPIDAE

Species: 1

### ORTHOPTERA

### ACRIDIDAE

#### Acridinae

Ligurotettix coquilletti McNeill

Opeia obscura (Thomas)

Horesidotes cinereus Scudder

Cibolacris parviceps (Walker)

#### Oedipodinae

Trimeritropis pallidipennis (Burmeister)

Lactista aztecus (Saussure)

Anconia integra (Scudder)

Heliastus benjamini Caudell

#### Cyrtacanthacridinae

Schistocerca vaga (Scudder)

Melanoplus sp.

Aeoloplides tenuipennis (Scudder)

Hesperotettix viridis (Thomas)

Leptysma hebardei Rehn and Eades

### TETTIGONIIDAE

Neoconocephalus triops (L.)

Scudderia mexicana (Saussure)

Ateloplus schwarzi Caudell

Eremopedes bilineatus (Thomas)

Insara elegans (Scudder)

Insara covilleae Rehn and Hebard

### GRYLLIDAE

Gryllus sp.

Nemobius sp.

### MANTIDAE

Litaneutria minor Scudder

Stagmomantis californica Rehn and Hebard

BLATTELLIDAE

Blattella vaga Hebard

**HOMOPTERA**

MEMBRACIDAE

Spissistilus festinus (Say)

CICADELLIDAE

Gyponinae

Species: 1

Iassinae

Stragania sp.

Hecalinae

Species: 1

Agalliinae

Aceratagallia sp.

Typhlocybinae

Empoasca sp. 1

Empoasca sp. 2

Deltocephalinae

Scaphytopius nigricollis (Ball)

Scaphytopius sp.

Opsius stactogalus Fieber

Other species: 5

Cicadellinae

Homalodisca sp.

Carneocephala sp.

Other species: 1

DELPHACIDAE

Species: 1

CIXIIDAE

Species: 2

FULGORIDAE

Cyrpoptus sp.

FLATIDAE

Ormenis sp.

PSYLLIDAE

Species: 1

CERCOPIDAE

Clastoptera sp.

ISSIDAE

Species: 1

## HEMIPTERA

### PENTATOMIDAE

Chlorochroa sayi Stal  
Chlorochroa ligata (Say)  
Thyanta pallidovirens Stal  
Mecidea minor Sailer

### CYDNIDAE

Melanaethus sp.  
Tominotus conformis communis (Uhler)

### COREIDAE

Leptoalossus brevirostris Barber

### RHOPALIDAE

Liorhyssus hyalinus (F.)  
Harmostes reflexulus (Say)  
Aufeius immressicollis Stal

### LYGAEIDAE

Lygaeus lateralis Dallas  
Nysius raphanus Howard

### LARGIDAE

Largus cinctus Herrich-Schaeffer

### BERYTIDAE

Pronotacantha annulata Uhler

### TINGIDAE

Species: 1

### REDUVIIDAE

Zelus renardii Kolenati  
Zelus socius Uhler  
Rasahus biguttatus (Say)  
tenolemoides arizonensis (Banks)  
Triatoma rubida (Uhler)

### MIRIDAE

Phytocoris sp.  
Oncerometopus nigriclavus Reuter  
Other species: 4

### VELIIDAE

Microvelia sp.

### NOTONECTIDAE

Notonecta indica L.  
Buenoa arizonis Bare

NAUCORIDAE

Ambrysus californicus Montandon

LEPIDOPTERA

HESPERIIDAE

Lerodea eufala (Edwards)  
Lerodea arabus (Edwards)  
Nyctelius nyctelius (Latreille)  
Copaeodes aurantiaca (Hewitson)  
Hylephila Rhyleus (Drury)  
Pholisora libya (Scudder)  
Pyrgus albescens Plotz  
Prygus philetas Edwards  
Prygus scriptura (Boisduval)  
Heliopetes domicella (Erichson)  
Erynnis funeralis (Scudder and Burgess)  
Systasea zampa Edwards

PAPILIONIDAE

Battus philenor (L.)

PIERIDAE

Pieris protodice (L.)  
Colias eurytheme Boisduval  
Colias cesonia Stoll  
Phoebis sennae L.  
Kricogonia lyside Godart  
Ascia howarthi (Dixey)  
Eurema nicippe Cramer  
Euema mexicana Boisduval  
Anthocaris pima Edwards  
Nathalis iole Boisduval

LYCAENIDAE

Calephelis nemesis Edwards  
Apodemia mormo Felder and Felder  
Apodemia palmerii Edwards  
Ministrymon leda Edwards  
Chlorostrymon simaethis Drury  
Atlides halesus Cramer  
Strymon melinus Hubner  
Strymon columella Fabricius  
Leptotes marina Reakirk  
Hemiargus isola Reakirk  
Hemiargus ceraunus Fabricius  
Brephidium exilis Boisduval

LIBYTHEIDAE

Libytheana bachmanii (Kirtland)

HELICONIIDAE

Agraulis vanillae (L.)

NYMPHALIDAE

Asterocampa leilia Edwards

Marpesia petreus Cramer

Nymphalis antiona L.

Precis coenia Hubner

Precis nigrosuffusa (Barnes and McDunnough)

Vanessa cardui L.

Vanessa virginiensis Drury

Vanessa annabella (Field)

Vanessa atalanta L.

Anthanassa texana (Edwards)

Chlosyne californica (Wright)

Chlosyne lacinia (Geyer)

Euptoieta claudia (Cramer)

DANAIDAE

Danaus gilippus (Cramer)

Danaus plexippus (L.)

TINEIDAE

Acrolophus sp.

Other species: 1

GRACILLARIIDAE Species: 1

GELECHIIDAE

Specimens: 8

PLUTELLIDAE

Plutella sp.

YPONOMEUTI DAE

Atteva punctella (Cramer)

SESIIDAE

Hypopta palmata Barnes and McDunn

Comadia intrusa Barnes and McDunn

TORTRICIDAE

Species: 1

PYRALIDAE

Evergestinae

Evergestis notentis

Phycitinae

Cactobrosis fernaldialis (Hulst)

Alberada parabates (Dyar)

Other specimens: 8

Crambinae

Diatraea grandiosella (Dyar)

PYRALIDAE (Contd.)

Pyraustinae

Hymenia perspectalis (Hubner)

Loxostege albiceralis Grote

Loxostege sp.

Achyra sp.

Hahncappsia sp.

Nomophila sp.

Other species: 3

Nymphulinae

Petrophila jaliscalis

GEOMETRIDAE

Synchlora rubrifrontaria Packard

Chlorochlamys ghyllinaria Zeller

Metasiopsis peralbata Packard

Cosymbia serrulata Packard

Eubarnesia ritaria (Grossbeck)

Glaucina sp.

Archihoe sp.

Tornos sp.

Anacamptodes obliquaria Grote

Anacamptodes dataria Grote

Semiothisa irrorata Packard

Semiothisa hypaethrata Grote

Semiothisa s-signata Packard

Semiothisa sp. 1

Semiothisa sp. 2

Apicia sp.

Other species: 2

SPHINGIDAE

Hyles lineata (F.)

Manduca sexta (L.)

Manduca quinquemaculata (Haworth)

ARCTIIDAE

Cisthene angelus Dyar

Ctenucha venosa Walker

NOCTUIDAE

Pseudaletia unipuncta (Haworth)

Bulia deducta (Morrison)

Heteranassa mimes Harvey

Schinia intrabilis Smith

Schinia balba Grote

Forsebia perlaeta Edwards

Meliothis acontioides Guenee

Matigramma rubrosuffusa Grote

Xylomyges curialis Grote

NOCTUIDAE (Contd.)

Heliopsis zea (Boddie)  
Autographa sp.  
Erebus odora (L.)  
Catocala junctiona Grote  
Hemeroplanis subflavidalis Grote  
Oncocnemis occata Grote  
Spragueia magnifica Grote  
Spodoptera exigua (Hubner)  
Grotella binda Barnes  
Azenia implora Grote  
Timora toralis Grote  
Acontia sp. 1  
Acontia sp. 2  
Conochares acuta Smith  
Conochares catalina no author  
Conochares arizonae Edwards  
Conochares sp.  
Pseudohadena vulnerea Grote  
Lepipolys perscriptura Guenee  
Cyathissa pallida Smith  
Aseptis catalina Smith  
Lacinipolia sp. 1  
Lacinipolia sn. 2  
Chorizagrotis auxiliaris Grote  
Chorizagrotis sp.  
Agrotis malefida (Guenee)  
Other specimens: 21

**COLEOPTERA**

CICINDELIDAE

Cicindela lemniscata LeConte  
Cicindela sp.

CARABIDAE

Omophron sp.  
Lebia viridis Say  
Lebia sp. 1  
Lebia sp. 2  
Bembidion sp. 1  
Bembidion sp. 2  
Agonoderus sp.  
Calosoma peregrinator Guerin  
Calosoma sp.  
Poecilus subchordatus LeConte  
Bradycellus sp.  
Brachinus sp.  
Scizogenius sp.



CARABIDAE (Contd.)

Tachys sp.

Pterostichini sp.

DYTISCIDAE

Rhantus gutticollis (Say)

Eretes sticticus (L.)

Laccophilus sonorensis Zimmerman

Laccophilus fasciatus Aube \*

Laccophilus pictus Castelman

Deronectes striatellus (LeConte)

Deronectes roffi nebulosus \*

Dytiscus habilis Say \*

Copelatus chevrolati Guignot

Cybister sp. \*

HYDROPHILIDAE

Hydrophilus triangularis say

Helophorus sp.

Tropisternus lateralis (F.) \*

Tropisternus ellipticus (LeConte) \*

Berosus ruquulosus Horne

Chaetarthria pallida (LeConte)

Enochrus pygmaeus (LeConte)

STAPHYLINIDAE

Tachyporinae

Species: 4

Paederinae

Species: 3

Staphylininae

Species: 2

SCARABAEIDAE

Melolonthinae

Diplotaxis sp.

Other species: 4

Aphodiinae

Psammobius quinqueplicatus Horn

Other species: 1

Geotrupinae

Species: 1

Dynastinae

Ligyris sp.

Cetoniinae

Cremastocheilus sp.

HETEROCERIDAE

Dampfius sp.

Other species: 1

DRYOPIDAE

Helichus sp.

BUPRESTIDAE

Acmaeodera flavomarginata Gory

Acmaeodera gibbula LeConte

ELATERIDAE

Diplostethus opacicollis Schaeffer

Discrepidius corvinus Candeze

Eniconyx sp.

Aeolus mellilus (Say)

Conoderus sp.

Other species: 2

ANOBIIDAE

Tricorynus sp.

BOSTRICHIDAE

Bostrichinae

Species: 1

CLERIDAE

Cymatodera oblita Horn

Cymatodera sp. 1

Cymatodera sp. 2

DASYTIDAE

Species: 1

MELOIDAE

Lytta magister Horn

Pyrota palpalis Champion

Epicauta wheeleri Horn

Epicauta lauta (Horn)

Epicauta tenella (LeConte)

MORDELLIDAE

Mordellistena sp.

Other species: 1

TENEBRIONIDAE

Tenebrioninae

Eleodes armata LeConte

Eleodes caudata Le Conte

Ulus crassus (LeConte)

Ammodonus granosus Fall

TENEBRIONIDAE (Contd.)

Other species: 1

Tentyriinae

Cryptoglossa verrucosa LeConte

Other species: 2

Asidinae

Asidina confluens Asidinae

Asidina confluens (LeConte)

Other species:

LAGRIIDAE

Statira sp.

ALLECULIDAE

Hymenorus sp.

Other species: 4

OEDEMERIDAE

Xanthochroina sp.

Oxaxis sp.

ANTHICIDAE

Notoxus sp.

Anthicus sp. 1

Anthicus sp. 2

NITIDULIDAE

Carpophilus sp.

COCCINELLIDAE

Hippodamia convergens Guerin

chilocorus cacti L.

Olla abdominalis (Say)

CERAMBYCIDAE

Taranomis bivittata (Dupont)

Aneflus pratensis Leconte

Crossidius suturalis Leconte

Osmidius guttatus Leconte

Peropleum sp.

Cerambycinae

Species: 1

CHRYSOMELIDAE

Cryptocephalinae

Pachybrachys sp. 1

Pachybrachys sp. 2

Pachybrachys sp. 3

Galerucinae

Species: 1

Alticinae

Species: 2

BRUCHIDAE

Algarobius prosopis (Leconte)

Mimosestes amicus (Horn)

CURCULIONIDAE

Anthonominae

Species: 1

Ceutorhynchinae

Species: 1

MALACHIIDAE

Collops sp. 1

Collops sp. 2

**DIPTERA**

TIPULIDAE

Tipula sp. 1

Other species: 2

CULICIDAE

Anopheles franciscanus McCracken

CHIRONOMIDAE

Tanypodinae

Tanypus sp.

Diamesinae

Species: 1

Chironominae

Species: 2

Orthoclaadiinae

Species: 2

Other species: 1

CERATOPOGONIDAE

Ceratopogoninae

Species: 1

Dasyheleinae

Species: 1

BIBIONIDAE

Bibiodes sp.

CECIDOMYIIDAE

Neolasioptera sp. 1

Asphondyliini

Species: 2

Cecidomyiini

Species: 1

Lestremiinae

Species: 2

Other species: 1

TABANIDAE

Chrysops sp.

Apatolestes aitkeni Philip

ASILIDAE

Saropogon sp.

Efferia sp. 1

Efferia sp. 2

Efferia sp. 3

Mallophorina sp.

BOMBYLIIDAE

Thyridanthrax sp.

Geron sp. 1

Geron sp. 2

Paravilla sp.

Heterostylum robustum (Osten Sacken)

Lordotus sp. 1

Lordotus sp. 2

Poecilanthrax sp. 1

Poecilanthrax sp. 2

Bombylius major L.

Anthrax sp.

Oligodranes sp.

Lepidanthrax sp. 1

Lenidanthrax sp. 2

DOLICHOPODIDAE

Tachytrechus angustipennis Loew

Chrysotus sp. 1

Chrysotus sp. 2

Medetera sp.

Hydrophorus sp.

Condylostylus inornatus (Aldrich)

Others species: 3

STRATIOMYIDAE

Odontomyia sp.

Hedriodiscus currani James

SYRPHIDAE

Scaeva pyrastris (L.)

Eupeodes volucris Osten Sacken

Volucella apicifera Townsend

Volucella sp. 1

Eristalis aeneus (Scopoli)

Eristalis latifrons Loew

Mesograpta sp.

Baccha clavata (F.)

NERIIDAE

Odontoloxozus longicornis (Coquillett)

OTITIDAE

Diacrita costalis Gerstaecker

TEPHRITIDAE

Euaresta bellula Snow

Other species: 1

LAUXANIIDAE

Camptoprosopella sp.

SPHAEROCERIDAE

Leptocera sp. 1

Leptocera sp. 2

Scatophora sp.

HELIOMYZIDAE

Pseudoleria sp.

DROSOPHILIDAE

Drosophila sp.

Other species: 1

EPHYDRIDAE

Species: 1

CHLOROPIDAE

Pseudogaurax sp.

Lasiopleura sp.

ANTHOMYIIDAE

Scatophora sp.

MUSCIDAE

Species: 3

CALLIPHORIDAE

Cochliomyia sp.

Lucilia sp.

Phaenicia sp.

SARCOPHAGIDAE

Sarcophaga sp. 1

Sarcophaa sp. 2

TACHINIDAE

Euphaseopteryx ochracea Bigot

Others species: 4

CUTEREBRIDAE

Species: 1

**HYMENOPTERA**

BRACONIDAE

Agathidinae

Zelomorpha sp.

Other species: 1

Braconinae

Species: 1

ICHNEUMONIDAE

Compsocryptus calipterus (Say)

Tryphoninae

Netelia sp.

Ophioninae

Enicospilus sp.

Tersolochini

Species: 1

Other species: 3

FORMICIDAE

Pogonomyrmex pima Wheeler \*\*

Novomessor cockerelli (Andre)\*\*

Veromessor pergandei (Mayr)\*\*

Pheidole vasliti arizonica Santschi\*\*

Iridomyrmex pruinosum analis (Andre)\*\*

Solenopsis xyloni (McCook)

CHALICIDOIDEA

Species: 1

EULOPHIDAE

Species: 1

CYNIPIDAE

Species: 1

SCELIONIDAE

Species: 2

TIPHIIDAE

Brachycistis triangularis Fox  
Brachycistis chinensis Bradley  
Brachycistis arenivaga Bradley  
Brachycistis sp.  
Paratiphia sp.  
Myzinum sp.

MUTILLIDAE

Odontophotopsis sp.  
Sphaerophthalma sp.  
Acanthophotopsis sp.  
Other species: 6

SCOLIIDAE

Campsoscolia flammicoma (Bradley)  
Scolia otomita Saussure  
Scolia ardens Smith  
Campsomeris tolteca (Saussure)

POMPILIDAE

Hemipepsis ustulata Dahlbom  
Pepsis mexicana Lucas  
Pepsis chrysothemis Lucas  
Pepsis mildei Stal  
Pepsis pallidolimbata Lucas  
Episyron posterus (Fox)  
Anoplius sp.  
Pompilus expulsus Schulz  
Other species: 1

EUMENIDAE

Stenodynerus sp. 1  
Stenodynerus sp. 2  
Other species: 2

SPHECIDAE

Ammophila breviceps Smith  
Ammophila sp.  
Ammophila aberti Haldeman  
Ammophilini  
Podalonia mexicana (Saussure)  
Aphilanthops hispida Fox  
Trypoxylon sp.



Glenostictia sp.  
Bembix sayi Cresson  
Bembix sp.  
Steniola duplicata Provancher  
Liris sp..  
Prionyx sp.  
Sphex sp.  
Eucerceris sp.  
Other species: 1

#### HALICTIDAE

Agapostemon melliventris Cresson  
Nomia nevadensis (Cockerell)  
Nomia tetrazonata Cockerell  
Augochlorella pomoniella Cockerell  
Lasioglossum sp.

#### ANDRENIDAE

Andrena sp.  
Other species: 1

#### MELITTIDAE

Ashmeadiella sp.

#### ANTHOPHORIDAE

Diadasia sp.  
melissodes sp.  
Hemisia sp.  
Anthophora sp.  
Other species: 1

#### APIDAE

Apis mellifera L.

#### MEGACHILIDAE

Lithurginae  
Species: 1  
Megachilinae  
Chalicodoma sp.  
Other species: 3

## DISCUSSION

Biogeographic affinities of the insect fauna of Quitobaquito are difficult to evaluate meaningfully. Usually known species ranges are limited to those areas that have received adequate surveillance. For many species, ranges vary from year to year, depending upon weather conditions. However, we have attempted to group the distributions of 129 species found at Quitobaquito Springs into areas in which they might be expected to occur with greatest frequency. These and the number of species and percent of the total 129 species included in this analysis are:

**TABLE 2. Biogeographic Affinities of the Insect Fauna of Quitobaquito.**

AREA	NUMBER OF SPECIES	PERCENT OF TOTAL
Cosmopolitan	4	3.1
Introduced	2	1.6
North & South America	18	13.9
North & Central America	11	8.5
North America	10	7.8
United States	5	3.9
Western U.S. & Mexico	26	20.2
Western U.S.	18	13.9
Southern U.S.	6	4.7
Southwestern U.S.	16	12.3
Arizona-California	1	0.8
Arizona-Sonora	11	8.5
Arizona	1	0.8
<b>TOTALS</b>	<b>129</b>	<b>100.0</b>

The data presented in Table 2 indicates that the insect fauna of Quitobaquito is representative to that found in any similar area of the Southwestern U.S. or Northern Mexico, than includes permanent water. There is a predominance of widespread species that are adaptable to a variety of situations.

The only really noteworthy distribution record is that of the butterfly, Ascia howarthi (Dixey), which is primarily a Mexican species, with a few U.S. records. This species is associated with, and completely dependent upon the plant Atamisquea emarginata, which is found in the U.S. only near Quitobaquito Springs. Bailowitz (1985) present a detailed discussion

of the distribution and biology of this species. This species was formerly considered to be conspecific with A. josephina (Godart), but has been evaluated to species level based on behavioral, ecological, and morphological evidence (Bailowitz 1987).

Two species are introduced and have become naturalized throughout the United States. The Honeybees, Apis mellifera, have become naturalized from domestic colonies. Bee specimens collected at Quitobaquito may have been members of domestic colonies kept at the site by the National Park Service for observation of pesticide drift, or may have been from wild colonies. The other introduced species is the striped earwig, Labidura riparia (Pallas). It was first found in Arizona at Yuma in 1952, and has become widespread in the southern part of the state. It is a predator on other insects, especially maggots. Occasionally, it may invade houses because it is attracted to lights, and may become a nuisance (Ebeling 1978). At Quitobaquito, it probably lives in soil, under leaves and other debris, and is uncommon and harmless creature.

Management implications of this research are not clear-cut. The ways in which present management techniques impact the arthropod fauna are not evident, save that the present condition of the habitat diversity provides a variety of resources for insects, including both stream and pond habitats for aquatic insects. Most, if not all, of the insect species present would likely remain present as long as this habitat diversity is maintained. Because of the very small extent of the distribution of Atamiscgunea emarginata, the population of Ascia howarthi is at some risk of extirpation in the U.S., should some misfortune befall the host plant. It is possible that insecticide use in the neighboring agricultural land in Mexico may adversely impact some components of the Quitobaquito fauna, particularly in the extent of extreme drift of aerially applied insecticides (NPS data available). However, since most of the fauna is widespread and highly mobile, eventual reestablishment following local catastrophe is likely.

It cannot be overemphasized that this study was based on a very small number of field trips, and many taxa may have been overlooked. Because insect populations in an area may be ephemeral, or cryptic or migratory, a much more extensive survey is needed to develop a clear understanding of the insect fauna. This study may, however, provide a good basis on which to begin more extensive work.

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