

HYMENOPTERA OF GREAT BASIN NATIONAL PARK

**REVIEW OF
BIOBLITZ 2011**

(C) Ken Kingsley



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Identifications by Dr. James Pitts and Lab at Utah State University
Annotated by Dr. Ken Kingsley, based on several sources

Introduction by Gretchen Baker

Over 80 people joined in the park's third annual Bioblitz August 1-3, 2011. This short term discover biodiversity event helped the park add to its list of Hymenoptera (wasps, bees, and ants). Dr. James Pitts from Utah State University led the effort, with assistance from his graduate students and entomologists from the Nevada Department of Agriculture, University of California-Davis, University of Nevada-Reno, and the Utah Natural History Museum. Volunteers came from California, Utah, Colorado, and Nevada.

The event began with a workshop about Hymenoptera featuring several speakers. It was followed by a lunch sponsored by the Western National Parks Association. Participants then embarked on a 48-hour collecting period. Volunteers, ranging in age from 3 to more than 80, collected Hymenoptera by various methods. Some used nets to sweep vegetation, forceps to pick up ants, bowl traps with soapy water to attract bees, and light and malaise traps to catch a variety of species. Bioblitz participants filled out data sheets to indicate the location, habitat, and collecting method. Everything was brought back to Bioblitz headquarters, where data were entered into a computer and entomologists began sorting samples.

The Bioblitz also provided an excellent venue for sharing the importance of insects with park visitors, staff, and volunteers. The Bioblitz included numerous educational programs, including a workshop, kids' programs, a campfire talk, and patio talks about Hymenoptera. The science class from Woodlin High in Colorado participated. A photographer helped document the event and some of the insects. The event ended with a lunch sponsored by the Great Basin National Park Foundation and raffle prizes from the Western National Parks Association. Dr. Pitts made closing remarks, noting that over 400 specimens were collected, with at least 25 families and 65 species of Hymenoptera. Dr. Pitts also remarked that he had seen several velvet ant species that he had not expected to be in the park.

Following the Bioblitz, most of the specimens were taken to the Dr. Pitts' lab at Utah State University to be identified. Back in the lab, the entomologists discovered that one of the species collected was a new species to science! This new species is in the family Tiphidae, the Tiphid wasps. These wasps are relatively small (up to 30 mm) and solitary. They lay their larvae on beetles, so they are considered parasitoids. The genus is *Acanthetropis*, but the species name has yet to be determined. Stay tuned for the unveiling of this new creature! The park thanks everyone who participated and helped with the Bioblitz. This has been a great way to learn more about the invertebrates that inhabit the park, as well as share information about the importance of these small creatures in our world.

This document compiles the identifications made by Dr. Pitts and his students with photographs by David Hunter and Ken Kingsley and brief descriptions of the families compiled from several sources by Ken Kingsley. We anticipate that there will be additions and revisions to the document over time, as identifications are completed and more is discovered about the Hymenoptera of Great Basin National Park.

Numbers indicate how many samples included the taxon out of 148 samples examined by Dr. Pitts.

Tenthredinidae—common sawflies -2

About 800 species in NA, most in northern half of continent; Adults 5-20 mm, stingless, feed on nectar, pollen, insects; larvae resemble caterpillars, feed on leaves or stems of trees and shrubs or make galls. Some species may be pests of trees and shrubs.

Megaspilidae -2

About 60 species in NA, adults 1.5-4 mm; larvae are parasites of Diptera and Homoptera. Poorly known, uncommon and tiny, with no economic impacts known.

Ceraphronidae—Gall Midge Parasite Family -3

About 50 species in NA, adults 1.2-4 mm; larvae are hyperparasites of aphid parasites and parasites of gall midges. Very poorly known.

Braconidae -17

About 2,000 species with 32 subfamilies in NA, adults 2-4 (rarely 15) mm; larvae are mostly parasites of Lepidoptera caterpillars. Generally considered beneficial to human interests.

Cheloninae -5—a subfamily of Braconidae

Ichneumonidae -14

More than 4,700 species in 24 subfamilies in NA; adults 3-40 mm; larvae are parasites or hyperparasites of Lepidoptera, Hymenoptera, Diptera, Coleoptera, Neuroptera, and Mecoptera, some feed on spiders and their egg sacs or eggs of pseudoscorpions. Generally considered beneficial to human interests. Uncommon in arid regions of the US.

Myrmariidae—fairyflies -13

Tiny wasps, smallest of all insects, less than 1 mm, parasites of eggs of Odonata, Orthoptera, Psocoptera, Thysanoptera, Hemiptera, Coleoptera, Lepidoptera, and Diptera. 120 known species in NA. Poorly known

Eulophidae -1

More than 500 species in NA, adults 1-3 mm, parasites of eggs or larvae of scale insects, beetles, or moths. Generally considered beneficial.



Ichneumonidae

Encyrtidae -2

Over 500 species in NA, 1-2 mm, may be gall makers or parasites on weevils, Homoptera, and other insects. One egg may produce many (up to 1,000) babies. Generally considered beneficial.

Eupelmidae -2

95 species known from NA, 2-5 mm, little brown or black wasps, some may be wingless jumping insects. May be parasites of some pest insects.

Eucharitidae -1

Adults are 2-4 mm long, black or iridescent green. Parasites of ant pupae, eggs are laid on leaves or buds, hatch into tiny larvae that wait for passing ants to grab to hitch a ride to the ant nest. 28 species in NA, many more in tropics.

Eurytomidae--seed chalcids -4

Adults 1-4 mm, usually black, yellow, or metallic in color. About 240 species in NA. Some live as larvae in seeds and stems of plants, including cereal crops, some are parasitic on other insects, and some start as parasites then switch to plants.

Participants in the 2011 Hymenoptera BioBlitz at Great Basin National Park found 32 families and more than 120 species. Most of these had never been documented previously in the park.

Chalcididae -9

Adults 2-11 mm, usually black or yellow, with enlarged hind legs. More than 100 species in NA, mostly parasites of Lepidoptera, Coleoptera, and Diptera, some hyperparasites, some considered beneficial. *Spilochalcis* sp. -3 There are at least 38 species in this genus, which has been revised to *Conura*.

Figitidae -3

Adults 3-6 mm, black or brown. Parasites of Neuroptera, Hemiptera, and Diptera and hyperparasites on Hymenopteran parasites of aphids. The 60 species in NA have been divided into five subfamilies.

Cynipidae--gall wasps -1

Adults 2-8 mm, over 630 species in NA, most inconspicuous little brown or black wasps. Females of most species deposit eggs in plant tissue, and somehow the larva causes the plant tissue to grow to form a home (called a gall) for the larva and feed it. Most species of gall wasp cause a unique and characteristic growth, which may be on leaves, stems, or roots, and some may be very much larger and more conspicuous than the wasp that caused them. Some species may live in galls made by other species. Reproduction may be very complex, with some species rarely, if ever, having males, and some having males in alternate generations, some using several species of plants and some using only one species. Galls may also be formed by flies, aphids, mites, and other organisms.

Heloridae -2

Only one species in this family is known, *Helorus paradoxus*. It is a parasite of lacewings. The adults are black and about 4 to 5 mm long.

Diapriidae -3

Adults 1-7 mm, over 300 species in NA, little black wasps, most are parasites on flies.

Scelionidae -6

Tiny wasps, 0.45-4 mm long, many are black with yellow legs. 275 species in NA, these are parasites of the eggs of other insects and spiders.

Platygastridae -1

Tiny, 1-2 mm wasps whose wings have no veins, mostly parasites of Diptera and Homoptera. 192 species in NA.

Chyphotidae

This family is known in some sources as Bradynobaenidae, and was formerly included in Mutillidae. Dr. Pitts has been studying this group, and considers it Family Chyphotidae. Males of most species are winged, the females are not. Adults are brownish hairy wasps 10 to 20 mm long. Little or nothing is known about their biology. There are about 50 species in NA, although continued research may reveal that there are more or fewer. Three species in two genera were found during the Bioblitz.

Chyphotes atriceps -3

Chyphotes attenuates -2

Typhoctes peculiaris -1

Chrysididae—cuckoo wasps

Adults 6-12 mm, usually brilliant metallic blue, green, or reddish, hard shelled, marked with tiny pits; some are capable of curling into a ball. They are inquilines or cleptoparasites—invading the nests of stinging Hymenopterans, killing the larvae, and placing their own eggs in the nest to consume the food gathered by the hosts. This parallels the behavior of the European Common Cuckoo bird, hence the name cuckoo wasp. More than 225 species in NA in five subfamilies.

Chrysis sp. - 1

Chrysura sp. -1

Ceratochrysis sp. -4

Hedichrydium sp. -6



Chrysididae- *Ceratochrysis* sp.

Bethylidae -1

Adults 2-5 mm, black or brown, females of some species resemble ants and have no wings. Many of the 196 species in NA are parasites of wood-boring beetle larvae.

Crabronidae

This is a large family of wasps, with over 1,200 species in NA, divided into many subfamilies and tribes. Most were formerly, and still are by many sources, included in the Sphecidae. New work and interpretations are constantly forcing revision of thinking. This is Dr. Pitts' interpretation of current classification.

Adults are 2-40 mm long, the females capable of stinging and often brightly colored with warning colors. They are usually solitary, although some may nest communally or in close proximity to each other, they are not truly social. They often nest in holes dug in the ground, but some build structures, such as clay pots or mud cells. Nests are provided with stung insects or spiders, on which the larvae feed. Adults feed on nectar or honeydew.

Eucerceris fulvipes -11

Eucerceris arenaria -2

Cerceris convergens -1

Zanysson sp. -1

Dryudella sp. -2

Psenulus sp. -2

Psen sp. -1

Pemphredon sp. -1

Pison sp. -1

Solierella sp. -1

Trypoxylon sp. -5

Crossocercus spp. -4

Lestica sp. -16

Ectemnius sp. -4

Crabro sp. -6

Tachysphex sp. -4

Oxybelus sp. -1

Pemphredonini -5

Bembicini -4

Tachytes sp. -2

Ammoplanellus sp. -3

Ancistrocerus sp. -1



Crabronidae



Crabronidae – *Trypoxylon* sp.



Crabronidae -- Bembicini

Sphecidae s.s. – thread-waisted wasps

This family now includes only the genera formerly (and currently in some sources) in the family Sphecidae, subfamily Sphecinae. Wasps in this family have long, thin “waists” or petioles connecting major body sections. There are 125 species in 11 genera in NA. Adults feed on nectar or honeydew and provision their nests with arthropod prey on which the larvae feed. Many are colored brightly with warning colors, and have effective stings. Adults may be 10 to 30 mm long.

- Sceliphron* sp. -4
- Chlorion* sp. -1
- Ammophila* sp. -23
- Podalonia* sp. -61
- Prionyx* sp. -2
- Sphex* sp. -3
- Palmodes* sp. -2



Sphecidae – *Podalonia* sp.



Sphecidae – *Ammophila* sp.



Sphecidae -- *Sceliphron*

Colletidae—plasterer and yellow-faced bees -7

Adults are 3.5 to 12 mm long, black or black marked with yellow and white. There are three subfamilies and around 150 species in NA, but about 100 species belong to the genus *Colletes*, yellow-faced bees, and about 50 to the genus *Hyleaeus* which mostly also have yellow faces. Adults feed on nectar and pollen and nest holes in the ground that they line with a plastic- or polyester- like secretion. Nests are provided with nectar and pollen.

Halictidae—Sweat bees -41

Adults are 4-10 mm long, usually black or brown but many have metallic green or blue, coppery, or yellow or a combination of these. About 12 of the 520 species in NA are attracted to human perspiration, hence the common name. They typically nest in holes in the ground and provision their young with pollen and nectar. Some species are social, the female offspring remaining with the mother and home nest, helping to rear additional offspring. They can sting, but the sting is not usually very painful to people.

Agapostemon sp. -9 Usually metallic green head and thorax, yellow and black striped abdomen, or all metallic green. 14 species in NA, usually quite common.



Halictidae – *Agapostemon* sp.

Megachilidae—leaf-cutting bees -13

Adults are 6 to 18 mm long, usually black with yellow or white markings, but some are metallic blue or green. Most species have a hair structure called a pollen brush on the underside of the abdomen, used to collect pollen for provisioning nests. Most nest in holes in ground, wood, or natural cavities, and many line the nest with pieces of leaves that are precisely cut to size and shape. Some build nests by cementing grains of sand together. There are almost 700 species in 18 genera in NA.

Megachile sp. -3

Osmia sp. -22

Anthidium sp. -9



Megachilidae- *Anthidium*



Megachilidae- *Megachile* sp.

Apidae—honey bees, bumble bees -29

There are 3 subfamilies, 50 genera, and about 1,000 species in NA. Adults may be 5 to 27 mm long, most are more-or-less hairy and have branched hairs. Most are black with yellow markings and females of many species can sting. Some species are social, most are not or have small families. Nests may be complex, containing thousands of individuals and lasting many years, or with only a few individuals and lasting only a year. Adults provision the nests with nectar and pollen. One subfamily, Nomadinae (Cuckoo Bees) lays its eggs in the nests of other bees, does not gather nectar or pollen, and is not particularly hairy. Surprisingly few species in this family were collected during the Bioblitz.

Bombus huntii -29

Bombus sp. -19

Triaepolis sp. -2

Apis mellifera -2



Apidae- *Bombus* sp.



Apidae- *Bombus* sp.

Tiphiidae

Tiphiid wasps in their larval stage are parasites of beetle larvae and some bees and wasps that nest in soil and rotting wood. Some species have wingless females and winged males. Adults are 6 -26 mm long, most are brown or black, but members of the subfamily Myzininae are yellow and black. Adults feed on nectar. There are 225 species known from NA, and a new species has been found in Great Basin National Park during the Bioblitz.

Acanthetropis sp. nov. -1

Brachycistis curvata - 2

Brachycistis glabella-2

Brachycistis ioachinensis -2

Brachycistis petiolata -2

Tiphiinae -1

Stilbopogon sp. -1



Apidae – *Apis mellifera*

Mutillidae—velvet ants

Velvet ants get their name because some species look somewhat like ants covered with deep soft fur or velvet. Males are winged, females wingless, and the two sexes may look quite different from each other in color, size, and form. Adults are very hairy, often brightly colored black and red or yellow warning colors. The females are capable of inflicting painful stings if molested. Adult size is 2-23 mm. Most species are nest parasites of ground nesting bees or wasps. There are over 400 species in NA.

Velvet ant taxonomy is one of the topics being actively explored by Dr. Pitts and Kevin Williams, one of his graduate students. They made an extraordinary effort to collect this family during the Bioblitz and were very successful in their effort. They are learning much and revising thinking about the species, so names of some are likely to change as a result of their work. Current names of the species found at Great Basin National Park during the Bioblitz are:

- Dasymutilla monticola* -1
- Dasymutilla scitula* -4
- Dasymutilla vestita* -1
- Dilophotopsis concolor* -2
- Ephuta grisea* -1
- Odontophotopsis clypeata* -3
- Odontophotopsis melicausa* -5
- Odontophotopsis quadridentata* -3
- Pseudomethoca bequarti* -1
- Pseudomethoca contumax* -3
- Sphaerophthalma brachyptera* -1
- Sphaerophthalma difficilis* -3
- Sphaerophthalma ferruginea* -3
- Sphaerophthalma marpesia* -1
- Sphaerophthalma parapenalis* -1
- Sphaerophthalma nokomis* -1
- Sphaerophthalma noctivaga* -1



Mutillidae- *Dasymutilla scitula*



Mutillidae -- *Dasymutilla vestita*

Pompilidae – Spider Wasps

Adult spider wasps can range from 5 to 40 mm in length, with black or blue bodies and long legs. They may have orange or yellow markings, and the wings may be black, bluish, or orange. Females of most species burrow in the ground and form branching tunnels, in which they place paralyzed spiders and lay their eggs, one per spider. The larvae eat the spiders, pupate in the tunnels, and emerge the following year as nectar or honeydew feeding adults. There are at least 288 species in NA. This is another group that is of special interest to Dr. Pitts, so the number of known



Pompilidae – a spider wasp

species and their names are likely to change as a result of his work. Currently, the spider wasps collected at Great Basin National Park have been identified as:

- Anoplius nigerimus* -1
- Aporus luxus* -2
- Ammosphex parvulus* -2
- Ageniella rufescens* -1
- Aporinellus apicatus* -1
- Evagetes hyacinthines* -2
- Arachnospila arctus* -2
- Ageniella* sp. -2

Vespidae—paper wasps, hornets, yellow jackets

Adults of this family range from 8 to 25 mm long, and most fold their wings longitudinally when at rest, which is a defining characteristic of the family. There are five subfamilies, 31 genera, and more than 300 species in NA. Most females can sting, some quite painfully and repeatedly, when molested as individuals or collectively in defense of the nest. Many are marked with warning colors of red and yellow or red and black. Adults feed on nectar and juices from dead animals, and provision nests with spiders, insects, or juices from dead animals, with one subfamily provisioning their nests with nectar and pollen. Many members of this family are social insects, with a queen, workers, and males, and live in nests built from a paper-like substance that they make from wood or leaf fibers either above or under ground. One species, the Parasitic Yellowjacket (*Dolichovespula adulterine*) lays its eggs in the nests of relatives.

- Dolichovespula arenaria* -4
- Dolichovespula adulterine*-1
- Vespula atropilosa* -3
- Mischocyttarus flavitarsis* -1
- Polistes* sp. -1
- Eumenes* sp. -1
- Symmorphus* sp. -2
- Euodynerus* sp. -3
- Ancistrocerus* sp. -7
- Leptochilus* sp. -1



Vespidae – *Eumenes* sp.



Vespidae *Mischocyttarus flavitarsis*



Vespidae – *Dolichovespula adulterine*

Formicidae—ants

There are at least 700 species of ants in six subfamilies in NA. Most ants, during most of their life stages, are wingless, social creatures with complex social organizations, often large distinctive nests, and numerous individuals. Adults may range in size from 1 to 20 mm. Ants may consume seeds, nectar, honeydew, insects, and the remains of dead animals. Some are predators, some scavengers, some make slaves of other species of ants to build and forage for the masters, and some care for aphids and feed on their waste. In some species, all worker ants may be the same size, whereas some species have a range of worker size, usually in several distinctive classes. Many species of ants can sting, but some bite, some both bite and sting, and some squirt noxious chemicals to repel predators and parasites.



Formicidae- *Pogonomyrmex* sp.

One female, called the queen and usually the largest in the nest, is the mother of all the ants in that nest. Most of her offspring are workers, non-reproductive, wingless females. Mature nests also produce winged males and females. After mating, the males die, and the single mothers shed their wings and begin to establish new nests. Most ant species have complex behavior and social organizations that is mediated by pheromones, chemical secretions that elicit specific behavioral responses. Nests may be in the ground, in logs, or in debris. Some may last for as long as 25 years. Many ant nests also harbor other creatures that live as parasites, predators, or inquilines in the nest and are tolerated by the ants.

Over 60 ant species have been documented in White Pine County, Nevada, and 23 of these have been found in the Park. Many more species are likely to occur in the park, but have yet to be documented. Ants collected during the Bioblitz were so far identified to genus but not species by Dr. Pitts and his students. Genera collected during the Bioblitz and species documented from White Pine County and specifically the Park, are included in the following table.



Formicidae – *Pogonomyrmex occidentalis* carrying a dead stink bug

The area of Great Basin National Park above 6,000 ft elevation and mostly concentrated at higher elevations was included in surveys by George and Jeanette Wheeler, the authors of *Ants of Nevada*, in the 1970s in a publication on the montane ants. They did not include areas below 6,000 ft elevation in that study. The following table compares the current list from the Bioblitz with Wheelers' published record and suggests possible explanations for differences and the species that may be included in the genera obtained in the Bioblitz. The documented presence of some genera (and species) at elevations higher than has been previously described may warrant further study because it may be indicative of habitat changes, including climate change, in the years since 1978. It is possible that they were present but overlooked by earlier collectors, or that they have expanded their ranges.

Comparison of Ants from Bioblitz with Published Records from Area		
Order is alphabetical by genus and species		
Genera from Bioblitz n= number of collections during Bioblitz	Species previously documented from White Pine County * = documented from the Park	*= Wheelers did not find above 6,000 ft elevation Names used by Wheelers and others in the past
<i>Aphaenogaster</i> sp. 2	<i>Aphaenogaster occidentalis</i> <i>Aphaenogaster uinta</i>	
<i>Camponotus</i> sp 36	<i>Camponotus laevigatus</i> <i>Camponotus modoc</i> <i>Camponotus sansabeanus</i> <i>Camponotus sayi</i> <i>Camponotus semitestaceus</i> <i>Camponotus vicinus</i>	
<i>Crematogaster</i> sp. 2	<i>Crematogaster mormonum</i>	*
<i>Dorymyrmex</i> sp. 2		* <i>Conomyrma insana</i>
<i>Forelius</i> sp. 5	<i>Forelius pruinosus</i>	* <i>Iridomyrmex pruinosus</i>
<i>Formica</i> sp. 72	<i>Formica argentea</i> * <i>Formica dakotensis</i> * <i>Formica densiventris</i> * <i>Formica fusca</i> <i>Formica haermorrhoidalis</i> <i>Formica hewitti</i> * <i>Formica lasioides</i> <i>Formica manni</i> <i>Formica neoclara</i> * <i>Formica neogagates</i> <i>Formica neorufibarbis</i> <i>Formica nevadensis</i> * <i>Formica obscuripes</i> <i>Formica obscuriventris</i> * <i>Formica obtusopilosa</i> <i>Formica oreas</i> <i>Formica planipilis</i> * <i>Formica puberula</i> <i>Formica subelongata</i> <i>Formica subnitens</i> <i>Formica subnuda</i> * <i>Formica subpolita</i> <i>Formica subsericea</i> *	
<i>Lasius</i> sp. 4	<i>Lasius alienus</i> <i>Lasius crypticus</i> <i>Lasius flavus</i> * <i>Lasius pallitarsis</i> * <i>Lasius sitiens</i>	

	<i>Lasius subumbratus*</i>	
	<i>Leptothorax crassipilis*</i> <i>Leptothorax muscorum*</i> <i>Leptothorax nevadensis</i> <i>Leptothorax rugatulus*</i> <i>Leptothorax tricarinatus*</i>	
	<i>Manica mutica</i>	
<i>Monomorium</i> sp. -6	<i>Monomorium minimum*</i>	*
<i>Myrmecocystus</i> sp. 3	<i>Myrmecocystus hammettensis</i> <i>Myrmecocystus pyramicus</i> <i>Myrmecocystus testaceus</i>	*
<i>Myrmica</i> sp. 11	<i>Myrmica americana</i> <i>Myrmica emeryana*</i> <i>Myrmica fracticornis*</i> <i>Myrmica incompleta</i> <i>Myrmica lobifrons</i>	
	<i>Pheidole pilifera</i>	
<i>Pogonomyrmex</i> sp. 9	<i>Pogonomyrmex occidentalis</i> <i>Pogonomyrmex salinus</i>	*
<i>Polyergus</i> sp. 2	<i>Polyergus breviceps</i>	
	<i>Solenopsis molesta</i>	
<i>Tapinoma</i> sp. 7	<i>Tapinoma sessile</i>	
	<i>Veromessor lobognathus</i>	