

INSECT BIODIVERSITY OF
**BULL RUN MOUNTAINS NATURAL
AREA PRESERVE**

A PICTORIAL GUIDE: EXAMPLES OF TAXA
GATHERED BY PITFALL, AQUATIC, AND SWEEP NET
SURVEY METHODS



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TABLE OF CONTENTS

PITFALL SPECIMENS.....	1
HYMENOPTERA.....	1
COLEOPTERA.....	2
DIPTERA.....	5
DICTYOPTERA.....	6
ARCHEOGNATHA.....	7
HEMIPTERA.....	8
AQUATIC SPECIMENS.....	9
HEMIPTERA.....	9
EPHEMEROPTERA.....	11
COLEOPTERA.....	12
ODONATA.....	13
NEUROPTERA.....	14
SWEEP NET SPECIMENS.....	15
COLEOPTERA.....	15
HEMIPTERA.....	18
TRUE BUGS.....	18
LEAFHOPPERS, TREEHOPPERS, PLANTHOPPERS.....	19
PLANT BUGS, ASSASSIN BUGS, STINKBUGS.....	21

PITFALL SPECIMENS

HYMENOPTERA

BEES, WASPS, ANTS, AND SAWFLIES



Ichneumonidae (parasitoid wasps)

Habitat: leaf litter, ground layer

Identifying characteristics:
tiny, antlike abdomen raised above thorax, slender waist and antennae 1x as long as body

Order: Hymenoptera

Family: Ichneumonidae

Seasonal Activity:
spring/summer/fall



Halictidae (sweat bees)

Habitat: nests in bare soil

Identifying characteristics:
shiny, two pairs of wings, large compound eyes, short antennae

Order: Hymenoptera

Family: Halictidae

Seasonal Activity: primarily active in summer, before dusk

Details: ground nesters that are eusocial

PITFALL SPECIMENS

COLEOPTERA

BEETLES



Nitidulidae (sap beetles)

Habitat: feeds on flowers, sap, and decaying materials

Identifying characteristics:

0.9 - 15mm in length, tarsal segments are 5-5-5

Order: Coleoptera

Family: Nitidulidae

Seasonal Activity: present in higher concentrations in summer

Details: found commonly in deciduous forests, are good indicators of good soil quality



Carabidae (ground beetles)

Habitat: under stones, logs, debris

Identifying characteristics:

filiform antennae, grooved elytra, large hind trochanters

Order: Coleoptera

Family: Carabidae

Seasonal Activity: night feeders, more active in summer

PITFALL SPECIMENS

COLEOPTERA

BEETLES



Odonteus (scarab beetles)

Habitat:

Identifying characteristics:

clubbed antennae, oval shape

Order: Coleoptera

Family: Geotrupidae

Seasonal Activity: species

dependent, each provide

ecological functions in connection

with seasonal change



Histeridae (scarab beetles)

Habitat:

Identifying characteristics:

hard, rounded elytra, thick

fossorial legs, clubbed antennae,

oval shape

Order: Coleoptera

Family: Histeridae

Seasonal Activity: species

dependent, each provide

ecological functions in connection

with seasonal change

PITFALL SPECIMENS

COLEOPTERA

BEETLES



Staphylinidae (rove beetles)

Habitat: soil

Identifying characteristics:

7 - 8 exposed abdominal segments, short elytra

Order: Coleoptera

Family: Staphylinidae

Seasonal Activity: year-round activity

Details: indicators of good soil quality

PITFALL SPECIMENS

DIPTERA

TRUE FLIES



Hybotidae (dance flies)

Habitat: woodland edges

Identifying characteristics:

large compound eyes, antennae distal to mouthparts, legs extend past abdomen

Order: Diptera

Family: Hybotidae

Seasonal Activity: warm days during the summer

Details: predatory behavior on the bark of trees



Diptera (flies)

Habitat: aerial in temperate environments

Identifying characteristics:

two wings, halteres, tapered abdomen

Order: Diptera

Family: Unidentified

Seasonal Activity: during the warmest parts of the day in summer

PITFALL SPECIMENS

DIPTERA

TRUE FLIES



Phoridae (scuttle flies)

Habitat: near decaying vegetation

Identifying characteristics:

small, scurrying, humped back

Order: Diptera

Family: Phoridae

Seasonal Activity: most active in late summer/early fall

DICTYOPTERA

TERMITES, COCKROACHES, MANTISES



Blattodea (cockroaches and termites)

Habitat: beneath stones and in damp areas

Identifying characteristics:

3 cm, dark brown-red, adults have long, yellow wings

Order: Dictyoptera

Family: Blattodea

Seasonal Activity: primarily at night

PITFALL SPECIMENS

ARCHEOGNATHA

BRISTLETAILS



Machilidae (bristletails)

Habitat: upper soil layers

Identifying characteristics:

3 long cerci, eyes on top of head and close together, wingless with humped thorax

Order: Archeognatha

Family: Machilidae

Seasonal Activity: year-round activity

Details: these archaic insects are indicators of good soil quality

PITFALL SPECIMENS

HEMIPTERA

TRUE BUGS



Reduviidae (assassin bugs)

Habitat: North, Central, and South America; wide species variety and multiple habitats

Identifying characteristics: tip of proboscis fits into a groove in the prosternum, long neck, bright coloration

Order: Hemiptera

Family: Reduviidae

Seasonal Activity: most active in daylight in the summertime

AQUATIC SPECIMENS

HEMIPTERA

TRUE BUGS



Gerridae (water striders)

Habitat: freshwater

Identifying characteristics:

tibias longer than femur

Order: Hemiptera

Family: Gerridae

Seasonal Activity: active March - September

Details: social when young, predators



Gerridae (water striders)

Habitat: freshwater streams and creeks

Identifying characteristics:

tibias longer than femur, abdomen widens as it approaches thorax

Order: Hemiptera

Family: Gerridae

Seasonal Activity: active March - September

Details: social when young, predators

AQUATIC SPECIMENS

HEMIPTERA

TRUE BUGS



Gerridae (water striders)

Habitat: freshwater streams and creeks

Identifying characteristics:
tibias longer than femur, abdomen wider towards base and pointed

Order: Hemiptera

Family: Gerridae

Seasonal Activity: active March - September



Veliidae (riffle bugs)

Habitat: freshwater streams and creeks

Identifying characteristics:
tibias do not extend past abdomen

Order: Hemiptera

Family: Veliidae

Seasonal Activity: active March - September

Details: social predators, gather near stream banks

AQUATIC SPECIMENS

EPHEMEROPTERA

MAYFLIES



Heptageniidae (mayflies)

Habitat: freshwater streams,
under rocks

Identifying characteristics:
flat, clear head

Order: Ephemeroptera

Family: Heptageniidae



Ephemeridae (mayflies)

Habitat: freshwater ecosystems,
aerial once adult

Identifying characteristics:
tusk-like projections from center
of head

Order: Ephemeroptera

Family: Ephemeridae

Seasonal Activity: Active in the
spring/summer/fall

AQUATIC SPECIMENS

COLEOPTERA

BEETLES



Dytiscidae (predaceous diving beetles)

Habitat: freshwater streams

Identifying characteristics:
rounded elytra, large eyes, tiny, filiform antennae

Order: Coleoptera

Family: Dytiscidae



Elmidae (riffle beetles)

Habitat: freshwater creeks, in leaf litter/debris

Identifying characteristics:
rounded elytra, pockmarked, long trochanter

Order: Coleoptera

Family: Elmidae

Seasonal Activity: Most active in summer/fall when there is larger drift density

AQUATIC SPECIMENS

ODONATA

DRAGONFLIES AND DAMSELFLIES



Gomphidae (club-tailed dragonflies)

Habitat: freshwater streams, sediment

Identifying characteristics: clubbed antennae, large mandibles on labium

Order: Odonota

Family: Gomphidae

Seasonal Activity: larvae active in summer, molt in summer into adults

AQUATIC SPECIMENS

NEUROPTERA

LACEWINGS, MANTIDFLIES, ANTLIONS



Chrysopidae (lacewing)

Habitat: freshwater streams and aerial, larvae live in creek sediment

Identifying characteristics: long, tusk-like mandibles

Order: Neuroptera

Family: N/A at this stage of development

Seasonal Activity: larvae active in summer, once molted they only live for a few days

Details: found underneath rocks

SWEEP NET SPECIMENS

COLEOPTERA

BETLES



Curculionidae (weevils)

Habitat: near/on their feeder plants

Identifying characteristics: extended rostrum, curved, large femur

Order: Coleoptera

Family: Curculionidae



Coccinellidae (ladybugs)

Habitat: grasslands/forests/cities/rivers

Identifying characteristics: circular, spotted

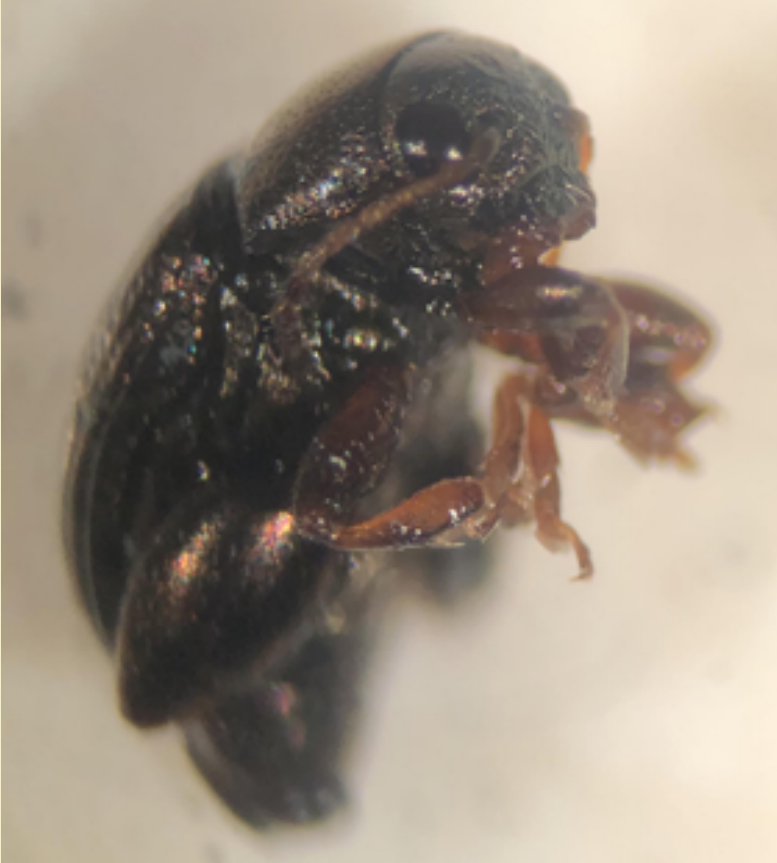
Order: Coleoptera

Family: Coccinellidae

SWEEP NET SPECIMENS

COLEOPTERA

BEETLES



Chrysomelidae (leaf beetles)

Habitat: leaf litter

Identifying characteristics:
relatively small, no visible neck,
antennae dorsal to eyes

Order: Coleoptera

Family: Chrysomelidae

Seasonal Activity: adults become
active in early spring



Mordellidae (tumbling flower beetles)

Habitat: fields, grasses

Identifying characteristics:
extended elytra

Order: Coleoptera

Family: Mordellidae

SWEEP NET SPECIMENS

COLEOPTERA

BEETLES



Coccinellidae (ladybugs)

Habitat: fields, plants

Identifying characteristics: heart shaped thorax, mirrored spots on abdomen, clubbed antennae

Order: Coleoptera

Family: Coccinellidae



Chrysomelidae (leaf beetles)

Habitat: fields, grasses

Identifying characteristics: filiform antennae, rectangular elytra

Order: Coleoptera

Family: Chrysomelidae

SWEEP NET SPECIMENS

HEMIPTERA

TRUE BUGS



Pentatomidae (shield or stink bugs)

Habitat: grasslands

Identifying characteristics: gold edged scutellum, antennae bicolor and segmented

Order: Hemiptera

Family: Pentatomidae

Seasonal Activity: March through September



Pentatomidae (shield or stink bugs)

Habitat: grasslands

Identifying characteristics: red and black coloring, same antennal patterns as adult (bicolor and segmented)

Order: Hemiptera

Family: Pentatomidae

SWEEP NET SPECIMENS

HEMIPTERA

LEAFHOPPERS, TREEHOPPERS, AND PLANT HOPPERS



Cicadellidae (leafhoppers)

Habitat: grasslands and fields

Identifying characteristics:

pale green, scutellum pronounced,
large compound eyes

Order: Hemiptera

Family: Cicadellidae

Details: ethanol preservation has
stripped the color from this
specimen



Cicadellidae (leafhoppers)

Habitat: grasslands

Identifying characteristics:

vivid green and black striping

Order: Hemiptera

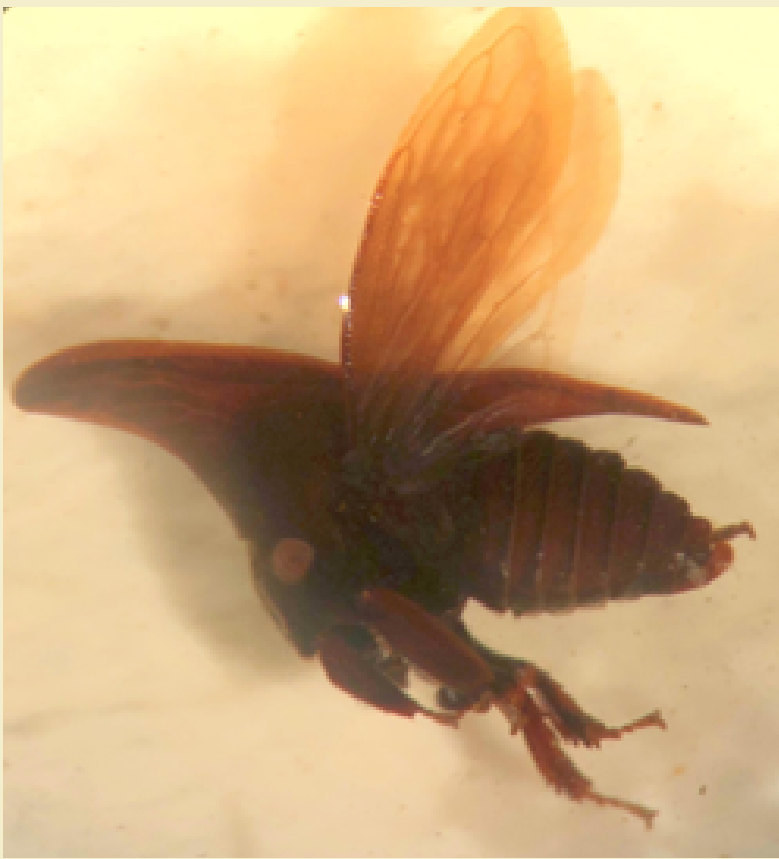
Family: Cicadellidae

Seasonal Activity: active in
spring and summer

SWEEP NET SPECIMENS

HEMIPTERA

LEAFHOPPERS, TREEHOPPERS, AND PLANT HOPPERS



Membracidae (treehoppers)

Habitat: forests & grasslands on plants

Identifying characteristics: forward facing pronotum (horn)

Order: Hemiptera

Family: Membracidae

Seasonal Activity: active in summer



Miridae (plant or grass bugs)

Habitat: grasslands and fields

Identifying characteristics: long antennae and legs, bright green and black coloring, 1cm long

Order: Hemiptera

Family: Miridae

Seasonal Activity: most active in late summer

Details: ethanol preservation has stripped the color from this specimen

SWEEP NET SPECIMENS

HEMIPTERA

PLANT BUGS, ASSASSIN BUGS, STINKBUGS



Miridae (plant or grass bugs)

Habitat: grasslands and fields

Identifying characteristics:

long antennae and legs, bright green and black coloring, 1cm long

Order: Hemiptera

Family: Miridae

Seasonal Activity: most active in late summer

Details: ethanol preservation has stripped the color from this specimen