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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With Summers Cleary and Joe Villari

Virginia Outdoors Foundation
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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 or 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
Staphylinidae (rove beetles)

Habitat: soil

Identifying characteristics:
7 - 8 exposed abdominal segments, short ekytra

Order: Coleoptera

Family: Staphylinidae

Seasonal Activity: year-round activity

Details: indicators of good soil quality
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
**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

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**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
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
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
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 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
Heptageniidae (mayflies)
**Habitat:** freshwater streams, under rocks
**Identifying characteristics:** flat, clear head
**Order:** Ephemeroptera
**Family:** Heptageniidae

Ephemeroidea (mayflies)
**Habitat:** freshwater ecosystems, aerial once adult
**Identifying characteristics:** tusk-like projections from center of head
**Order:** Ephemeroptera
**Family:** Ephemeroidea
**Seasonal Activity:** Active in the spring/summer/fall
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
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
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
Beetles

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

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
Hemiptera

**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
Membracidae (treehoppers)

**Habitat:** forests & grasslands on plants

**Identifying characteristics:** forward facing pronotum (horn)

**Order:** Hemiptera

**Family:** Membracidae

**Seasonal Activity:** active in summer

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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
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