



The Facts

- There are more than 47,000 species of spiders worldwide
 - Over 4000 in North America, north of Mexico
- Beneficial for pest control
 - Important to agriculture, forests, and homes
- Spiders can account for over half the predator biomass on forest floors
- The only spider of medical importance in MT, to date, is the black widow, *Latrodectus hesperus*
- The brown recluse, *Loxosceles reclusa*, has not been detected in MT
- There is no conclusive evidence to support that the hobo spider is harmful to humans



The Myths

- Spiders want to bite you.
- Daddy long leg spiders are the most poisonous spiders, but their fangs are too short to bite humans.
- People swallow eight spiders in their sleep yearly.
- Brown recluse bites are common in Montana.



Harvestman (Daddy Long-leg)

Spider Bites

- Spiders implicated for causing bites and lesions for years
- Most often due to **circumstantial evidence**
- Spider bites are rare.
- Last decades, no proven fatality from a spider bite (Nentwig and Kuhn-Nentwig 2013)
- Professionals working in toxicology and poison control clinics report spider bites as over diagnosed.



Why most spiders are not venomous to humans

- Venom does not contain toxic fractions which affect humans
- Quantity of the venom injected by spider is insufficient to cause problems
- Spider is too timid to encounter a person
- Contact with humans is unlikely due to spider's lifestyle



Spider Life History

- Most live 1-2 years
 - Wolf spiders-several years
 - Tarantulas-**up to 30 years!**
 - Males die shortly after maturing
- Molt (shed skin) several times
- Most adult spiders die after 1st hard frost
 - Overwinter as egg sacs
 - Adults/subadults under leaf litter



Feeding

- Generalist predators
- How they feed
 - Deliver venom and/or wrap prey
 - Vomit a digestive enzyme
 - Suck up liquid with sucking stomach



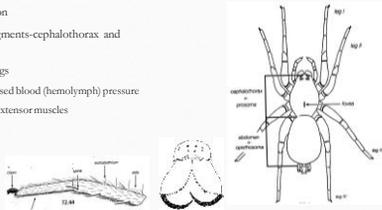
Classification

- Kingdom Animalia
- Phylum Arthropoda (Insects, Arachnids, Millipedes, Centipedes)
 - Class Arachnida (scorpions, spiders, vinegaroons)
 - Order Araneae
 - Suborders Mesothelae and Opisthothelae



Functional Anatomy

- Exoskeleton
- 2 body segments-cephalothorax and abdomen
- Walking legs
 - Increased blood (hemolymph) pressure
 - Lack extensor muscles
- 0-8 eyes



Brown recluse, *Loxosceles reclusa*

- Not established in MT
- Misdiagnosis of bites in non-established *Loxosceles* areas very common
 - Even in established areas, bites are rare
- Causative agent in venom-sphingomyelinase-D (Forrester et al. 1978)
 - Necrotic enzyme
- Bites are dry; no pus



Male brown recluse spider



Range of recluse (genus *Loxosceles*) spiders in the United States

Conditions That Can Be Confused With or Misdiagnosed as Recluse Spider Bites

- | | |
|--------------------------------------|---|
| Bacterial | Vascular disorders |
| <i>Staphylococcus</i> infection | Focal vasculitis |
| <i>Streptococcus</i> infection | Purpura fulminans |
| Cutaneous anthrax | Reaction to drugs |
| Viral | Warfarin poisoning |
| Infected herpes simplex | Arthropod-induced |
| Chronic herpes simplex | Lyme disease |
| Varicella zoster (shingles) | Rocky Mountain spotted fever |
| Fungal | <i>Ornithodoros ornata</i> bite (soft tick) |
| Sporotrichosis | Insect bites (flea, mite, biting fly) |
| Lymphoproliferative disorders | Misc. / multiple causative agents |
| Lymphoma | Pyoderma gangrenosum |
| Lymphomatoid papulosis | Pressure ulcers |



Unknown necrotic wound

Diagnosing brown recluse spiders: Key characters for identification

1mm
6/2/20

Violin pattern on epigynum

Hobo spider, *Eratigena agrestis*

- Introduced into Seattle, WA in the 1920s
- Established and very common in MT
- Erroneously reported to cause necrotic lesions
- **No evidence to support that it is a spider of medical or human concern**
 - Venom not harmful in native habitat (Binford 2001)
 - No sphingomyelinase-D in venom (Binford 2001)
 - No hemolytic enzymes (Binford 2001, Gaver-Wainwright et al. 2011)
 - No microbial fauna vectored by the hobo spider (Gaver-Wainwright et al. 2011)
 - Cannot vector MRSA

Female hobo spider

Black widow, *Latrodectus hesperus*

- Black widows
 - Western widow, *Latrodectus hesperus*
- Sexual dimorphism
- Bites are rare
 - Fatalities from bites <1%
- Toxin is a neurotoxin
 - alpha-latrotoxin (α -LTX)
 - Uncontrolled release of acetylcholine and norepinephrine

female
male

Web Builders vs. Hunting Spiders

<ul style="list-style-type: none"> • Web Spiders <ul style="list-style-type: none"> • Funnel-web spiders • Orb-web spiders • Long-jawed orb-web spiders • Cob-web spiders • Sheet-web spiders • Mesh-web spiders • Cellar spiders 	<ul style="list-style-type: none"> • Hunting Spiders <ul style="list-style-type: none"> • Wolf spiders • Ground spiders • Sac spiders • Ant-mimic spiders • Tarantulas 	<ul style="list-style-type: none"> • “Sit and Wait” Spiders <ul style="list-style-type: none"> • Crab spiders • “Running” crab spiders • Other crab spiders • Jumping spiders • Lynx spiders
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Linyphiidae-Sheet-Web Spiders

- Horizontal sheets of silk
 - “Bowl and doily spiders”
- Webs in leaf litter, ground, vegetation
- Feed on soft-bodied insects
 - Flies, springtails

Pityohyphantes sp.

Uloboridae

- Orb webs, triangle webs, and simple webs
- Occur in woody shrubs, trees, tall grass, and vegetation

Hyploetes gertschi

Dictynidae-Mesh-Web Weavers

- Very small
- Mesh-like webs
- Forest inhabitants
 - Leaf litter, bark, logs, rocks



Dictyna coloradensis

Theridiidae-Comb-Footed Spiders

- Cob-like webs
- Comb on end of 4th leg
- Hang upside down in their webs



Theridion sp.

Theridiidae-Comb-Footed Spiders



Parasteatoda sp.



False widow, Steatoda grossa

Agelenidae-Funnel-Web Spiders

- Sheet-like webs
- Grasses and in/around buildings
- *Example:* hobo spider, grass spider



Grass spider, Agelenopsis sp.

Araneidae-Orb-Web Spiders

- Orb-web weavers
- Cat-like ears on abdomen
- Common on porches in the fall



Cat-faced spider, Araneus gemmoides

Araneidae-Orb-Web Spiders



Banded Argiope spider, Argiope trifasciata



Black and yellow Argiope, Argiope aurantia

Tetragnathidae-Long-Jawed Orb-Weaving Spiders

- Great predators for agriculture and aphids



Anyphaenidae-Ghost Spiders

- Hunting spiders
 - Look similar to funnel web weavers and wolf spiders
- Mostly nocturnal
- Found in vegetation, dead leaves, loose bark, and rocks
- Many species feed on aphids in trees



Anyphaena aperta

Clubionidae-Sac Spiders

- Wandering hunters
- No webs, sac-like retreats
- Often found in rolled leaves or on foliage



Clubiona sp.

Corinnidae-Ant-Mimic Spiders

- Hunting spiders
- Live in burrows and under leaf litter
- Most are ant mimics



Gnaphosidae-Ground Spiders

- Hunting spiders
- Live in burrows and under leaf litter
 - Retreats often in decomposing wood
- Many mimic ants



Sergiolus sp.

Lycosidae-Wolf Spiders

- Hunting spiders
- Build burrows
- Fast moving
- Diagnostic eye pattern
- Great eyesight
- Hogna carolinensis*
 - One of our largest spiders in MT
 - Body-20mm
 - w/legs-50mm



Hogna carolinensis

Lycosidae-Wolf Spiders




Females carry egg sacs and early spiderlings on abdomen



Lycosidae-Wolf Spiders



Schizocosa miccooki wolf spider with egg sac

Oxyopidae-Lynx Spiders

Sit and wait^o predators
Stalk prey like cats
Occur in woody shrubs, trees, tall grass, and vegetation



Oxyopes scalaris

Salticidae-Jumping Spiders

- Hunting spiders
- Median eyes-large
- Varied habitats
 - From leaf litter to the forest canopy
- Some are ant mimics
- Excellent eye sight



Metaphidippus sp.

Salticidae-Jumping Spiders




Apache jumping spider,
Philippus apacheanus

Zebra jumper - *Salticus scenicus*

Thomisidae-Crab Spiders

- Crab spiders
- Hunting spiders
- Can camouflage to the color of their surroundings (such as flowers)



Goldenrod crab spider, *Misumena vatia*

Thomisidae-Crab Spiders



Goldenrod crab spider, *Misumena vatia*



Elegant crab spider, *Xysticus elegans*

Philodromidae-Running Crab Spiders

- Hunting spiders
- Found on plant stems, leaves, coniferous trees
- Can walk on most walls and surfaces



Philodromus sp.

Philodromidae-Running Crab Spiders



Philodromus sp.



Ebo sp.

Theraphosidae-Tarantulas

- *Theraphosa blondi*
- One of the largest spiders in the world



Questions?



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