

# Chelicerata Ecology

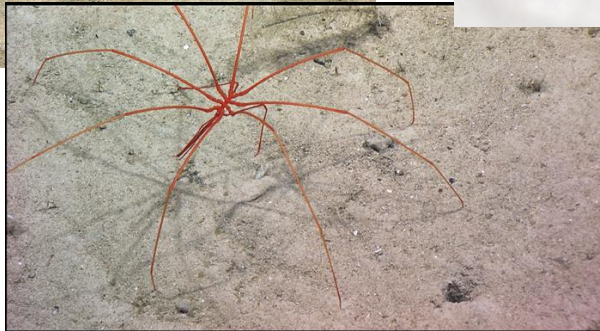
Kaylyn Flanigan



Perry, Bill. 2013.



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NOAA. 2016.

Chelicerata is a subphylum within the phylum arthropoda. Within the subphylum there are three classes of chelicerates: merostomata, pycnogonida, and arachnida<sup>1</sup>.

Horseshoe crabs can be found in marine waters of North America, Southeast Asia, and Indonesia<sup>1</sup>. Ironically, the horseshoe crab is not actually a crab but a member of class merostomata - making it a chelicerate and not a crustacean.

The second class, pycnogonida, are referred to as sea spiders but aren't technically spiders. Although commonly called spiders, members of class pycnogonida lack specialized excretory and respiratory systems<sup>1</sup>.

The third class, arachnida, is of primary focus this week as our presented invertebrate falls within this category. The class arachnida comprises more orders than those mentioned in this powerpoint.

When I first hear arachnid, my mind automatically goes to spiders. This is far from the case, though, because only one of the orders within arachnida are actually spiders. Order araneae are the true spiders. Order Acari are ticks and mites. Order Amblypygi are tailless whip scorpions. Order scorpiones are the scorpions.

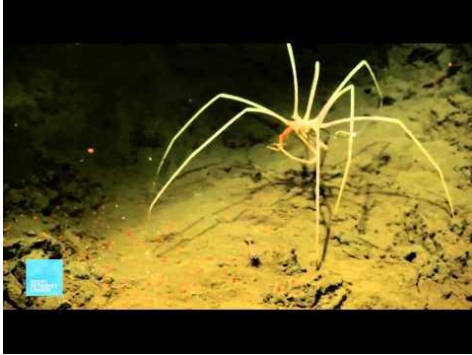
The ecology of these orders are discussed in further slides.

# Ecology

- *The study of relations and interactions between organisms and their environment*

## Chelicerata Distribution

- Located on every continent
- Occupy diverse habitats
- [https://www.inaturalist.org/observations?place\\_id=any&taxon\\_id=47119](https://www.inaturalist.org/observations?place_id=any&taxon_id=47119)



Class pycnogonida live in the deep-sea waters of the Arctic and Antarctica<sup>3</sup>. Class merostomata are mainly marine creatures<sup>1</sup>.

Class arachnida have various distributions and habitats.

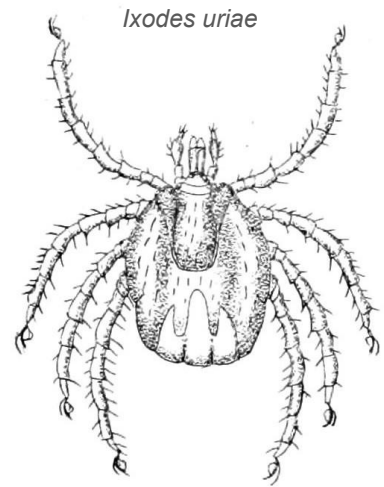
They can live in the desert, the tropics, and temperate zones. Nearly anywhere, arachnids can survive. There are species of mites and ticks that live in Antarctica and deep in the sea.

Pycnogonida Deep Sea: <https://www.youtube.com/watch?v=A5rZdrNlrts>

Diving Bell Spider: <https://www.youtube.com/watch?v=jjFew5Lk2r4>

# Arachnid Distribution

- Acari
  - Found on every continent
    - *Ixodes uriae* is a tick found in Antarctica
    - *Maudheimia* is a mite found in Antarctica<sup>4</sup>.



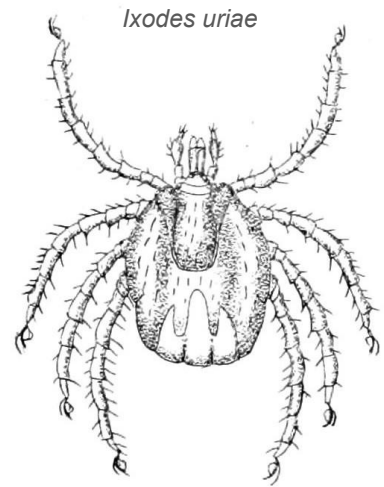
*Ixodes uriae*

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*Ixodes uriae* - found in higher latitudes, including Antarctica  
*Maudheimia* is a mite found in Antarctica<sup>4</sup>.

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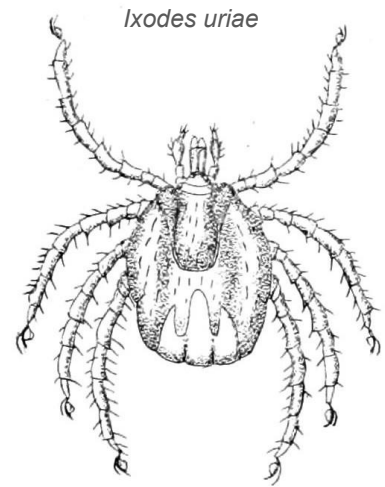


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  - Found as atmospheric plankton at high altitudes<sup>5</sup>.



*Ixodes uriae*

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*Ixodes uriae* - found in higher latitudes, including Antarctica  
*Maudheimia* is a mite found in Antarctica<sup>4</sup>.

## Arachnid Distribution

- Amblypygi<sup>6</sup>
  - Found in the tropics and the subtropics



Can be found in the US in Arizona, Texas, and Florida



## Arachnid Distribution

- Amblypygi<sup>6</sup>
  - Found in the tropics and the subtropics
  - Occupy many habitats from wet forests to deserts



Can be found in the US in Arizona, Texas, and Florida

# Arachnid Distribution

- Araneae
  - Found everywhere but Antarctica



BBC

Live along shores of fresh or salt water. Can also live on top of the water layer.

Diving bell spider is one of the aquatic species

<https://www.sciencenews.org/article/diving-spiders-make-their-own-gills>

<http://www.bbc.co.uk/nature/13614742>

# Arachnid Distribution

- Araneae
  - Found everywhere but Antarctica
  - Found in Himalayan Mountains, tropic and temperate zones, and in or on water<sup>7</sup>.



BBC

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## Arachnid Distribution

- Scorpiones<sup>8</sup>
  - Temperate, subtropical, and tropical environments



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Range from the intertidal zone to mountain ranges

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  - Range from intertidal zones to mountain ranges



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Range from the intertidal zone to mountain ranges



## Arachnid Food Webs

- Acari
  - Omnivores, carnivores, herbivores, fungivores, and parasites<sup>1</sup>.



<https://www.livescience.com/20815-honeybee-collapse-mite-virus.html>

- A mite called *Varroa* is parasitizing bees causing honey bee colony collapse
-

# Arachnid Food Webs

- Amblypygi
  - Predators



Day, H.

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# Arachnid Food Webs

- Amblypygi
  - Predators
  - Consume other arthropods, but opportunistic



Day, H.

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# Arachnid Food Webs

- Araneae
  - Herbivores<sup>9</sup>



Abel, D. 2014.

Spitting spider (spit), wolf spiders (jump), trap-door spiders (create silk tubes to dart and kill prey), web spiders, orb-weavers<sup>7</sup>

<https://www.livescience.com/5759-rare-vegetarian-spider-discovered.html>

# Arachnid Food Webs

- Araneae
  - Herbivores<sup>9</sup>
  - Predators
    - Sit-and-wait
    - Active hunters



Abel, D. 2014.

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# Arachnid Food Webs

- Scorpiones
  - Opportunistic predators
    - Will eat what they can catch



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Australian spiral burrow - only eats burrowing spiders

# Arachnid Food Webs

- Scorpiones
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  - Sit-and-wait or hunters
  -



Creative Commons

Australian spiral burrow - only eats burrowing spiders

# Arachnid Food Webs

- Scorpiones
  - Opportunistic predators
    - Will eat what they can catch
  - Sit-and-wait or hunters
  - Cannibalistic



Creative Commons

Australian spiral burrow - only eats burrowing spiders

# Arachnid Species Interactions - Acari

- Acari
  - Parasitic<sup>5</sup>
    - *Demodex folliculorum* and *D. brevis* are parasites that live on human skin



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[https://www.huffingtonpost.com/2014/09/02/face-mites-microscope-video\\_n\\_5752696.html](https://www.huffingtonpost.com/2014/09/02/face-mites-microscope-video_n_5752696.html)

<https://www.cbsnews.com/news/eye-mites-millions-of-people-have-them-and-dont-know-it/>

<https://entomology.ca.uky.edu/ef637>

Dichotomous Key for Mites: <http://delusion.ucdavis.edu/mites.pdf>



# Arachnid Species Interactions - Acari

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    - Chiggers
    - *Sarcoptes scabiei*



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    - Chiggers
    - *Sarcoptes scabiei*
  - Commensalist<sup>5</sup>
    - Phoresy - hitching a ride without harming the host



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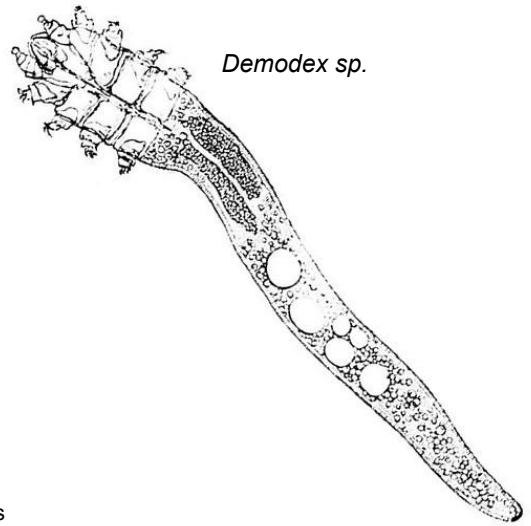
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Dog's ears infested with ticks



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*Demodex folliculorum* and *D. brevis* are parasites that live on human skin. They feed off of the skin cells and the oil that is secreted from the glands.

# Arachnid Species Interactions

- Amblypygi
  - Commonly parasitized by mites and chloropid flies
  -



National Geographic

Wise, G., 2014.

<http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1056&context=bioscihebets>  
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# Arachnid Species Interactions

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# Arachnid Species Interactions

- Araneae
  - “The enemy of my enemy is my friend”
    - Spiders have negative interactions with many pests of humans



Bay, N., 2010

# Arachnid Species Interactions

- Scorpiones
  - Cannibalistic



M, Hamm, 2013



# Arachnid Species Interactions

- Scorpiones
  - Cannibalistic
  - Mostly solitary



M, Hamm, 2013

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