

Lab 1: The Scientific Method



Armadillidium vulgare

The Scientific Method

- Is a systemized **way to investigate** a question.
- If followed correctly, it reduces the chance of a mistaken conclusion because of error or **bias**.
 - You may think you know *why* or *how* your experiment should turn out – **be very careful!**
 - This kind of thinking may cause you to influence your experiment incorrectly.

Designing an Experiment

To start you need...

- **Hypothesis:** a testable statement, sometimes an “if... then” statement
- **Variable:** an isolated factor that you can control & test
- **Control group:** group not exposed to the variable

After your experiment you will have...

- **Data:** the results of your experiment, can be either numerical or more observations
- **Conclusion:** the interpretation of your results; whether the data supports or rejects your hypothesis

Designing an Experiment

Remember to...

- Keep all **conditions the same for ALL groups** (except for the experimental variable)
- Only test **one variable** at a time
- Make sure your experiment is repeatable!
- **Be objective about results** – don't reject data only because it doesn't agree with your hypothesis!

Steps of the Scientific Method

1. Observations

Observe subject and study past data.

2. Hypothesis

Formulate a cause & effect statement to test.

3. Experiment / Observation

Test hypothesis and collect data.

4. Conclusion

Analyze the data.
Do the results support your claim?
If hypothesis is not supported, start again.

5. Scientific Theory

If many experiments and observations support the hypothesis, it might become a theory.

Armadillidium vulgare (pill bugs)

- Also commonly known as “roly poly bugs” because they roll up as a **defense mechanism**
- Not insects, but terrestrial (land-living) **crustaceans**
 - Common crustacean examples: crab, lobster, shrimp, etc.



Heterocarpus ensifer (shrimp)



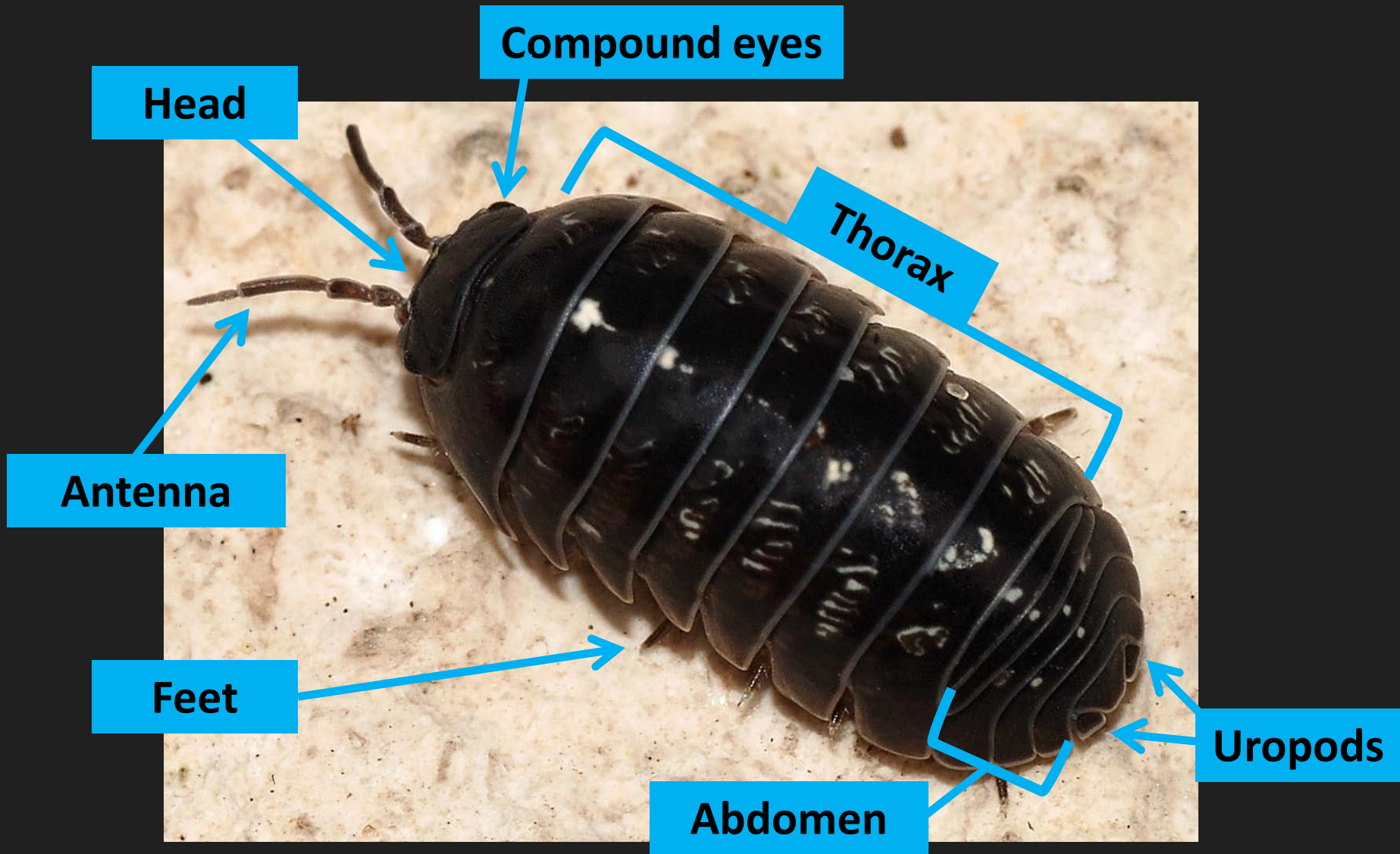
Liocarcinus vernalis (crab)

Armadillidium vulgare (pill bugs)

- Social – parents care for their young offspring & individuals can distinguish family from strangers
- Diet – mostly dead plant material, sometimes living plants or dead animals
- Habitat – prefer moist areas, in the soil or under fallen leaves, logs or rocks



“Pill Bug” Anatomy



“Pill Bug” Anatomy

- Hard **exoskeleton** – no inner skeleton, but an outer skeleton of armor-like plates
- Head
 - Compound eyes
 - Two pairs of antennae (2 are hard to see, **4 total!**)
- **Thorax** - below the head & before abdomen
 - 7 pairs of feet
 - Breathe through gills on the underside
- **Abdomen** – about the last five segments of body
 - **Uropods** – pair of appendages at the end of the body, they are very short in *Armadillidium vulgare*