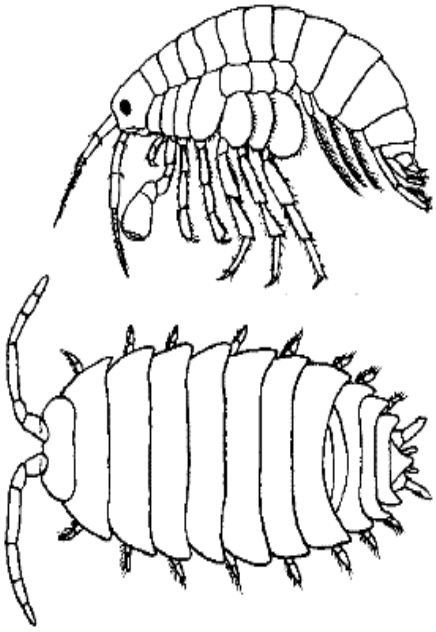
DO NOT WRITE ON LAB – AVAILABLE ONLINE

Isopod Behavior, AKA the Roly-poly Lab (45 pts.)

Introduction

Today we will be observing the behaviors of terrestrial isopods commonly known as sow bugs, pill bugs, or roly-poly. As living organisms they exhibit the following properties:



Order: All organisms exhibit complex organization as determined by their genetic code (DNA).

Regulation: The environment outside of an organism may change markedly, but regulatory mechanisms maintain the organism's internal environment

Growth and development: Every organism has a pattern of growth and development that is characteristic of the species.

Energy utilization: Organisms take in energy in one form and transform it to another in order to perform all of their life activities.

Response to the environment: All organisms respond to stimuli.

Reproduction: The structure of DNA lends itself to precise replication and as the blueprint for every species it allows every species to reproduce its own kind.

Evolution: All species have the potential to change over time through the process of evolution by natural selection.

As with all living things, scientists have named and categorized these organisms based on their appearance, behaviors, and most importantly their relationship to other species. Terrestrial arthropods are in the domain Eukarya, Kingdom Animalia. Terrestrial isopods are members of the phylum Arthropoda, class crustacea, which also includes lobsters, crabs, and shrimp all of which are aquatic organisms that breathe through gills. While they look similar, sow bugs are different from pill bugs, but they are both isopods. Pill bugs will curl into a ball when threatened whereas sow bugs will attempt to flee.

Female isopods can carry up to 200 eggs in a brood pouch underneath her abdomen and they will remain in the pouch for about three weeks - they look the same as adults, only smaller. The only reliable way to sex a roly-poly is to turn it over and look at the critter's underside -- which is pretty difficult to do with something named for its ability to roll into a tight ball. Females have growths on some legs that resemble leaves. Those develop into brood pouches for young isopods after mating. Males have special copulatory organs formed from their first two appendages.

Larger isopods can be handled and observed easily with your hand, by picking them up with your fingers or gently scooping them up with a spoon. They are fast walkers and can withstand short drops. Immature isopods are more fragile than adults.

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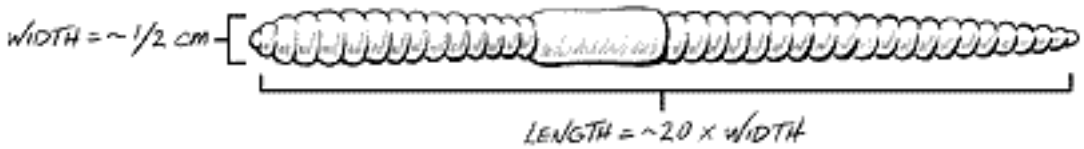
Isopod Observations *(5 pts.)*

In the first part of this exercise, you will observe isopods and record what you see.

a. Take out a piece of paper and title it "Isopod Behavior Lab." Title the first subsection "Isopod Observations"
b. Place 10 pill bugs and a small amount of the bedding material in a Petri dish. Pill bugs generally do not climb, but if they do you may cover the Petri dish with plastic wrap or the lid of the dish.
c. Observe the pill bugs for ten minutes. Make notes on their general appearance, movements around the dish, and interactions with each other. Notice if they seem to prefer one area over another, if they keep moving or if they settle down. Make your observations while disturbing the animals as little as possible. Do not poke or prod or shake the dish, or make loud sounds, or subject them to bright lights. You want to observe their behavior, not influence or interfere with it. Record your notes in the isopod observation section of your paper.
d. Answer questions 1 -10 at the end of this lab on your paper after you have recorded your observations of the pill bugs.

Scientific Sketching *(10 pts.)*

Biology commonly involves a form of science referred to as discovery science or descriptive science. One common way to communicate the results of such science is through the use of scientific diagrams and sketches. In this part of the lab you will be making a sketch of one of the isopods you have been observing. When you make a sketch of an isopod, don't jut draw an oval with a few squiggly legs - you are expected to do a scientific illustration similar to the sketch of an earthworm below. Create a new section on your Paper titled "Isopod Sketch" and sketch one of the isopods in that space using the tips below.

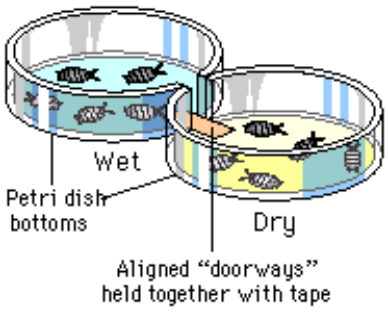


Here are some tips for making an accurate sketch (include in your lab report)

- Determine the relative proportions (length, width, height as well as lengths of body parts) – use ruler
- Count the number of body segments
- Count the number of legs
- Locate and label the body parts
- Note the size of the isopod
- Draw larger then actual size and include scale
- Do not copy picture on front page

The Choice Chamber

For the following experiments you will need a choice chamber to test the isopods reactions. Each choice chamber consists of two sides, each side having a different environment, plus a channel that connects the chambers so that the isopods can move from one place to the other. In the first experiment one side of the chamber will be moist while the other side will be dry.



Orientation of Isopods in Response to Moisture

a. Using the same piece of paper that you recorded your isopod observations on, create a new subsection titled "Orientation of Isopods in Response to Moisture." **Record your prediction**

(*2 pts.*) to which side of the chamber the isopods will prefer, either the moist side or the dry side.

b. Assemble your choice chamber. The choice chamber should consist of two large plastic Petri dishes taped together with an opening cut between them. Line one side with a moist piece of paper towel and the other with a dry piece of paper towel. (You will need to cut out a circular shape paper towel for each side of the choice chamber).
c. Draw a table similar to Table 1 below ***(5 pts.).*** You will use it to record your results from this experiment. DO NOT WRITE IN THE TABLE BELOW.
d. Carefully use your fingers or a plastic spoon to transfer ten isopods from the stock container to the choice chamber. Place five isopods in each side of the choice chamber. Cover the chambers.
e. For the next ten minutes, at 30 second intervals, count how many isopods are on each side of the choice chamber and record your data AND observations in the table you created in step c of this section of the lab. Continue to record even if they all move to one side or stop moving completely.
f. Return your isopods to the stock container.
g. Use a ***line graph (6 pts.)*** to graph both the number of pill bugs in the wet chamber and the number of pill bugs in the dry chamber. (You will need to plot two lines). Think about what are and label dependent (y – axis) and independent variable (x – axis)
h. Answer questions 11 -12 at the end of this lab on your own paper

Table 1: Number Of Isopods in Moist Dry Chambers

TIME (Minutes)	# in Wet Chamber	# in Dry Chamber	observations	TIME (Minutes)	# in Wet Chamber	# in Dry Chamber	observations
0.5				5.5			
1.0				6.0			
1.5				6.5			
2.0				7.0			
2.5				7.5			
3.0				8.0			
3.5				8.5			
4.0				9.0			
4.5				9.5			
5.0				10.0			

Isopod Observation Questions *(13 pts.)*

1. What evidence can you observe that allows these isopods to be classified in the domain Eukarya and Kingdom Animalia?
2. How do the pill bugs seem to sense their environment?
3. Do you think they are they all the same species? Explain.
4. Can you tell the difference in males and females?
5. How many eyes do they have?
6. How many legs?
7. Do they exhibit dominance behaviors?
8. How do they breathe?
9. What are some stimuli they seem to respond to?
10. What other properties of living things can are evidenced by the pill bugs you observed.

Isopod Orientation in Response to Moisture Questions *(4 pts.)*

11. What conclusions can you make based on your data? Suggest a physiological reason for the behavior you observed.
12. Did your data support your prediction? Explain.