

MICROPIA

toont het onzichtbare

Tracking down water bears

In search of the ultimate survivor



Water bears (also known as moss piglets or tardigrades, meaning 'slow walkers') are a fascinating group of microscopically small animals. These eight-legged microbes are able to survive all kinds of extreme conditions. They can deal with temperatures from $-270\text{ }^{\circ}\text{C}$ to $150\text{ }^{\circ}\text{C}$, X-rays that are a thousand times stronger than the dose deadly to human beings, environments without water or oxygen and even the vacuum of space. But normally they live in moist conditions, such as nice, wet moss.

You can use a microscope with a magnification of 20x to track down water bears in a piece of moss. If you do not have a microscope at school, you can also find them with a magnifying glass with a magnification of 10x. But then the water bears will still look very small and you may not be able to see their legs.

What do you need?

- a little piece of moss;
- a small dish or any small waterproof container;
- a Petri dish;
- rainwater or distilled water (better not to use tap water);
- black paper;
- a pipette;
- a microscope (or a magnifying glass with a magnification of 10x);
- microscope slides and cover slips (three per microscope slide).

WHAT IS THE BEST TYPE OF MOSS?: Water bears feel most at home on moss that grows on stones, rather than on trees or on the ground. This is because they need the minerals from stone to build up their teeth. Moreover, water bears live best on moss that sometimes dries out, while this is not often the case in a forest. Do not use any stinky or permanently moist moss. Water bears live best on moss that has fewer bacteria and fungi.

BEFORE YOU BEGIN: You can collect rainwater by placing a clean dish or any waterproof container outside. In order to keep the water as clean as possible, the container can stand on a table so that no mud can splash into the container. Rainwater is good because it is similar to the water that can naturally be found in moss and does not contain any dirt particles. It can be easier to find water bears if you first dry the moss in the sun or keep it in a paper bag for a while. Water bears will survive this with no problem, while other microscopic organisms will be killed by the dry conditions. This makes it easier to find the water bears.

Getting started!

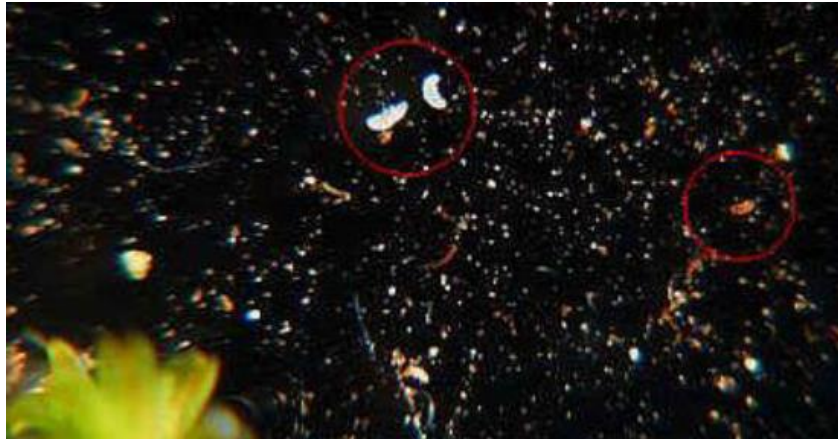
Step 1: place the moss in water

1. Choose a piece of moss that fits in the Petri dish. Remove as much of the loose earth as possible. Do not be alarmed if a few of the larger inhabitants quickly run away.
2. Put the moss upside-down in the dish and fill it with water until it is about one centimetre deep.
3. After a while, the moss will have absorbed the water. Then add a little more.
4. When the moss is really soaked with water, add a little more water until it is about half a centimetre deep.

Now let the dish with the moss stand for at least three hours. Overnight is good as well.

Step 2: look through the Petri dish

1. Let the excess water flow out of the dish. Shake or squeeze the water out of the moss above another Petri dish.
2. Place this second dish on the black paper or another black background and look at it with the microscope or with a magnifying glass.
3. Search for water bears. At magnification of 10x they are still very small and their legs can hardly be seen, so they might look like thick little worms. But you can only see them from close up if they are lying on a microscope slide. Some types are red, most of the larger types are whitish or transparent. Sometimes water bears hold on to little pieces of dirt or little grains of soil and this makes them hard to see.



questions

Question 1: How many water bears did you find?

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Step 3: make a specimen

1. When you have found water bears, carefully suck them up in a drop of water using the pipette.
2. Place the drop of water on a microscope slide.
3. Put two cover slips on each side of the water drop, and then place a third cover slip on top of the water drop. Make sure that the two side cover slips are in between. This means there will be enough space between the microscope glass and the cover slip to prevent the water bears being accidentally squashed.
4. Look at the water bears with 20x and 40x magnification.

Question 2: What do you find strangest about their appearance?

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Question 3: On the back of the sheet, make a drawing of a water bear that you found.

drawing

Would you like to know more about how water bears manage to survive so well? Or would you like to do more experiments? Then go to micropia.nl.