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Rearing and Experimenting with Isopods

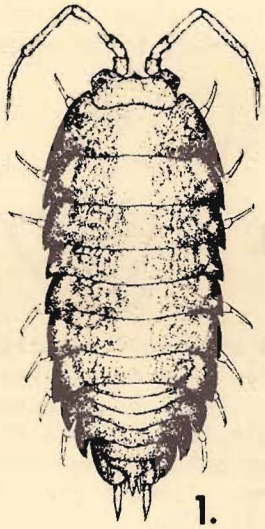
Have you ever turned over a rock or old board and discovered a small, hard-shelled creature resembling a miniature armadillo, and then upon picking it up had it roll-up into a near-perfect ball in your hand? Such armoured creatures are called wood-lice or sowbugs and those kinds that roll up are often called pillbugs. Technically, however, they are all known as isopods, which means "the legs are alike"--of which there are seven pairs (Figs. 1 and 2). Isopods are not insects but rather land-dwelling relatives of the crabs and lobsters. Most are rarely more than 1/2-inch long. They are excellent subjects for indoor study because they live a long time, are easily reared on simple fare, and react readily to experiments.

There are nearly a dozen species in the Great Lakes region. Two common ones are *Cylisticus convexus* (Fig. 1) and *Tracheoniscus rathkei* (Fig. 2). *Cylisticus* is one that can roll up into a ball while *Tracheoniscus* cannot. Another common species, *Armadillidium vulgare*, has the most highly developed ball-rolling ability and above all others deserves the name "pillbug".

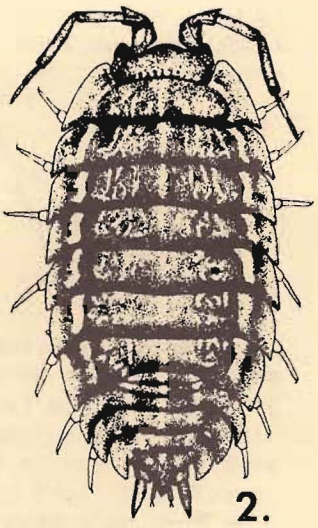
Each isopod species prefers a different habitat and thus some kinds are more abundant than others in certain localities. For instance, *Cylisticus* prefers a wet habitat and frequents rocky beaches along streams and lakes. *Tracheoniscus*, on the other hand, prefers moist woodlands and so warrants the name "woodlouse". All these species, however, can be found in cities where they are readily collected in gardens, along house foundations, and sometimes in basements.

Although these animals are common, you rarely see them in the daytime because they prefer dark, moist places--under rocks, boards, bricks, and debris. Only at night do they emerge and wander about. Then you can easily find and collect them if you are armed with a flashlight and jar. You can also trap them using a whole potato as bait.

To make the trap, simply bore a 3/4-inch diameter hole through the potato lengthwise and then close up one end of the hole with a small piece of the potato plug. Place the "trap" in the garden or any other place where isopods are abundant and cover it with leaves. Let it remain there a few days. The isopods will come and feed inside the hole in the potato. To remove them, place the opening over a jar and strike the potato to dislodge them. The potato trap is especially useful for collecting small or young isopods and rare species too.



1.

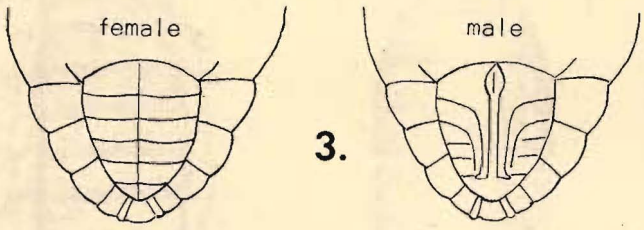


2.

Colonies of one or more species can be easily reared indoors in a terrarium. A suitable vessel should be at least 12 inches long by 8 inches wide by 8 inches high so as not to crowd them and to facilitate observing their habits. Fill the bottom with pulverized soil about 1-inch deep and moisten it with a little water. Place a few dry leaves, twigs, and pieces of bark on top. Add one or two small flat stones--supported by pebbles in such a way as to leave a small space beneath for the isopods to hide. Put a tightly folded paper towel soaked with water in the corner on the soil to give the isopods some water to drink and also to raise the humidity in the terrarium. Then place two or three small slices of potato or potato peels on the soil for food. A slice of raw carrot or some lettuce will provide

variety. Then drop in the isopods and cover the terrarium with a piece of glass or plastic to keep the humidity high. Be sure to keep the terrarium out of direct sunlight. Once established the isopods will reproduce and grow successfully, and the colony can be kept for many years with only a little attention. The paper towel may need rewetting or an additional piece of food may be needed at about monthly intervals. Several species may be reared together if desired.

By inspecting the terrarium daily or weekly you will be able to follow the life history and behavior of the specimens in the colony. Female isopods generally have 1 to 3 and sometimes 4 broods of young per year. The females can be distinguished from the males by comparing the rear segments on the lower side (Fig. 3) using a microscope or magnifying glass. When the eggs are formed the female transfers them to a specialized receptacle called a brood pouch. You can check for eggs in this pouch by placing a female on her back and using a pin gently lift the armoured plates on the underside between the legs. She may carry 50 or more eggs at one time. After about two months of incubation the young crawl out of the brood pouch. Young isopods look just like their mother and those kinds that can roll up are able to do so soon after birth.



3.

Isopods, like insects and their relatives, must shed their hard outer skin or exoskeleton in order to grow larger. This occurs a dozen times or more during their lives. Once the skin splits and is forced off, the new skin is soft and light colored. Isopods generally hide when skin-shedding is about to occur because they are especially vulnerable to enemies at this time. The average life span of most isopods is about 2 years but some have lived as long as 5 years.

Experiments with isopods are rewarding because these creatures react strongly to moisture, temperature, and light. Most isopods react "normally" when the relative humidity is moderately high (50-70%), the light is dim, and the temperature is close to indoor conditions or slightly lower. An isopod, then in its favorite habitat, walks around slowly, feeds casually, and moves in and out from under objects nearby. When the conditions are unfavorable, however, the isopods will behave differently. There are several simple experiments in which you can observe isopod behavior under modified and adverse conditions.

For instance, here is a simple way to show their response to moisture. Take a batch of medium to large isopods (8-10 specimens) and place them in a petri dish or jar on dry filter paper. Keep the light dim. Isopods have gills and they do not retain water well, so within a minute or two you should see them clump together, indicating a need to reduce water loss from their bodies. Now, if you put these isopods in a container with just a small piece of damp paper, most will find the paper and sit on it.

Take another batch of isopods and place them in a small box that has screen covering the bottom and a glass or plastic top. (A 2-inch deep section and lid of a Quaker Oats box is suitable). Place the box over a petri dish of calcium chloride crystals. The crystals will absorb the water out of the atmosphere in the box causing the humidity to drop to near 0%. At first the isopods may clump but soon they will rush around frantically indicating their distress from water loss. If you then place the same box over a dish of water the isopods will slow down and return to normal as the water vapor rises through the screen bottom.

Another interesting way to test for moisture reaction is to offer the isopods a choice of conditions. Straddle the box of isopods over two adjacent petri dishes--one containing water and the other calcium chloride. The isopods will wander about the box for awhile but soon will congregate on the water side. If you rotate the box so the dishes are reversed the isopods willl repeat their searching pattern and once again move to the water side.

You can also test isopod responses to temperature. Isopods are cold blooded, which means their bodies take on the temperature of their surroundings. Place 4-6 isopods in a small jar with a cover and float it on water in a pan. Add ice cubes and a thermometer and stir gently so as not to tip the jar. The isopods will slow down their movements and may even stop moving as the temperature approaches 0° C. Now remove the ice cubes and gently heat the water. The isopods will speed up their movements as the temperature rises. Their pace will become frantic by the time the temperature reaches 40° C. Remove the isopods at this time or they will go into heat stupor which may kill them if prolonged.

Isopods also react to light. You might devise your own tests using different degrees of light or colored filters and test their responses.

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