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Centipedes in compost

Centipede on a rock (all photos by D. Cahill.) Myriapods or myriapoda, such as centipedes and millipedes, are an important part of the soil food web. The word ‘myriapods’ is Greek and translates to myriad (or many) feet. These two types of creepy crawlers work in tandem, but in different ways, to benefit the soil. Centipedes are the hunters, and millipedes the gatherers. The taxonomic hierarchy goes like this: 1) Animals 2) Invertebrates 3) Arthropods (which also includes insects, spiders, mites, lobsters and crabs) 4) Myriapods. Besides their many legs, other characteristics of both centipedes and millipedes include: One pair of antennae; Two body segments – a head and trunk; Segmented trunks; Simple eyes, Mandible (lower jaw), maxillae (upper jaw); Respiratory exchange happens through a tracheal system — a series of branched tubes that infiltrate the body and carry oxygen directly to cells. Centipedes are fierce predators, specializing in insect larvae and are a top predator in the soil ecosystem. Centipedes Centipedes are the top predator in the soil food web. They have modified legs that work like the mouthpieces of spiders, except the mouth claws on centipedes are tipped with venom. Using these claws to hunt their prey make centipedes fierce predators. Most are fairly harmless to humans, although a bite from some types is painful, similar to a wasp sting. Centipedes help keep some pests in check. They specialize in killing and eating snails and grubs, a definite pro for the farmer. On the con side, centipedes also eat earthworms and spiders. To keep things fair in the compost battleground, spiders, in turn, eat them. Centipedes are also a food source for large beetles, snakes, salamanders and opossums. Some species of centipedes can reach 12 inches in length, although most are .5 to 4 inches. They have poor eyesight. Some soil centipedes are even blind. They move through the soil like an earthworm by expanding their length forward and then contracting to bring the hind part of their body towards the head. This tunneling improves aeration of soil, allowing water and nutrients to reach the roots of plants. Centipedes can be good mothers. Some species give live birth, others lay a clutch of 15 to 60 eggs. The maternal-type centipedes wrap their bodies around the eggs, licking them to protect them from fungi. They stay with the eggs, shielding them until they hatch. Although centi means one hundred, centipedes never develop exactly 100 legs. They always have an odd number of body segments, and with one set of legs per segment, the math never adds up. Their legs can grow back if damaged. More body segments and legs are added with each molt. Millipedes range in size from less than an inch to nearly a foot in length. Millipedes Millipedes are the centipedes' distant cousin. They consume organic materials and are considered shredders, or detritivores. They play an important role in breaking down plant and animal debris (detritus) and are excellent for the soil, eating up to 10 percent of the leaf litter in compost. Millipedes work in much the same way as earthworms, moving nutrients through the soil. Also like earthworms and soil centipedes, their tunneling aerates the soil and assists with water penetration. Millipedes also benefit other soil organisms, working together to turn mulch and debris into nutrient-rich soil. They recycle nutrients at a much higher rate than natural decomposition. Millipedes are more docile than centipedes. They move slower, and instead of biting as a defense, they roll up into a tight ball to protect themselves. They also secrete a nitrogen gas that is toxic to small insects such as ants. Generally harmless to humans, a millipede’s gaseous secretions might cause skin or eye irritation to sensitive people. Like centipedes, millipedes have poor eyesight and get around by feel with their antennae. They have a special group of hairs on the second and third pair of legs that they use as brushes to keep their antennae clean. Millipedes lay eggs. In some species, the mother – in others the father – protects the eggs. The hatchlings look like miniature adults, minus all the legs. Some species are legless at hatching. After the first molt, baby millipedes have three body segments and six sets of legs. It takes one to two years, sometimes longer, for a millipede to reach adulthood. Their average life span is 1 to 11 years. The African giant millipede can reach nearly a foot in size and is often kept as a pet. Most species are one to four inches long and dark brown to black in color. Like centipedes, millipedes don’t live up to their name in number of legs. Milli means one thousand, but most millipedes have only 80 to 100 legs. No millipede species known to science has 1,000 legs. The one that comes the closest is Illacme plenipes, a rare millipede found only in Northern California. A Specialized Millipede For decades California’s Illacme plenipes was thought to be extinct. First discovered by government scientists in 1928, it wasn’t documented again until the mid-2000s when University of Arizona entomologist Paul Marek, then a doctorate student, found one. In the three-year period from 2005 to 2007, Marek and his team found 17 of the rare millipedes, as reported by National Geographic. All were clinging to the underside of sandstone boulders in a 2.8 square mile area outside of San Francisco. The female of this little Silicon Valley creature sports up to 750 legs. Males have up to 550. Other unusual notes of interest about this highly adapted millipede are the claws on the ends of its legs – thought to assist in digging and traveling deep underground - and the long silken hairs on its back. The hairs likely help it cling to the underside of rocks and boulders. Even with its myriad of legs, this millipede is small – only 1.2 inches in length. For millipede aficionados, the rare and unusual Illacme plenipes is legend. There are two less familiar myriapods – the sauropods and symphylans. They are both small, even microscopic organisms, that live in the soil and play their own roles in the soil food web. A centipede can have many legs, but never exactly 100. Telling Centipedes and Millipedes Apart Centipedes and millipedes sometimes look similar, but centipedes are flatter. They have round, flat heads and flattened bodies. They are the quicker of the two, undulating rapidly over rough terrain. Soil centipedes are often reddish orange in color but can range from translucent white to dark brown. Millipedes are cylinder-shaped with a rounded head and body. They have two pairs of legs per segment. One would think with all those extra legs they would be the faster of the two, but they are much slower, with their legs moving in a wave motion on either side. They are most active at night or after a rainfall. Centipedes live in dark, damp places. This one was found under a large rock after a rainstorm. Where do They Live? Myriapods are found around the world in grassland, farmland and forests and in every continent but Antarctica. They are even found in deserts, which strikes as odd because they generally dwell in damp, dark places – under logs and rocks, underground or inside mulch or compost piles. Without the waxy substance that coats the exoskeleton bodies of many insects, millipedes and centipedes are prone to dehydration, so they need a moist environment to thrive. In agricultural soils, shredders such as millipedes can become pests if there isn’t enough dead plant material available. Without detritus available, they will eat live plant roots – adding another check in the compost pro column. There are at least 12,500 different species of myriapods. Scientists estimate they have creeped along the earth, contributing to soil health, for some 485 million years. Many people worry about having ants in their compost heap but ants contribute to the composting process by bringing fungi, and other organisms, into their nests as well as introducing minerals e.g. phosphorus and potassium. Ants feed on a range of food including aphid honeydew (produced by aphids from t plant sap excreting), fungi, seeds, scraps and insects some of which are found in the compost heap. Compost provides some of these foods and it provides shelter for ants nests when cold composting techniques are being used or during the maturation stages of hot composting when the compost has cooled. Several species found in the UK including Lasius, Myrmica and Formica species. Ants nests can be beneficial in a compost heap as they increase the biodiversity by bringing insects and fungi into their nests and their tunnels can assist airflow. Ants are less welcome in a wormery. They are omnivorous and will not normally harm the worms, but they will compete with the worms for the food. If there are relatively few ants, provided you adding enough food to keep the worms supplied as well as allowing the ants their share it might be acceptable to just ignore the ants and let them co-exist. Allowing the ants to compete for food cause indirect result in the worms becoming malnourished as the ants will compete for sugars and fats in the feedstuff which are essential to the development in of the worms. Not removing the worms also means that when handling the compost your hands and arms are likely get covered with ants and some might take the worm eggs (cocoon) which will impact on the breeding programme. Where ants have infested a stacking wormery it is possible to remove the trays containing most of the ants and the nest, disturb them using the hand fork and leave them exposed to the light which will further encourage them to leave. It should also be possible to hunt through the nest to find and remove the Queen. (Gloves should be worn) The Queen will be much bigger than the other ants. It is said that sprinkling cinnamon cause the ants to disperse making it easier to remove the nest. The consensus is that the presence of an ant’s nest is an indication of dry bedding. Although there are several cases on Internet forums where people state that their moist wormeries have been invaded. The moisture level can be measure using a meter of estimate by squeezing the compost in the hand (Compost Moisture) but it is probably safest to assume that the bedding is on the dry side and moisten the it is using a water spray and turn it with a trowel or hand fork to disrupt ant colonies. Continue this process for a few days and most ants will move to a new home. As ants invade wormeries to gain access to readily available food an invasion may indicate a review of the amount of food provided to ensure that the worms are not being overfed. Too much food left in the wormery may increase the acidity of the bedding which makes it more attractive to ants and less favourable to worms. Ideally the bedding should be as close to neutral (pH7). If the bedding is acidic many suppliers of wormeries recommend the addition of a small quantity of lime, (which they sell!). Some suppliers recommend treating the wormery with a small handful of lime every month, but this view is not shared by all. Preventative is better than cure. Moated wormery One of the simplest ways of preventing worms occupying the wormery is to surround the wormery, or its legs, with water. With a bin on legs each of the legs can be stood in a dish or a coffee jar of water to which a little washing up liquid has been added to reduce the surface tension. Some recommend the use of mineral oil rather than water. Sticky Goo Alternatively, a commercially available ant goo, a sticky substance that is painted around the stems of rose bushes to trap ant can be used this is said to be s. It is eco-friendly and does not contain any insecticide poisons. Vaseline can also be smeared round each leg. These techniques will not only exclude ants but other creeping and crawling creatures as well, so it should only be used where ants are a problem. I’ve been called a lot of strange things in my life, but I never thought I could be called a nematode-lover. I certainly never envisioned a day when my wife would start referring to house centipedes – those terrifying huge invertebrates that seem to have a million legs and run at top speed – as our “honored guests.” We’re definitely not “bug people,” so what turned us around? As an ecologist, I can appreciate that even unlovable critters serve valuable functions in nature like decomposing organic matter and keeping the populations of other organisms in check. Then again, I never thought the indoors had room for biodiversity or strange “guests.” Living in the aptly named “eco-house” in college (where a dirt floor basement and holes in the walls contributed to hefty populations of slugs, moths, flies, and more) forced me to get used to it, but it certainly wasn’t my ideal living situation. So you can imagine my unhappiness when I discovered several years ago that I’d moved into a condo chock full of house centipedes. Then the ecologist in me started wondering why they were there, and what would happen if I successfully got rid of them. I knew that getting rid of wolves in Yellowstone led to a number of problems (e.g. higher elk populations started to wipe out cottonwood groves), and that the centipedes wouldn’t be there if they weren’t finding something to eat. It turns out house centipedes actually eat cockroaches, ants, bed bugs, moths that can eat clothes, and other household pests. We don’t keep a pristine house, and living in a condo there are always cockroaches and ants somewhere nearby, waiting to strike. When we realized that these beasts were our front line against even more unsavory bugs, our attitudes towards them changed; after all, the enemy of my enemy is my friend. No more vacuuming them up, and no more trying to bring the humidity levels low enough to make them unwelcome. A Few Million Nematodes When our household worm compost bin (another adventure in urban ecology) got infested with fruit flies, we naturally wondered about biological controls. While there were many species of mites, springtails, and other tiny bugs in our bin, we were missing predators. I ordered a few million nematodes (a kind of tiny roundworm) by mail. Within a few weeks (long enough for the adult flies to die off and their larva to have been eaten) we had a fly-free bin. To this day, I smile when I see the tiny little white thread-like nematodes patrolling my compost bin, looking for new larvae to eat. My wife has made it clear that bringing in spider eggs from outside to take care of the occasional housefly is going too far. But we’ve learned that whether we like it or not, we do share our homes with a variety of other creatures. Rather than dive into a spiral of ever-increasing applications of poison or traps, we’ve been learning to love our allies, no matter how creepy they may be. (Photos: Centipede by Flickr user robswatski under a Creative Commons Sharealike license; nematodes by Jon Fisher/TNC under a Creative Commons Sharealike license).

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