

Composting Isopods (*Porcellio laevis*)

CARE INSTRUCTIONS



Your Isopod Package Includes:

- P. laevis* (the smooth woodlouse or composting isopod) of various sizes, in a starter container with some food
- A starter amount of blended substrate from our lab, which includes enough food for your isopods to last for a week or two: the wood and leaves are also food.
- Possibly some springtails (tiny, beneficial jumping invertebrates which cohabitate in a bioactive unit with your worms)

Things You Might Need:

- a spoon or scoop for scooping dirt or picking up your new friends
- a tote-type container for their habitat (plastic shoeboxes or storage bins work well)
- chopsticks, spoons, or forceps to help you dig around in the dirt
- a spray bottle with mist function, in case your soil gets dry

Isopods make charming and entertaining invertebrate companions for terrariums, or just for fun. Isopod composting is also a growing field and one way to divert your food waste from the land fill. The number of isopods (also called rollie-pollies, woodlouse, pillbugs, doodlebugs, slaters, potato bugs, armadillo bug, etc) in your kit is a starter size, and do expect them to breed and multiply. Your isopods can be combined safely with red wigglers, and when combined, they make a powerfully efficient combination of charismatic composters. Once your isopods are established in your bin (3-4 months), expect the combination to eat almost 3 times as worms alone would. Do be aware that isopod waste is not well researched and it is not clear whether it will be as beneficial to your plants as pure worm castings will: isopod waste is also a little harder to separate from the isopods themselves, as they tend to be bolder than worms alone and scurry about with gusto, making them challenging to remove.

Some people combine them into their tropical aquariums as beneficial recyclers, to do the waste cleaning for another pet such as tropical frogs. You've started out with one of the largest, most robust, and easy to keep species: but there are hundreds of isopod species in the hobby. Some are very fancy indeed, and they all have different needs. Do not combine your isopods with other terrestrial invertebrates including other isopod species: *P laevis* loves protein and may eat their competition (though – as mentioned – they leave red wigglers alone).

A Little About Isopods

- Isopods are not an insect, arachnid, or a millipede. They are a tiny land crustacean, so their closest cousins are shrimps, crabs and lobsters.
- Isopod bodies: they have three body parts: head, thorax, and abdomen: with seven segments on the thorax. There is 1 prominent pair of antennae ("flagellum") at the front (you can see them waving them around and exploring their world with these) and one inconspicuous pair. They have two very simple compound eyes, and 14 legs in total. The little paired appendage at the "tail" end of the isopod is called a uropod: in males it is usually longer than on females. They breathe through primitive gill-like structures on the base of their legs.
- Your isopod's colour varies from dark grey to almost white, occasionally with pinkish or brownish hues. Some other types of isopods have heads like ducks, some isopods have stripes like zebras... there is a lot of diversity!
- The Isopod has many common names because they live almost everywhere all around the world, from the ocean to our backyards. Some live at high altitudes, some live-in deserts, some live under the Antarctic sea ice. This is an ancient family of animals, around since the carboniferous era, and they have adapted to a wide variety of environments.
- Not all of them can curl fully into a ball. This *Porcellio* species, can curve, like a shrimp, but not ball up.
- Isopods have an exoskeleton: a hard shell. They can withstand a short fall, but please be careful not to squish them!
- Female isopods have a marsupium (like a kangaroo pouch) on their belly, about 2/3 - 1/2 way down their body, in between their legs. The eggs grow and when ready, hatch inside of this pouch, upon which she "gives birth" to babies that are ready to walk around. If you look carefully and gently you might be able to see full brood pouches on mature females.

YOUR ISOPODS: *Porcellio laevis*

Your isopods are properly called *Porcellio laevis*: try this name out as it really is the only one unique to this species. Wikipedia lists **23 common English names** for isopods – including rollie-pollie, smooth woodlouse, and pillbug – and these are shared among many of the 5000 terrestrial species of isopod in our world. And that's just the English names! There are many more nicknames in other languages as well.

These are not wild isopods: the species you have is native to North Africa and parts of Europe, and they are appropriate for *indoor use only*. This species is big and powerful, with a broad appetite, and will outcompete our native wildlife only to die in the winter. **Do not release this species outdoors.**

GETTING STARTED

Check your isopods in their little travel house to make sure they are alive and scurrying around. They have some food in there: wood and leaves from a hardwood tree (usually oak or apple), and perhaps some veggie scraps. This gives them enough snacks to last a week or so, until you have your supplies for a larger home gathered. If you feed them a small amount of food every week, they can stay in this container for about 3 weeks if need be, but it's not ideal for a growing colony so make sure you upgrade them within that time.

- Keep your container between 16 and 25 degrees: they do their best work between these temperatures.
- Put them somewhere quiet, and in low light. Isopods like the dark! They are not as shy as worms, but they

- feel much safer if they can hide and have some privacy.
- Humidity levels need to be fairly high (50-75%; so, keep the lid on) to ensure your dirt does not dry out. **They need moist dirt at all times** because they breathe through gill-like structures on some primitive appendages on their ventral (bottom) surface. If you notice the dirt drying out on top, spray it with water until you see condensation forming.

The Habitat

Your isopod habitat should have a lid, be waterproof, and ventilated. Though your isopods are not as shy as worms, they VERY MUCH PREFER the dark and will want to hide: so either provide them with lots of ground cover like leaves and moss, or have an opaque bin. Your container can be many sizes, but a bigger bin will mean you'll get more isopods and they'll be able to recycle more of your kitchen food for you. Standard sizes for home composting are between 40-60 L, but if these are pets, you can go for something smaller, like a plastic shoebox. There are a lot of commercial plastic tote bins you could use from heaps of places: just ensure that if you do use a bin with a lid that seals, that you drill some **air holes** in the top. Ventilation is important, the isopods need air.

Do not use a bin made of wood! We really can't emphasize this enough. Isopods are great climbers of anything they can cling to: and that includes wood. Plastic and glass are not climbable.

The Substrate

Proper bedding is important to maintain the health of your isopods; do not underestimate the importance of the substrate in the habitat. A quality substrate is the single most important care factor in maintaining and growing your population of isopods, because they eat it and live in it: it is the primary food source. It is their shelter. It is their source for hydration. A good substrate provides all these things and any supplemental foods or products are just secondary to their well-being. Having layers of texture throughout the bin is nice too, so make sure you mix the substrate around so that they have lots of places to burrow and explore. You've been provided with a small starter size of substrate, but you'll need to expand that. The mix you have been given is approximately a 1:1:1 blend of coco coir, black earth, and shredded rotten hardwood (we use birch). Suitable substrates you could use:

- clean black earth potting soil (no chemicals, no fertilizer; usually available at garden centres) and coconut coir (can be found at greenhouses or hydroponic stores, or pet stores - where it is very expensive).
- peat moss
- orchid bark or other shredded wood (decayed is best; no cedar!)
- a handful of clean sand for grit
- New Zealand sphagnum moss
- Some kind of ground cover: they would be living under the leaf litter in the wild. If you have them in a dark bin, they will be ok without it. But if they are exposed to any light at all you will need to obtain some ground cover to help them hide: moss and leaves, rotten pieces of wood, or cork bark from a pet store. Hardwood species such as oak or birch are good, because it is nutritious for your isopods. Soft decayed hardwood is a nice treat. Many of these items can be purchased at pet

stores, which is the safest option.

- Do not use cedar, as it is toxic to invertebrates.

A note on collecting stuff from outdoors: this is the cheapest option for substrates and especially for groundcover, but it can be unsafe. *Please use extreme caution when collecting from the wild: much of what we do to the land makes it toxic for critters, especially in a bin the animals can't escape from.*

- Collected substrates can be very beneficial, especially if they are rotten hardwoods such as birch, oak, and apple. Other woods may be discarded, and some are repellent or toxic, such as conifer and cedar.
- Ensure that whatever you collect is far away from any location that might have been exposed to fertilizer or pesticides. Ask your neighbours what they put on their lawn, and avoid any public spaces that may have been sprayed (such as avenues, roadsides, trees along sidewalks, and school yards). There is no way to clean the material of fertilizer or pesticide except time.
- Be aware also of "volunteers;" these would be the stowaway organisms that hide in the collected materials. They might be mould, fungus, bacteria, viruses, or even large organisms such as centipedes. These are all potentially harmful.
- To get rid of pests, **bake or freeze any wild-collected material for about 4 hours at 200 C** (low and slow). Baking's a bit more thorough, and makes your house will smell lovely. 24 hours in a freezer if you go with that method.

Vary the bedding in the bin and provide texture diversity for the animals. Make sure your isopod substrate is at least 3 - 4 inches deep. **Moisten the bedding with non-chlorinated water before you add in your isopods;** it needs to be damp, though not wet enough for water to be squeezed out. Spread your surface cover around on the surface for them to explore and hide amongst. You are ready to populate your bin!

Life Cycle & Moulting

You will have both male and female isopods. After mating (which occurs during a female's moult cycle), the female grows eggs into a brood pouch on her underside (you can see it if you look very, very carefully; like a little white bundle in the middle of the body between the legs). The eggs develop inside this marsupium, and then stay as little mini white isopods inside until they are ready to be "born," which is simply when the marsupium detaches and the little babies emerge. Some species of isopod have females who can reproduce asexually, without a male.

Like all animals with an exoskeleton, they must moult in order to grow; an isopod will molt 4 or 5 times to reach adulthood. Unlike most arthropods, they do not shed their exoskeleton all at once: first the back half is shed, and then in the next 2 or 3 days the front will follow.

Watch for moulting individuals in your colony and avoid bothering them! You can spot a moulting isopod because the front half of the isopod will be a different colour than the back half (they moult their exoskeleton in two parts).

Moulted skins are called exuviae, and the adults will naturally eat them and recycle them as they would other decaying organic matter.

Feeding Your Isopods

Isopods are "detritivores," which means in addition to all this dead plant matter in the bedding, they will also eat rotten organic waste such as dead animals or certain fruits and vegetables. You can exploit this to compost your kitchen scraps because this isopod species is known for their great and formidable hunger, though until you have more of them, it won't be a lot of food. 1-2 times a week, feed a variety of food: mix it up so they have things to choose from. If they haven't eaten it within 4-5 days, remove it. When in doubt, work with smaller portions of food: if you notice it disappearing within a day or two, add more in. No water is necessary as long as there is moist food available and the soil is high humidity.

DO FEED: well washed semi-soft veggies and fruit such as squash, mushroom, lettuce, avocado, carrot, zucchini, cucumber slices, apple cores, pear, banana, banana peels etc. Always keep a piece of cuttle bone in the habitat or add pulverized eggshell (your isopods need calcium to grow their exoskeletons).

A SMALL AMOUNT: of protein such as dry dog or cat food leftovers (stay away from the wet stuff, it's stinky), fish food, grains, bread, or salty treats like fish skin or bones. This should be less than 5% of the food.

AVOID: dog & cat waste, human waste, cheese, onions, oil, and butter. Stay away from citrus fruits and tomato, and potato peelings as well; though the isopods would eat them in the wild, excessive amounts of these in a closed environment will alter the PH of your soil and your friends cannot escape. An orange slice here or there will be enjoyed, but you might need to remove the rind after a couple days. Your isopods will enjoy small amounts of some other forms of protein such as lean meat trimmings, but we recommend against this in a small bin, as slimy rotting meat in a tub full of dirt is gross for people: stinky, may attract flies, and can be unsanitary.

TREATS: Isopods love to eat dead bugs, including each other as they pass away, and their molted exoskeletons. Make sure any dead bugs you add are CLEAN! Wild-caught bugs can have pesticides on them, so be careful (leftovers from a pet lizard are fine). Fish food is a favourite treat, and there are commercially available "Isopod Powder" foods on the internet or at some pet stores if you want to get really fancy because you love them like a pet. In our experience these are not necessary, as long as the kitchen scrap diet you are feeding them is well supplemented by a good substrate blend.

TO AVOID ODOR PROBLEMS: bury the food just barely under the soil. This also keeps fruit flies at bay. Simply pull aside some of the bedding, dump the food in, and then cover it up with anywhere between 1-4 inches of fine substrate so the flies can't get to it (though any maggots or fly cocoons will get eaten by isopods) If you want, a fun project is to mark the location where you last buried food, and next time move to a different location. Work your way around the bin so no one site is never over-saturated. This is also an easy way to see their composting in action.

Combining with Other Animals

Red Wigglers for Combo Composting: This species of isopod

combines well into a red wiggler composting bin. Not all isopods might enjoy a habitat like a worm bin, but as long as you have enough clean woody materials and places for them to wiggle and hide, this species plus red wigglers together will consume kitchen waste at a much more efficient rate than worms alone will; almost 3 times as efficient based on density. The isopods are directly on top of the surface and the worms are a little bit deeper, so your buried food will be going towards two different types of mouths. The beneficial gut bacteria from the worms will keep the deep bedding in good state, and the competitive, voracious isopods will keep any pests down. We would suggest adding a thick layer of isopod-edible bedding (as described above) on top of your worm bedding, and then simply seeding your isopods in. The beddings will likely be very similar; the only thing you will want to avoid is a lot of newspaper or dry substrate. The only problem with adding isopods in is that harvesting compost for your garden becomes quite challenging.

Live Bio-active Terrarium/Vivarium: Isopods are increasingly popular in the live vivarium hobby, where they can play a valuable role in maintaining a bio-active setup. If you are interested in this, there is a whole world of information to delve into. Google is very much your friend in this case, as we could fill another instruction sheet with vivarium tips alone. You will need to carefully research which species of reptile, amphibian, or other would have the same habitat as a given species of isopod. For instance, *P laevis* new species needs high humidity, so they would not be happy with a desert animal like a bearded dragon. Some reptiles or amphibians may take an interest in eating this large species of isopod: do your research as it could be that a smaller type of isopod would be more appropriate. If you are housing your isopods in a bioactive viv, they will need a layer of isopod-friendly substrate including leaf litter and other edibles, which will need to be replenished from time to time. Besides that, the nutrient content of your pet's waste will provide them with nearly all the food they require and will end up being very low maintenance.

Other Invertebrates: We do not recommend using this species with other invertebrates such as scorpions, tarantulas, mantis, etc (besides the worms, as mentioned). They tend to have a bit of a propensity for eating inverts when they are in a vulnerable state, such as when your tarantula goes through a molt.

Dogs & Cats: Isopods are non-toxic, so your pets will not get sick eating them. We have observed, however, that many pets seem to believe your bin must contain the garden of earthly delights, probably due to the interesting little noises your bugs are making. Hide your bin somewhere pet-proof if possible.

Handling!

Isopods can be handled and observed easily as long as you are very, very gentle.

Use a spoon or careful fingers to scoop and gently free them from the soil and deposit into your hand. They are very small and their legs are delicate, so never pinch them or press on them because you may not be able to see the damage that they can feel. Let them walk around on your fingers or hands freely; they do not appreciate being forced to stand still. They are fast walkers and can withstand a short drop.

Like all arthropods, handling while they are moulting is discouraged! Immature individuals will be more fragile than the adults, so go for the bigger ones.

Sometimes you will find a mother with a full brood pouch on her

belly: looking in between the first several sets of her legs; you will see a fat white blob nestled safe against her. It is best to leave these mothers alone in their gravid state!

Congratulations on your new role as an isopod caregiver! Isopods make an easy, convenient addition to the home or learning environment: like an ant colony, but they work for you!

They are a wonderfully helpful little invertebrate ally we can incorporate into our daily 21st century lives, allowing us to reduce our carbon footprint by diverting landfill waste, and helping to close the metabolic gap through recycling. They are charming and whimsical to watch as they trundle about on their cute isopod business. We like to think they will trundle their way right into your heart.

The world of isopods is vast and interesting: enjoy your journey!

Your isopods cannot be released outdoors.

This includes adding them into an outdoor composting bin. You are better off to attract wild isopods for that.

Your colony has the potential to live indefinitely. Please take this into consideration: they are living creatures who have needs. Should at any point you find yourself without the ability or desire to care for your isopods, you have several options:

-Find them a good home. Chances are you know someone personally who would be willing to take on your compost bin. Please be sure you pass along all the information you have at your disposal.

-Notify us, and we will guide you through the process of getting them back to us or finding them another good home.

Under no conditions can you release your isopods be released to the wild. This is highly unethical, and is cruel to both the animals and the environment.

Butterfly Wings N' Wishes respectfully acknowledges that we operate on Treaty 6 territory, a traditional gathering place for diverse Indigenous peoples whose histories, languages, and cultures continue to influence our business, our way of life, and our community.



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