

# OWNER'S MANUAL



BY WORMSYSTEMS





## Table of Contents

1. The Basics of Vermicomposting.....	1
2. Where to Assemble and Use the WormBag .....	2
3. Preparing Your WormBag for Success.....	2
4. Feeding Your Worms .....	5
5. Maintaining Optimal Conditions.....	8
6. Harvesting Your WormBag.....	9
7. WormBag Timeline.....	10
8. The Ecosystem In Your WormBag .....	12
9. Frequently Asked Questions .....	13



# 1. The Basics of Vermicomposting

## What Is Vermicomposting?

Vermicomposting is the use of composting worms to recycle organic waste, converting it into a valuable, organic soil amendment called worm castings. This process is functioning odorless and significantly reducing the volume of organic waste to 90% of its original volume.

The worms are consuming the microorganisms present on the organic waste (such as fungi, bacteria, nematodes, protozoa and actinomycetes): these microbes interact with the ones already present in the worm's gut. As a result, the worms' excretions contain very high levels of nutrition

and microorganisms, explaining its great fertilizing quality.

**Vermicomposting is not only an efficient, sustainable and enjoyable way to treat all your organic waste, it also reduces the amount of waste trucks on the roads!**

## How Does It Work in the WormBag?

In nature, composting worms only live in the top 15-30 cm of loosely-packed soil, leaf litter, manure and other organic matter. It is no different in the WormBag!

As organic waste and bedding are added into the WormBag, the worms will move into the new, upper layers of the waste, leaving their castings behind in the lower layers. By allowing you to harvest from the bottom, the WormBag

takes advantage of the upwards migration of the worms, meaning your harvests should contain little to no worms.



## 2. Where to Assemble and Use the WormBag

The WormBag can be installed and used in a variety of places within your home, garage, office, or classroom. Basements or below-grade dwellings are perfect for the WormBag, due to the constant temperature and humidity.

2

The minimum requirements of any location are that it is flat, level, and protected from direct exposure to sunlight, rainfall, or extreme variation of temperatures. This is why we recommend, whenever possible, to use the WormBag indoors in a climate-controlled setting for best results.

Once you have begun filling your WormBag, it should be moved carefully (2 personnes carrying it) as dragging it across the floor will place stress upon the connectors.

### LEVEL THE PLAYING FIELD

INSTALL THE URBAN WORM BAG ON A  
FLAT, LEVEL SURFACE



## 3. Preparing Your WormBag for Success

New worm bins need a little attention before they become hospitable environments for worms, and the WormBag is no different. Use the following guidelines to prepare the WormBag to receive worms!

### What Is Bedding?

Adding appropriate bedding is an important part of starting and operating your WormBag. Where as organic food waste is high in nitrogen and will decompose quickly, bedding is high in carbon and will decompose more slowly, allowing the contents in your worm bin to decompose at a moderate rate to prevent rotting and anaerobic conditions. Coco



coir, peat moss, aged horse manure mixed with shredded paper or cardboard are best examples of bedding. For best results, consider adding a few handfuls of dirt, crushed organic waste or existing vermicompost to diversify your bedding. Worms eat microbes and

this will help grow the microbe population.

Theoretically, many other substrates like compost are good beddings but depending on several factors like acidity, worms might not like it.

In total you should fill the WormBag to 1/5 of its volume. This is important that the worms have enough space to migrate.

### Our Recommendation for bedding : Coco Coir

We recommend coco coir as bedding: 3 pieces of 650g brick of coco coir is an excellent amount of starter bedding material for an WormBag. Place the coco coir in a bucket and add 14 liters of water. Wait a few hours till the coco coir has absorbed all of the water.



### Adding The Bedding

Unclip the buckles on the bottom part of the WormBag and pull down on the Velcro flaps to remove the bottom. Ensure that your bottom drawstring is cinched or tied shut and that the drawstring is outside of the WormBag, not inside of it.

**Note:** There will be a small hole in the bottom of the interior fabric enclosure, even when the drawstring is fully closed. Place a shallow container below the Bagor use the bottom part as a container to catch any bedding or excess moisture that may fall.

Add the bedding to the bottom of your WormBag. Once the bedding material or excess moisture stops leaking, you may clip back the bottom part after cleaning and drying it if necessary.



4

Close the top zipper and wait for 12 hours before adding the worms, if possible. This will allow microbes to begin to form before the worms arrive. It also allows the conditions in the Bag to stabilize and give you time to fix temperature or moisture issues before you add the worms. However, if this is not possible, adding the worms immediately should be OK.

## Adding The Worms

Now it is time to add worms to the WormBag!

### How many worms?

We recommend that you begin with between 500 to 1000 (0.25 - 0.5kg) composting worms. The worms will multiply quickly and the population will eventually grow to the capacity that your conditions allow. At maximum capacity in optimal conditions, your WormBag may hold up to 4000 composting earthworms!

You also have the option of fully populating your WormBag with up to 4000 (2kg) composting earthworms, but it is much safer for the beginning vermicomposter to start with only 500 to 1000 worms per WormBag until the worm bin matures and you are able to

maintain optimal conditions.

If you are starting out with a high worm density, then your WormBag will be able to process an even greater amount of food waste as your worm population grows to its maximum density.



## What kind of worms?

The most appropriate species of worms are the Red Wigglers (*eisenia foetida / andrei*) or the European nightcrawler (*eisenia hortensis*). If possible, we recommend ordering worms with a high amount of bedding to provide the worms with a substrate they are familiar with. You can have a look at [www.WormBag.com](http://www.WormBag.com).

## How to proceed?

Once the bedding is ready, add your composting earthworms. It is recommended that you also add all of the bedding that your worms were shipped in. Do not mix the earthworms with the bedding. They will move into the bedding on their own. Then keep the top of the WormBag completely closed.

At first, your worms may not be comfortable in their environment

and may try to escape by crawling up the side of the Bag. If after 24 hours, you notice a significant amount of the worms gathering on the sides of the Bag, it is recommended to unzip the top of the Bag and install a bright light directly over the open Bag. Light is repellent to earthworms and it will force them to retreat to their bedding.

## 4. Feeding Your Worms

While this instruction manual gives you helpful rules of thumb for operating your WormBag, these rules should not be followed blindly. The WormBag is not just a bin. It is a wonderful and complex ecosystem! If you observe it, pay attention to how the worms are processing food, what they like and what they

don't, you will be able to offer them the best conditions possible! Read the following as a starting guideline for operating your WormBag but keep observing it on your own.

## What Worms Like and What They Don't

While nearly all organic waste can be vermicomposted given enough time and preparation, a home worm bin like the WormBag should probably only be fed non-meat, non-dairy food waste.

Generally, it is a good idea to diversify the food waste you put into the WormBag: a good balance, in terms of volume, includes approximately 80% food waste and 20% bedding (as mentioned, bedding can be shredded paper, cardboard, coco coir, plant leaves and other carbon-heavy materials). It will help aerate the food waste,

keeping the pH neutral and making your worms healthier.

If you have any doubt about waste that is not on this list, ask yourself these two questions:

1. Is this waste biodegradable? (Would it get decomposed in nature?).
2. Does this waste have a plant origin?

If the answers are yes, then you can put it in the Urban WormBag and pay attention to the reactions of the worms after a few days.

## How much food waste can your WormBag process?

How much food waste your WormBag can process depends on

2 main factors: maintaining optimal conditions and how many worms are in your worm bin.

**Assuming optimal conditions your worms will consume roughly 25-50% of their own weight each day.**

However it is essential that you don't overfeed your worms. Food waste should be added in thin layers of no thicker than 2.5-5 cm. Always observe how fast the worms are eating the waste: don't add waste if there is still a top fresh layer of uneaten food. This will prevent overheating in your bin.

In the beginning, add small amounts of food waste. If you started with 500 worms, add no more than 400 grams every 3 days. If you started with 1000 worms, add no more than 800 grams every 3 days. Check the bin periodically to estimate how



 <p><b>Feed</b> ✓</p> <ul style="list-style-type: none"><li>• Fruits and Vegetables</li><li>• Coffee Grounds, Tea Bags, and Tea Leaves</li><li>• Banana peel and other exotic fruits</li><li>• Pulp from a Juicer</li><li>• Ground Egg Shells</li></ul>	 <p><b>Don't Feed</b> ✗</p> <ul style="list-style-type: none"><li>• Meat or Dairy Products</li><li>• Citrus</li><li>• Fats or Oils</li><li>• Bread or Pasta</li><li>• Wood Ash</li><li>• Cat and Dog Feces</li></ul>	 <p><b>Bedding</b></p> <ul style="list-style-type: none"><li>• Coco coir</li><li>• Aged Horse Manure</li><li>• Shredded Paper / Cardboard, toilet paper rolls, tissue</li><li>• Leaves and mature, cured compost</li></ul>
--	--	--



quickly the worms are processing the waste.

If the worms are processing the waste quickly, you will notice a top layer with organic waste (2-4 cm thick) where only a few worms are visible. Directly below, another layer (4-6 cm thick) with a lot of worms and half composted organic waste. In the top layer, the microbes start to colonize the waste and in the

second layer, worms do the rest.

As your WormBag matures and your worm population expands, you will find that you are able to add greater amounts of food more frequently: up to 2 kg per day!

### Tips and Tricks for Feeding Your Worms

Remember that worms do eat some amounts of the food waste directly, but what they consume the most are the microbes growing on the decomposing food. Finely chopping your waste (or even using a food processor) will increase the surface area of the food waste and allow greater decomposition, microbe colonization, and ultimately consumption by the worms. That is why cutting the food waste in small pieces will accelerate the process!

Regularly adding a layer of newspaper (1 sheet is enough) on the organic waste will retain some moisture and help the microbes to colonize faster and at the same time, it will reduce the likelihood of fruit flies. You could do this every few days.

## 5. Maintaining Optimal Conditions

A successful experience with the WormBag isn't simply about feeding your worms organic waste. A worm bin should be dark, moist, pH neutral, and at room temperature if possible. While maintaining darkness is easy in the WormBag, it is necessary to observe the 3 other critical conditions inside your worm bin: temperature, moisture, and pH.

## Temperature

The optimum temperature range for vermicomposting is between 15°-25°C (59°-77°F). Temperatures beyond 35°C (95°F) and below 4°C (39°F) will harm or even kill the worms and slow or stop the vermicomposting process. Temperatures as low as 1°C (34°F) or 32° (90°F) may be tolerated for only short amounts of time.

If your bin is indoors, but your temperature is higher than desired, it is possible that you are feeding the WormBag too much, resulting in thermal increases due to the hot composting of excess food waste. Remove the top layer of organic waste and add bedding.

## Moisture

Moisture should be maintained

between 60-70%. This is best measured by simply feeling the contents of the WormBag. Put a small amount of vermicompost in your hand. It should have the feel of a damp sponge. When you squeeze the vermicompost, you should be able to squeeze out a single drop of water. Any more than this indicates excess moisture.

If it's too wet, add some dry bedding and stop feeding for a few days.

If it's too dry, use a spray bottle or spritzer as needed to maintain appropriate moisture levels. Do not pour water directly into the WormBag. The WormBag may need consistent moisture application in arid climates.

**Note :** Be aware that the moisture will depend on the ambient

humidity wherever it is you keep your bin.

## pH

pH is a number representing acidity or basicity of a substance. Vermicomposting is a pH-neutral to slightly-acidic process and you should be maintaining a pH between 6 and 7.

Inexpensive pH meters are not reliable. But if you are adding paper and cardboard to the organic waste, then pH should easily be maintained within this range.

Likewise you can consider adding 3 small spoons of lime or crushed eggshells each month.

If the worms appear to be thriving in your WormBag, then there is a good chance you are successfully maintaining appropriate pH.

## 6. Harvesting Your WormBag

After roughly 6 months, your WormBag will be ready to harvest!

To start, unclip the buckles on the bottom of the WormBag. Then pull down on the Velcro flaps to remove the bottom. You can place a shallow container below the Bag or use the bottom part as a container. Gradually loosen the locking mechanism on the interior drawstring enclosure. This will allow worm castings to fall into the container.

**Note:** You may find that the castings will not fall freely from the bottom of the Bag. You may need to disturb the outside of the interior enclosure in order to loosen the castings enough to fall into the container.



**1. Unclip the bottom buckles**



**2. Remove the velcro bottom**



**3. Loosen interior drawstring**



**4. Extract worm castings**

Your harvested worm castings should contain no or very few scattered worms. Stop harvesting when you reach a layer containing worms. Once your harvest is complete, cinch the barrel lock to close the interior drawstring enclosure. Clean the bottom container of any excess moisture or castings that remain before you reattach it to the WormBag.

If the harvested castings contain many worms, it indicates that the vermicompost is still not ready or that it is too wet. Empty the contents of the harvest in the top of the WormBag, close the interior fabric enclosure, and clip back the bottom part. Wait for at least another month before harvesting again.

If the harvested castings were wetter than desired, it may be a

good idea to operate the Bag with the bottom part open, exposing the interior enclosure to better airflow. If you do so, it is recommended to leave the container below to catch any leachate that may drain out of the bottom.

**Note:** Leachate is not a desired by-product of the WormBag and indicates overfeeding or overwatering.

## 7. WormBag Timeline

A guideline of what you can expect during your first few months!

### Getting Started

Fill the WormBag with an an initial bedding layer, 20-25 cm deep, mixed with a small amount of organic food waste in order to promote growth in your microbe

population. Add your worms 12 hours later.

After 3 days, begin adding thin layers of food waste every 3 days, observing how the worms are consuming food before feeding more. Keep a layer of damp newspaper on the top of the waste and bedding.

### Month 2- 4 : Growing population of worms

The starting layer of bedding is mostly processed and you are able to feed your worms every 3 days or more as the worms process food waste more rapidly. You will start to observe cocoons, juvenile worms,



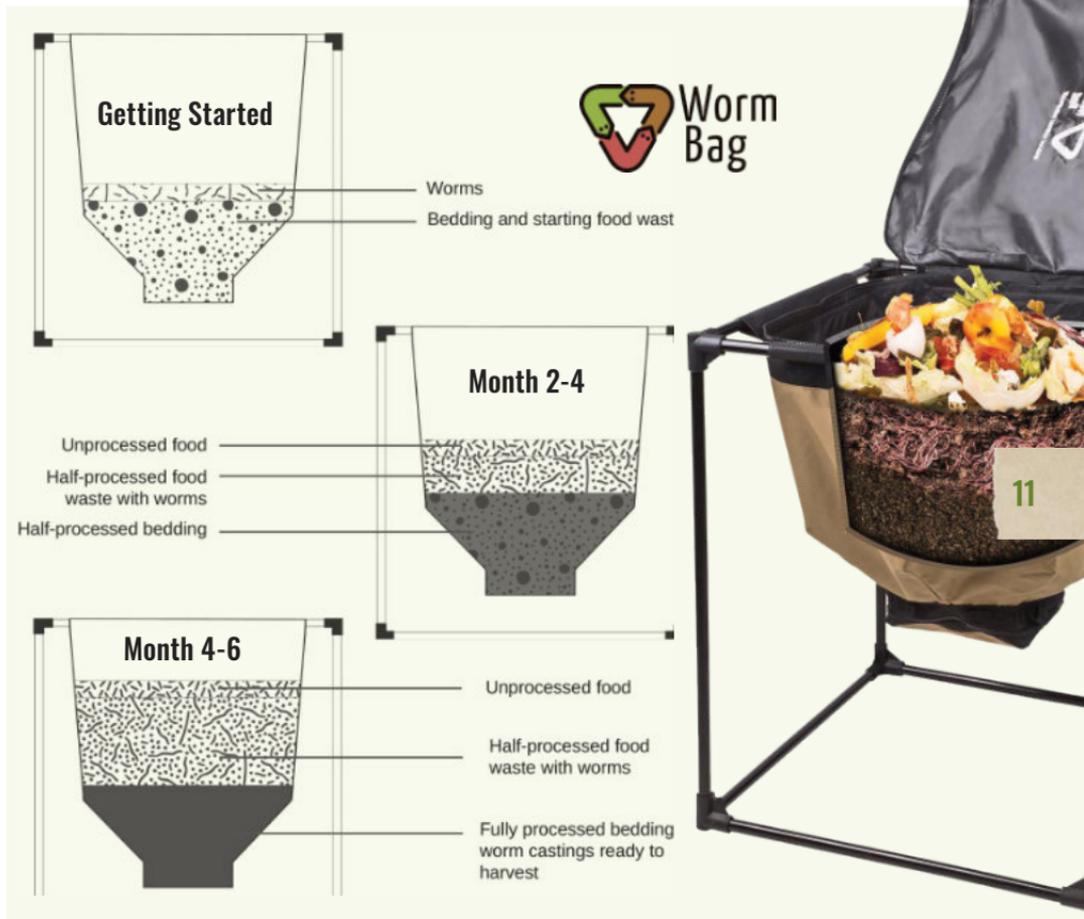
and an overall growing worm population.

Under the top layer of food waste and bedding, you can see a layer of processed waste and an increasingly consistent texture the deeper you explore.

### Month 4 – 6 : Reaching full capacity and first harvesting

Your worm population approach its maximum density and process your layers of food waste at its maximum efficiency of roughly 1 kg per day.

Your Bag is very heavy by now as the periodic additions of food waste and bedding have been processed by your worms, resulting in a 20-25 cm deep layer of worm castings that may be ready to harvest. Wait the end of month 6 for your first harvest!



## 8. The Ecosystem In your WormBag

### Worm Reproduction Inside Your WormBag

In optimal conditions, worms will multiply very rapidly inside your WormBag. Earthworms are hermaphroditic, meaning they possess both male and female reproductive organs. This means any two sexually-mature earthworms of the same species may mate with one another.

The worm reproduction process is fascinating. Two worms will intertwine around each other and form a cocoon, which will normally contain 3 baby earthworms. This may happen up to 3 times per week. It will take 21 days for the cocoon to hatch. After hatching, it will take



approximately 42 days for the worms to reach sexual maturity, as evidenced by the presence of the fleshy band around the earthworm called a clitellum.

In optimal conditions, the worm population can double every 3 months! An interesting fact is that the worms will stop reproducing

when they reach the maximum density, that is to say up to 12,000 worms per square meter. This means that you will never have an overpopulation of worms. They regulate their reproduction on their own and adapt it to the surface area and food they have.

### Other Organisms Inside Your WormBag

Aside from the earthworms and microorganisms that you intend to grow inside your WormBag, you will undoubtedly observe other organisms that you did not intend to find. These may include fruit flies, gnats, mites, ants, beetles, centipedes or roly-poly (or pill) bugs.

These tiny animals are often effective composters themselves and should generally be considered to be normal parts of the



Enchytraeidae



Springtail

vermicomposting ecosystem. The WormBag, when fully closed, does an excellent job of keeping them inside your worm bin. But in some cases, the presence of unanticipated organisms may indicate less than optimal conditions.

**Ants:** The presence of ants indicate your WormBag is too dry.

**Gnats, mites, and fruit flies:** the presence of unwanted numbers of gnats, mites, and fruit flies typically indicate a worm bin that is too wet. If you see these organisms, you should stop feeding and add dry bedding like shredded paper to help absorb excess moisture (read page

15 “What should I do about fruit flies or fungus gnats?”).

**Note:** Many of these organisms were not necessarily attracted to your bin. In many cases, their larvae were already existent on the food waste that you introduced to your WormBag.

## 9. Frequently Asked Questions

### Can I Use the WormBag Outside?

Technically, yes, but the worms won't be able to tolerate extreme hot or cold temperatures and should be protected from direct exposure to sunlight and precipitation. It is recommended that the bin be kept indoors.

### My WormBag Is Dripping. What's Going On?

Your Bag has been overfed or overwatered. A properly-maintained worm bin should not be draining an excess of water, also known as leachate. Add dry bedding or shredded paper ( see “Moisture”).

### Why Doesn't the WormBag Have a Tap for Leachate like other worm bins?

A properly-maintained worm bin should not be producing leachate and adding a tap to the product would suggest that it should. The WormBag's breathable fabric construction reduces the likelihood of conditions that would result in leachate. However it is essential to regulate the humidity inside the bag in case of an excess of water ( see “Moisture”).

## How Much Vermicompost or Worm Castings Can the WormBag Produce?

Your results are dependent upon too many variables to give you an accurate number. However you can use commonly-known rules of thumb to get a very rough estimate.

Conservatively, worms can eat 25-50% of their own weight per day and at maximum density, you will have around 4000 (2kg) worms.

So a WormBag stocked with 2kg of worms will be able to process roughly 0.5 to 1 kg of food waste per day under good conditions, roughly 10-20% of which will exit the worm in the form of worm castings.

For instance a family with 3 persons producing 500g of food waste per day using the WormBag for 6 months will be able to

harvest between 9 to 18 kilos of vermicompost in optimal conditions.

## Won't the Castings Just Fall Out?

Despite the heaviness of vermicompost, it is also slightly compacted towards the bottom of any worm bin and will experience "bridging" where the vermicompost doesn't necessarily flow to the lowest point like water.

Due to both bridging and the tapered design of the Bag, the weight of all of the vermicompost will not be resting directly on the bottom of the WormBag.



## How Can I Use My Worm Castings?

This is up to you! Most people prefer to use worm castings as a soil amendment at a 10% substitution rate for a growing medium or apply it directly to the base of their plants as a top dressing (this will not burn the plants.)

You can also brew worm tea by mixing water and a compost tea bag of worm castings at roughly

a 1% concentration and apply as a soil drench or a foliar spray using a handheld low-pressure sprayer. This is an incredibly economical way to use worm castings.

## What Should I Do About Fruit Flies or Fungus Gnats?

If you notice an overpopulation of flies in your wormbin, they might be fruit flies or fungus gnats. Fruit flies are brownish with red eyes and you know them if you ever forget a banana or an apple in the kitchen for too long, as they lay their eggs directly on fruit peels. Fungus gnats are smaller, black and their larvae are very resistant.



Fruit fly (0,5-1,5 mm) Fungus Gnat (1mm)

Flies are often a sign that you overfed your worms. Microbes did not have time to colonize the waste and flies started to develop. There are lots of ways to deal with them:

- You can start by using a vacuum cleaner to get rid of the overpopulation of flies.
  - Then remove the last layer of fresh organic waste or simply bury deeper in your wormbin.
  - Add some more bedding and put a layer of paper on top.
  - Create a fly trap by putting a bit of apple cider vinegar and a drop of dish detergent in a bowl that you can place inside the WormBag.
  - Then stop feeding for a few days and observe the results. When flies and gnats are no longer present, resume feeding in small quantities
- until you are sure the problem is solved.
- If flies are still present you can spray neem oil twice a day for two weeks. This natural insecticide is quite effective and will not harm your worms. However we recommend using it as a last resort.
  - To prevent new infestations, cut the waste in small pieces so that it will be quickly processed.
  - Avoid feeding large amounts of fruit waste at once, especially in summer. Also consider freezing food waste to kill fruit fly larvae.
  - Add bedding on top of your organic waste.
  - Simply stopping feeding for a few days may solve your problem as the worms will not starve. But the flies will!

## What Should I Do When I Go on Vacation?

In most cases, your WormBag can be left alone for days or even weeks. Ensure that your worm bin is protected from extreme conditions and consider adding bedding and more food waste (if you are certain that the worms are processing it efficiently). In case of not feeding for more than 3 weeks, it could be necessary that somebody checks the moisture.

And enjoy your vacation!

## What If My Worms Have Died or My WormBag Has A Foul Smell?

A properly maintained worm bin should not have a foul odor. If the WormBag starts to smell, ensure you have added the appropriate

type and quantity of waste. Consider adding dry bedding and removing any foul smelling waste.

If your worms have died and your worm bin does not have a foul odor, it is likely that your bin got too dry.

If your worms have died and/or your bin has a foul odor, it is likely that your bin became too wet. Excess feeding and moisture created a toxic environment for the worms.

## Can I Use the WormBag As Part of a Commercial Operation?

The short answer is “yes,” but the WormBag is designed more for home use.

You could use several WormBags to create “small batch”-style castings with different feedstocks to create different vermicompost,

but a mid- to large-scale operation should be considering an industrial-level continuous flow-through system like the kind offered by Wormsystems. You will find more informations on our homepage [www.wormsystems.com](http://www.wormsystems.com).

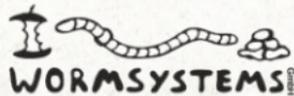


## Are You Happy With Your Purchase?

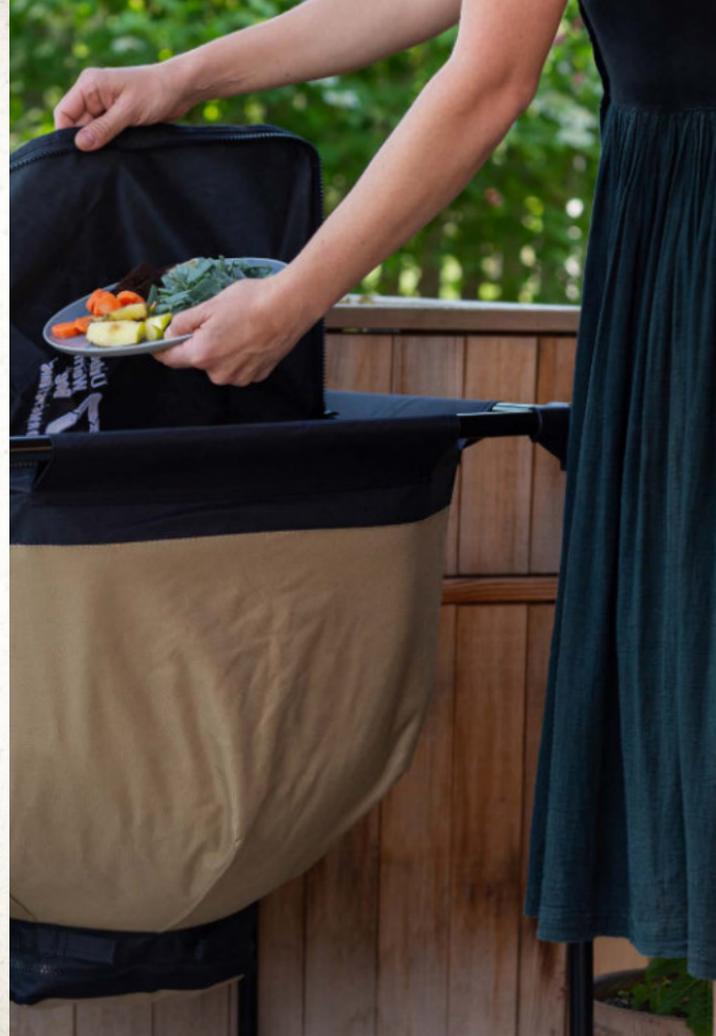
We would very much appreciate an honest review wherever you purchased your WormBag!

Your feedback, even if negative will be highly appreciated. We will explore what we can do to give you a satisfying customer experience. Please e-mail us at

[info@WormBag.com](mailto:info@WormBag.com)



Concept and Design:  
Urban Worm Company - USA  
Import and Reseller Europe :  
Wormsystems - AT





[www.WormBag.com](http://www.WormBag.com)



WormBag by Wormsystems GmbH  [www.WormBag.com](http://www.WormBag.com)  
Harter Straße 13a - 4770 Andorf - Austria