

## Caring for Compost

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**ABSTRACT:** *In compost, the relationship between humans, more-than-humans and the environment is diffuse because it involves the active participation of an entire food web. The entanglements embedded in the composting process(es) can be studied by attempting to understand the care needed to keep a compost active and how this relates to more-than-humans. We conducted interviews with two composting advocates in Berlin and visited the Peace of Land's composting facility. In our work, we discuss the different perspectives of the two to shed light on their motivations for the care work they provide. In doing so, we combine their responses based on practical experience with theoretical reflections. Both interviewees expressed a similar view about the reciprocal relationship between humans and more-than-humans, suggesting that composting is a simple practice that allows us to "give back" to the earth rather than just take from it. Further, the interviewees described composting as a continuous learning process that requires constant work, learning, and maintenance. Finally, the act of composting involves an ongoing interconnectedness between humans and more-than-humans. This entanglement leads us to the need to redefine anthropocentric concepts such as the concept of ecosystem services, where the role of more-than-humans has been less discussed.*

**KEYWORDS:** *care, compost, more-than-humans, ecosystem services, soil*

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### Introduction

**D**ecomposition takes place everywhere; it is the end, climax, and beginning of a perpetual cycle that gives new life to dead materials. Countless organisms, especially organisms that cannot be seen with the naked eye, are involved in this process. The process can sometimes occur faster and sometimes slower, depending on prevailing environmental conditions. Decomposition in the soil is the condition for the formation and maintenance of new, fertile soil and ensures the availability of nutrients. Inorganic substances become mobile from dead organic material and lead to new organic life. Humans also take advantage of these circumstances. Under the term compost, which has almost become a lifestyle, hype, and slogan, countless people recycle their organic waste with the aim of obtaining fertile humus. Compost is thus decomposition, but different. This is because composting requires care and work, first on the part of humans, but ultimately to encourage the myri-

ad bacteria and organisms involved in the actual decomposition process to do their work. When you stop taking care of your compost, it becomes inactive, but that doesn't necessarily mean that the decomposition stops, it just becomes much slower.

To understand composting, we had to experience it, or at least physically visit, smell and observe a compost site. A number of different composts can be explored at the Peace of Land in Berlin. Peace of Land is an initiative and a hands-on learning space. One of their aims is to work with as well as spread the ideas and concepts of permaculture. Essentially, this involves developing systems that are largely self-sustaining and relatively resistant to change. Their purpose is to benefit life in all its forms. The site consists of various areas that are more or less cultivated by people. There is a vegetable garden with many raised beds, a vegetable forest, wild beehives, smaller ponds, a seminar room, and many opportunities for composting. Various composting methods can be tried on the grounds, such as a worm farm (currently without worms) and a compost made from car tires (currently without material). Most of the compost sites were not active on the day we visited them. Checking the temperature of one showed that it was not hot enough to encourage bacterial activity. Is a compost without bacterial activity still a compost? Does decomposition take place in it? How do you maintain an active compost? What are the motivations for doing so? What feelings are triggered by composting? How do we become part of this cycle that constantly surrounds us and yet is so different when we intervene in it? Since we couldn't draw from our own experiences, we spoke with two experienced and dedicated composters. Both share an interest in composting that goes beyond a simple hobby that seems to be shared by so many these days but has become a fundamental lifestyle. In addition, both have worked with the Peace of Land initiative.



Fig. 1. Worm farm (without worms)



Fig. 2. Compost out of tires (inactive)

Ricardo Beck has dedicated his life to the development of waste management projects. He graduated with a master's degree in Mediterranean Forestry and Natural Resources Management and is a Brazilian Environmental Manager. He is currently conducting research on the role of the black soldier fly (*Hermetia illucens*) during organic waste decomposition and started composting at home in Sao Paulo, with the initial goal to become active and reduce his own environmental footprint. But why did he choose composting for its positive

impact on the environment? In response to this question, Ricardo reflects on the impact of waste and recycling:

I have realized that home composting is a simple and easy activity to adapt to daily life. It does not require large investments neither of money nor of time and in the end, it has a considerable impact on the lifestyle. (Interview Ricardo Beck, September 7th, 2021)

After realizing that composting could have a big impact on waste reduction, Ricardo decided to give workshops and educate people about composting at home. With the intention of spreading the word about the importance of managing our own waste and turning it into non-waste, Ricardo specialized in Spain, where he gained a new perspective on composting by transitioning from at-home composting to communal composting. Later, while living in Berlin, Ricardo participated in the Peace of Land community garden.

Stefan does not describe himself as an expert but as a generalist. He has been volunteering with the Peace of Land initiative for several years and has gained a wide variety of experiences. At the moment, he is mainly involved in organizing events and bookkeeping, but also helps out in the garden, knows the values and principles of the project, and knows a lot about composting. For him, holistic approaches and living in harmony with nature are essential. To lead a self-sufficient life, he has familiarized himself with the thoughts, ideas and concepts of permaculture and has taught himself a lot by simply doing and practicing, as well as through the seminars and workshops offered by the initiative. He now teaches permaculture courses himself. After a conversation with him and a walk through the garden of one of Peace of Land's sites, it becomes clear that he sees himself as an active part of his environment and tries not to harm his living environment.

Both, Stefan and Ricardo, are involved in the processes on several levels: personally, proactively and professionally. Although they do so against the background of the accumulation of useless waste and the current human-induced environmental challenges, it is clear from talking to them that the two are more deeply involved in the work than just because of a moral obligation. Both speak of a learning process and constant engagement with composting. "As much as you do it at home, you are probably going to fail, since experience is required" (Interview Ricardo Beck, September 7th, 2021). Thus, for Ricardo, composting work is, on the one hand, simple, natural and convenient (in order to do good) and, on the other hand, it is also doomed to failure and requires perseverance. What kind of care is required during composting and how do they sustain this continuous work? How do the two experienced composters view working with their fellow living beings involved in the process? How do the two deal with negative feelings towards composting side effects like for example smells? What ecosystem service does composting provide, and for whom? Both are enthusiastic advocates of composting. Ricardo even slept with his compost under the bed for a while. Accordingly, he not only cares for his environment and composts for that reason, but he also cares for his compost.

Motivations, care work, and perspectives on their efforts are discussed in more detail in the following sections. The two interviews were unraveled and are presented under the following three research questions:

1. What form of care (work) is required in composting and how can it be sustained?
2. How are humans entangled with more-than-humans during composting?
3. Why is composting an ecosystem service and for whom?

In the following, we present three sections subdivided into interview excerpts followed by the theoretical framework that supports the view of the interviewees. The interview with Ricardo was originally conducted in Spanish and was later translated into English. Both interviews were transcribed and grammatically corrected for better comprehension.

### Part I: Care and Maintenance Work of Composting

**Ricardo Beck:** "I wanted to do something without having to protest, many people complain that nobody does anything, and I have realized that home composting is a simple and easy activity to adapt to daily life. It does not require large investments either of money or of time and in the end, it has a considerable impact on the lifestyle [...]. I started composting in the garden of my parents' house. At first, it was a piece of land that had been used for a long time to dump construction debris, it was a very poor land because it had remains of cement and concrete. We spent a year composting at home and obtained humus that, when mixed with clay, we were able to give texture to the soil [...]. I had a surplus of humus, it made me want to do something more potent. I started cleaning the place to see if I could restore the floor. [...] In my workshops, no matter how convinced people came out, it was difficult for them to continue it over time. As much as you do it at home, you are probably going to fail, since experience is required. I have learned by trial and error and there are people who do not take the time and give up quickly. When you start, the cube does not know that it is a worm house, it is a set of plastic without use. When you start using it, it is inoculated with bacteria so that everything is done in a more dynamic way, but it takes a few months. On the other hand, many people start without having a clear reason but perhaps they find it fun, then people sometimes lose their patience to learn so they stop composting in a month or two [...]. Then I realized that at the community level, the experience is very interesting. I have obtained the greatest benefits when a community experience was generated. That is very beautiful. In Berlin we had a calendar where each one chose when to go, there was no direct exchange with the people because each one went on a different day and they did not see each other, but everyone shared the tasks and there were no conflicts, some did it once a week and others once a month." (Interview Ricardo Beck, September 7th, 2021)

**Stefan Fischer:** "I was looking for methods for self-supplying. I found the expression permaculture and wanted to know more about us and saw an interview for a project in Austria where they explained a raised bed that I have shown you earlier. And yeah, this has fascinated me, and having someone who explains some processes was fascinating. And I thought this could be a solution for so many challenges, so I wanted to know more about it. And later I went to a short presentation about permaculture and shortly I heard from a friend. She was into permaculture education and has told me about it. She was already in this project about Peace of land and told me about it [...]. I love the concept of the circulation of material. That all materials go back into natural circulation. It is like a natural model for circulation and the circular economy, and I think that that's one of the most important parts for keeping our world liveable because we have limited resources on this planet, and we have to manage to deal with these limited resources. And so, we have to keep all these resources in usable circulation. And when we harvest nutrients we just take out, we

take out value from the system. We take out nutrients and these nutrients must come somehow back in some way for example by composting or by using our excrement to get it back like our composting toilet. The water is another aspect: to keep the water usable for us and clean by storing the rainwater and reusing our used water, the greywater and so on." (Interview Stefan Fischer, September 20th, 2021)

### Theory I: Care and maintenance

Stefan and Ricardo's motivation, and ultimately their reason why they care for the compost, is very similar to Tronto's definition of care (1993). According to the latter, care is "everything that we do to maintain, continue and repair 'our world' so that we can live in it as well as possible. That world includes our bodies, our selves, and our environment, all of which we seek to interweave in a complex, life-sustaining web" (Puig de la Bellacasa, 2017, p. 4). The main concern for Ricardo is the rising piles of garbage. With the help of compost, according to him, he can make a big impact with very little financial resources or investment of time. Stefan's primary motivation is to give back to the earth what we take from it and to see himself as part of the eternal cycle of growth and decay. It appears as if care manifests itself from an urge to take action and become active in the work with the compost and thereby also with the other living beings, to which both have to adjust in order to have a favorable effect for both.

According to Bellacasa, it is not enough to only feel affectivity without doing the maintenance work of caring (Puig de la Bellacasa, 2017, p. 5). For her, affectivity without care work is not yet care, and at the same time, care work alone is not enough for a relationship to involve care. Care work becomes very visible and apparent in composting. Composting requires maintenance work as well as constant continuation. Otherwise, the compost is no longer active, so bacterial processes slow down very much, less biodiversity diversity gathers in the compost and the formation of humus is prevented. At the Peace of Land, most of the composts were not active when we visited the site. Any inactive compost can be brought to life. The decomposition of organic materials is enhanced under certain conditions and can thus be accelerated. This is exactly what composting takes advantage of. Temperature, moisture, pH-value, aeration, light, and the type and amount of compost material are some of the most important aspects composters must pay attention to. At this point, it is worthwhile to elaborate on the processes of composting. Composting is the controlled decomposition, the natural breakdown of organic material under aerobic (containing oxygen) conditions (Robertson & Paul, 2000). This process produces carbon dioxide, water, minerals, and easily degradable organic matter, the characteristic compost. Finally, all dead organic matter (called humus) is also subject to this decomposition process, which releases inorganic matter such as inorganic CO<sub>2</sub> and other inorganic ions such as calcium or potassium from the organic matter (Robertson & Paul, 2000). Biological (such as the activity of soil biota and presence of humus), chemical (for example temperature and oxygen availability), and physical components (like the size of material) determine the processes (Robertson & Paul, 2000). The processes are largely driven by soil bacteria and fungi (Buscot & Varma, 2005). At various stages, tiny organisms are accompanied by actinobacteria which are instrumental in decomposing organic matter. Fungi (some even have special relationships with their plants known as mycorrhizae) and larger organisms such as arthropods and, for example, the well-known earthworm, break down and decompose organic matter as well through their guts (Abrahamsson & Bertoni, 2014).



Stefan explained during the tour of the facility that a compost is most active between 40 and 55 degrees Celsius. If it is too hot, it needs to be turned over, but if it is too cold, nitrogen should be added. The easiest way, Stefan says, is to urinate on it – provided it is clean urine – otherwise green leaves can be added. For him, it is important for a compost to have good aeration, sufficient oxygen and moisture, and an ideal C/N ratio. There are countless manuals and tips on which leftovers belong in the compost, what to do if the worms do not eat or – in the worst case – die, and how to take care of your own compost. Although everyone is led to believe that anyone can compost, there are countless things that can and should be considered. Both interviewees can relate to this. Ricardo's experiences illustrate that composting requires constant work maintenance as well. He reports that many people start without having a clear reason but perhaps they find it fun, then people sometimes lose their patience to learn so they stop composting in a month or two. (Interview Ricardo Beck, September 7th, 2021)

The motivation behind it, the reason to care, seems to be crucial for continuous care. At the same time, many do not have the patience to fail and learn and give up when they do not get the desired outcome. The process of learning is reminiscent of the work of *Abrahamsson & Bertoni (2014)* which comments that the human composter has to be attuned to the worms and is consistent with the observation that compost is a continuous learning process. The constant learning and attunement contradict Puig de la Bellacasa's view that composting is a simple ethical-political doing. A great deal of experience and knowledge about the ways to compost and continuous care is needed.

Stefan talks about care a lot, but he often means taking care of it, namely when it comes to the condition of the compost. The fact that he cares a lot about his environment is shown by the fact that even when it comes to what some gardeners consider harmful pests, he talks about the fact that these animals have always been part of the ecosystem, and for this reason, he naturally grants them a share of the harvest.

The interviews made it clear that care in the context of composting is more than just a moral obligation, although both interviewees feel a sense of responsibility to act differently in response to the humans' current way of life. Nevertheless, both agreed it is not enough, they are inherently convinced of composting and see other living beings as a fundamental part of the process. For Puig de la Bellacasa, obligation is a concept that is not morally grounded. Instead, she sees it as more intrinsic, as necessary, and as a political-ethical action, one of many ways to understand and preserve not only human and more-than-human habitats, but to understand "that for interdependent beings in more than human entanglements, there has to be some form of care going on somewhere in the substrate of their world for living to be possible" (Puig de la Bellacasa, 2017, p. 5). For Puig de la Bellacasa care is not a normative moral obligation "but rather a thick, impure entanglement in a world where the question of how to care must be asked" (Puig de la Bellacasa, 2017, p. 6). To better sense and live in this world, there are various "personal-collective doings" (Puig de la Bellacasa, 2017, p. 155), with Puig de la Bellacasa citing composting as a simple example. For Ricardo it is a personal-collective activity but not a simple one, he states

It also became clear that care for compost involves a significant amount of maintenance work, including failing, learning and committing to it. One question that remains unanswered is to what extent people can be motivated to actively participate in this process. One approach to this was made by the project *Composta Sao Paulo*, where 84 percent of the people who left the project said it was for personal reasons such as a home move, not enough time and personal or familiar problems<sup>1</sup>. On the other hand, the importance of group work to succeed seems to be highly relevant, since 85 percent of the participants

said that having access to the experience of others influences positively personal motivation, where one participant explains: 'The exchange of experiences is very important, it is like a Chain of Good, where those who have already lived the experience help beginners.' (Interview Ricardo Beck, September 7th, 2021)

## Part II: Entanglement with More-than-Humans

**Ricardo Beck:** "Something that I have always told people is that composting is a house for worms, it is a laboratory, and it is a space for learning. [...] Composting is an aerobic process with a bacterial process while the human body performs an aerobic process with enzymes. [...] Many people create rejections to have worms at home because they do not think it is an interesting connection or does not match what they want to be as people. I saw a difference between the people of Madrid and Brazil. Perhaps in Brazil, people have more connection with life in the countryside and it is easier for them than the people from Madrid, among whom I noticed a greater rejection to have worms at home. The boom that occurred in Sao Paulo is not even close to what happened in Madrid, the attendance at the workshops is lower. For example, in Spain it happened a lot to me that people said, 'I love what you do but worms disgust me', differently in Brazil, as a child I played with insects in the backyard of my house and I did not live in the countryside, but I did have access to a backyard to get muddy, many other people did not have a backyard.[...]. A symbiotic relationship between humans and animals favors safety and the food that it needs, there is no need to see that as a bad thing. There are some vegan lines of thought that reject any encapsulation of animals, that having chickens raised within a fenced garden is having enslaved chickens, while other vegans have told me that the way I treat chickens is very appropriate and that they would eat the eggs because they are against the productive system. Others have told me that putting worms in a bucket is like making a worm jail, for keeping them there without their consent. However, there are ecosystem principles, and we can have a healthy relationship with the environment. In that sense, I am calm with what I do, but I know that it can generate debate." (Interview Ricardo Beck, September 7th, 2021)

**Stefan Fischer:** "We work with worms, we work with microorganisms, and the more diversity you have in a system, the more different processes, the more self-regulation, and synergetic processes you have. And the more resilient your system gets toward changes. It can absorb changes better. One of our goals is to increase the biodiversity in and above the soil. Maybe some people can say that having worms enclosed in some place makes them not happy. They are not free because they are not in their natural environment on earth but locked up at home in closed storage."

**Interviewer:** *"How do you feel about it? Would you say they are okay being in there?"*

"I think because you shall not confuse compost worms with earthworms. It's a different species. Compost worms are living inside to compost. And when you have a real compost in a box it is their natural environment". [...]

*"How do you control that rats and others come here and might not be healthy? How do you keep the rats out of the compost?"*

"We cannot really control it completely but we try to not or to not attract them, as little as possible, by not offering them or leaving out food that they really like. Like cranes, they really really like cranes, and in the winter also cooked food. And we also tried to close all the holes in the building where they can hide"

*"Are there other animals that you are careful with or try to avoid?"*

"Mice, voles. One possibility is a grid. So the mice can't come in there"

*"Do you have a grid for the compost as well?"*

"No, there we only have the small wooden sticks but maybe this will be a good idea. But it is more difficult when it is more open. Maybe it could be an optimizing idea"

*"And why are they bad because?"*

"They are eating all the young plants, the salads, the pumping leaves, especially the very young plants. So it can be a danger for the complete harvest in the vegetable garden. We have so many possibilities to keep them off but many of them haven't worked. [...] For me one of my philosophies is that a part of the harvest is always for animals because they have always been a part of nature. But some of our gardeners have a little different opinion. (Interview Stefan Fischer, September 20th, 2021)

## Theory II: More-than-Humans

Working with compost requires working with other living organisms. The direct contact with those species that are not always cute or adorable, as Ricardo reports, is sometimes considered unpleasant and fraught with reservations. In order to have an active compost, that is, a compost that produces humus, some animals are preferred, and a diversity of species is expected, but other species are considered harmful and should not come near the compost. Do humans ultimately have the power to decide who must stay and who has to go? Stefan says that many methods of repelling voles or certain snails, for example, have been unsuccessful so far. Nevertheless, for the maintenance of compost some animals need to be repealed such as rats, foxes or ferrets. In Ricardo's experience, the design of the compost place should have certain criteria to avoid predators when working with chickens. So, the question arises: Who is in the driver's seat?

Ricardo is working on optimizing the use of organic residues in compost. Involving other animals in the process, such as chickens or the Black Soldier larvae, helps to make composting not only more efficient — to make it faster — , but also to return all the leftovers to the cycle eventually. In this way, community work and solidarity in composting help not only on a human level, but also on a more-than-human level. First, the organic waste is processed by the larvae of the Black Soldier Fly, which according to Ricardo, can even digest cooked food. Everything that these animals do not eat is passed on to chickens, and then what chickens do not eat is put into the worm composting. Here, a kind of



chain can already be observed, where all species are part of the network, co-working and living together. For Puig de la Bellacasa, this is one of the reasons why she is interested in the multispecies approach, the living soil. Accordingly, she writes:

"If I am lured by moves that see soil as a multispecies world, it is for how they could affect not only the nature of soil itself but also the ways humans maintain, repair, and foster soil's liveliness—that is, the agencies involved in more than human webs of care." (Puig de la Bellacasa, 2017, p. 191)

These webs can be recognized not only in the soil itself but even in the humus, in the compost. Both interview partners describe that a careful look with regard to other organisms is helpful and even unavoidable in the case of dying worms. The process of learning is reminiscent of the work of Abrahamsson & Bertoni (2014) which comments that the human composter has to be attuned to the worms and is consistent with the observation that compost is a continuous learning process.

Contact with other species can also pose a problem for first-time composters, who feel uncomfortable around worms, bacteria and mosquitoes. It seems there is a problem with decomposition where "decay and putrefaction are rarely aspirational terms or aesthetic phenomena" (Lorimer, 2017). In addition, society protects itself against bacteria with chemicals, such as bleach in daily life or pesticides in agriculture, with the objective to escape decay, foulness as well as rot and ensure a clean sanitized life (ibid).

### Part III: Ecosystem Services for More-than-Humans

**Stefan Fischer:** "For me, one of my philosophies is that a part of the harvest is always for animals because they have always been a part of nature. But some of our gardeners have slightly different opinions"

**Interviewer:** *"And now what role does composting play?"*

"Yeah composting is one of the aspects in nature that uses all materials in a circulation and keeps it in a circulation. It is an ongoing transformative process that you try to imitate by compost to try to keep all the stuff in the circulation and to keep the value of the system. (Interview Stefan Fischer, September 20th, 2021)

**Ricardo Beck:** "Regarding the research that I developed, I knew a lot about worms, but my objective was to investigate how to give more value to the waste because worms are not capable of digesting all kinds of waste, for example, if there is waste that is high in fat or high in salt (such as from cooked food) or citrus, worms will not digest it. That margin of improvement is what I was interested in, for that I implemented Avicomposting that basically instead of throwing everything directly into the compost a previous process is carried out. To explain a bit, what is compost? It is feeding bacteria. What we do not eat, feeds other beings, so instead of directly feeding the bacteria in the compost, we feed the chickens. What for us is rotten, chickens eat, and they eat what the worms did not eat, except for citrus fruits. [...] The idea was to feed the chickens with the neighbors' waste, they took their bio waste and threw it into the chicken dispenser, what was left over they gave to the worms, even the feces

that are also good for worms. Another pillar of the project was the fly larvae, which had incredible potential to digest organic matter, even cooked food. Including fly larvae in the composting cycle makes it possible to reduce the space, per square meter of fly larvae, four kilos of organic matter are eaten per day, which would increase the number of people who could bring food. After feeding the larvae, what they do not eat is given to the chickens, then to the worms, and finally the humus is used as compost in the garden." (Interview Ricardo Beck, September 7<sup>th</sup>, 2021)

### Theory III: Ecosystem Services

Ecosystem services are all the benefits that people obtain from ecosystems. According to the classification made by the Millenium Ecosystem Assessment (Millenium Ecosystem Assessment, 2005), they are classified into four groups: supporting, regulating, provisioning and cultural ecosystem services. Different ecosystems provide different Ecosystem services due to the result of the intrinsic properties and characteristics each ecosystem has. In the case of soil, the same principle applies and some Ecosystem services are expected to be provided depending on the properties and management of the soil (Morel et al., 2015). For the provision of Ecosystem services in soils to be prosperous, a variety of microorganisms needs to interact. Due to the high activity and large numbers of microbial communities present in soils, diverse bacteria, and microfungi are essential for ecosystem functions and services (Saccá et al., 2017). Furthermore, the higher the biodiversity, the more possible functions can be observed in the ecosystem (ibid).

It is obvious that humans benefit from the fertile humus, but the effect of humus in revitalizing dead land shows that it can also serve other living beings. Humus provides habitat and food for different creatures. In this scenario, the act of composting is aimed at benefiting humans rather than supporting non-humans, who may provide Ecosystem services but could also be beneficiaries. Humans provide them with food and 'habitat', and people care for their living, nevertheless composting essentially serves their own purposes.

Puig de la Bellacasa emphasizes that "[t]hinking multispecies models such as food webs through care involves looking at the dependency of the (human) carer not so much from soil's produce or "service" but from an inherent relationality". (Puig de la Bellacasa, 2017, p. 192). She further argues that "[i]nterdependent models such as the food web disturb the unidirectionality of care conceived within the linear timescapes of productionist time traditionally centered in human-crop care relations." (Puig de la Bellacasa, 2017, p. 191)

Since other species provide functions and services for human use, there are some services provided by soil ecosystems for more-than-humans. Taking care of ecosystems is vitally connected to the provision and long-term stewardship of ecosystem services. A one-sided exploitation of resources is not only harmful to humans but often also means the destruction of the habitats of infinite other living beings. So instead of focusing on the benefits of humans alone, we should broaden our horizon to include the entire web of relations as Puig de la Bellacasa put it.

### Conclusion

Care is difficult to grasp, it is more than a theoretical concept, a responsibility or just a feeling. Working with compost shows that care requires above all commitment, dedication

and perseverance. The Peace of Land teaching material shows that there are concrete and diverse ways to take care of a compost. But this advice and information on composting is not enough to show care. One thing became very clear during the visit and the interviews: without the continuous work of care and work of maintenance, the compost is not active. For both interviewees, motivations for composting came from the impulse to reduce their own footprint on this planet. While Ricardo's interest was also based on his personal experiences in his parents' garden and the desire to revive soil and dead land, Stefan was mainly fascinated by the concept of recycling and the natural cycle of nutrients.

The work or cooperation with other species in the compost and in the soil is still quite direct and concrete with larger creatures, such as worms. It becomes more challenging when considering the other thousands of microorganisms that are involved in decomposition. Many of them are not visible to the naked eye and especially non-specialists overlook many of these fellow species. Can we then still speak of cooperation? Or is it enough to give them more agency by acknowledging them, not spraying destructive pesticides, and examining their role in the process more closely? What does the agency of these animals look like?

The discussion and conversations with Ricardo and Stefan brought the theoretical concept of care into the practical use of compost. This made Puig de la Bellacasa's continuous maintenance more visible, and it showed their dedication and affection involved in care work. Negative feelings towards the compost pile, the animals, smells, or anything else does not occur with either interviewee. This does not mean that the smells do not exist, although Stefan is of the opinion that a healthy compost does not stink, rather both are so entangled in the compost that they pass over these side effects.

Working with and through more-than-humans is essential during composting. A redefinition of ecosystem services is needed to enhance the existence and importance of more-than-humans. Doing so for the main purpose of connecting with other species and recognizing the reciprocal relationship between humans and more-than-humans. Furthermore, humans are not the only consumers or beneficiaries of ecosystems and can also contribute to the conservation and protection of ecosystems (Comberti et al., 2015).

Even though narrative interviews are useful for this type of analysis, especially for a better understanding of the personal motivations of the interviewees, more interviewees would have been helpful to make clear other aspects and especially possible tensions between human composter and compost pile. It would also have been interesting to hear the views and motivations of people who are not necessarily professionally committed to the subject. During the interview with Stefan, it was noticeable in retrospect that the conversation was sometimes very guided, and thus detours into other topics besides composting were avoided. The observations at the compost were helpful in gaining experience, although the limited expertise of the researchers did not allow for comprehensive statements about the life and presence of more-than-humans. In this regard, an expert on-site would have been useful.

It is highly recommended to carry out further research and discuss the relationship between humans and more-than-humans during composting, especially in an urban environment. As explained before, many species live in composts and the soil itself. The city provides an increasingly important habitat for many of these species.

To conclude, care as a commitment to a fruitful life together with other species on this planet may still not reflect the lived reality of the majority of people, although more and more people are embracing composting, as Ricardo speaks of a "huge boom" in this context. Finally, a quote from Puig de la Bellacasa is shown which summarizes humans' role

in the interspecies food web of the soil and shows us that human care is necessary for co-existing on this planet.

"Yet foodweb models also affect relations to the soil for how they turn humans into full participant 'members' of the soil community rather than merely consumers of its produce or beneficiaries of its services. It is the emphasis on the inter-dependency of soil communities that are appealing for exploring more than human care as an immanent obligation that passes through doings and agencies involved in the necessary maintaining, continuing, and repairing of flourishing living webs." (Puig de la Bellacasa, 2017, p. 192.)

## Notes

- 1 *Composta São Paulo* is a pilot project done in Brazil in 2014 to stimulate the practice and understand "the feasibility and benefits of decentralized treatment organic waste through domestic composting with earthworms". For more information visit <https://compostasaopaulo.eco.br/>.

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