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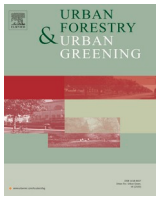

Gardening in an urban farm: A way to reconnect citizens with the soil

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ABSTRACT

Simultaneously perceived as places of agriculture, of nature, and of social ties, urban collective gardens and farms enable city dwellers to immerse themselves in gardening, to recover forgotten skills, to learn from nature and the environment. They reinstate the soil as a feature of the city by making it visible to the urban population, to whom it is often unknown. In this article, we focus on urban gardeners' representations of the soil in a city of south of France. These representations were analyzed through the lens of the relationships that gardeners develop with the soil as an element of nature. Our results highlight relations where the care ethic is central. They suggest that the practice and the extension of agroecological urban gardening, by placing city dwellers in physical, skilled contact with the soil, promise a reconfiguration of citizens' relationship with soil.

1. Introduction

In industrialized countries, human relationships with the soil have weakened since the industrial revolution. Agricultural soils, closely tended for centuries by farmers, have been neglected with the advent of chemical fertilizers (Chabert et Sarthou, 2017). Considered mainly as a support, a substrate to exploit to accelerate productivity, soils have suffered substantial damage (Koch and al, 2013; Puig de la Bellacasa, 2014; Artiola et al., 2019). This particularly applies to cities, where the soil is strongly artificialized and largely invisibilized, concealed under layers of concrete, considered as a degraded environment, "the heavily disturbed remnants of a once natural soil" (Meulemans, 2017). The urban design principles of the last centuries have promoted practices of systematic earthmoving and waterproofing, resulting in a historical urban loss of knowledge relating to soils, which thus become "non-soils" (Meulemans and Labat, 2016). These authors speak of a "double performative movement": the soil's disappearance from city dwellers' consciousness buries it under concrete, and vice versa.

The Anthropocene, marked by the influence of human beings and the process of generalized urbanization, is raising new issues in terms of relations between humans and non-humans. Recently, soil health has emerged as a concept to be considered in agriculture, together with the organisms that live in and are an essential component of the soil (Besson, 2011; Bender et al., 2016). The rediscovery of the soil is in particular linked to its importance in the agroecological production processes that have developed as a reaction to industrial agriculture using synthetic fertilizers and pesticides. Yet interdependence between man and soils is increasingly being taken into account in many spheres, particularly scientific and political (Fournil et al., 2018).[1] In cities, which outsource their waste and deplete natural resources, soils are attracting the attention of decision-makers because they affect the volume of greenhouse gas emissions and promote biodiversity (Guillain and Le Gallo, 2017). Through the role they can play in mitigationg the climate crisis, the soil issue is thus becoming politicized. It offers a potential lever for rethinking the urban environment, ecologically, socially, and aesthetically.

In parallel, the "agriculturalization" of the city (Ernwein and Salomon-Cavin, 2014) is a concept increasingly manifested in attempts to reconnect city dwellers to the soil. The practice of agroecological gardening in urban collective gardens brings the soil back to the city and to the attention of its inhabitants, who often know nothing about it and its ecosystem services (Donadieu et al., 2016). It makes soils visible again, reminds city dwellers of their presence (Chalmandrier et al.,

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[1] To such an extent that FAO has declared 2015 the International Year of Soils with a slogan " Healthy Soils for a Healthy Life " (http://www.fao.org/soils-2015/about/special-ambassadors/fr/ accessed 6 August 2020).

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2017). Urban agriculture experiments seeking to cultivate vegetables and fruits in collective gardens are popular with city dwellers and can change urban living patterns and philosophies. Urban collective gardens and farms are places of production, of social ties and well-being; they are considered as an interface between city, nature, and agriculture (Scheromm, 2015; Silva et al., 2016; Slavica et al., 2020). They allow the inhabitants to immerse themselves in an extra-ordinary universe where gardening leads them to recover forgotten skills, to learn from nature and the environment. They partially compensate for the loss of interactions between human and nature characteristic of urban societies (Bendt et al., 2013), thereby helping to combat "the extinction of nature experience" (Pyle, 1993). These places are therefore considered "pockets of socio-ecological memory" in the urban environment (Barthel et al., 2014). Donati et al. (2010) perceived urban community gardens and farms as "urban geographies in which the mundane and everyday practices may produce new and more meaningful connections and networks with the more-than-human communities of the city"; they may foster new ethical connections between human and non-human inhabitants, since they represent "hybrid human-natural places". As an experience of nature that goes beyond mere contact with the latter, gardening is even endowed with a transformative power that can go so far as to alter the identity of those involved (Clayton et al., 2017).

Although the above reflections suggest that urban collective gardens can have a strong impact on the human/soil relationship, little is known about the representations that urban collective gardeners have of the soil they meet in the gardening experience. The majority of the literature approaches gardens' soils from the perspective of their contamination by toxic chemicals (for example Schwarz et al., 2016; Al-Delaimy and Webb, 2017; Dumat et al., 2018). The rise of urban gardening has in fact been accompanied by a growing concern about the sanitary quality of plants grown on urban soils, due to the presence of pollutants, and this question is now being raised by all those involved in the design, development and management of urban gardens and farms, including gardeners (Grenet et al., 2016; Rémy et al., 2017).

In this article, we explore urban gardeners' representations of the soil. City dwellers are key players in the soil issue because the human knowledge of soils has direct implications for the future of life on Earth (Puig de la Bellacasa, 2019). Their representations, as a means of knowing the world and acting on it (Jodelet, 2003), directly influence practices and ways of living (Abric, 2016). Exploring representations of the soil and taking them into account should thus contribute to the development of sustainable land management, especially inside the cities. In the first part, we present our case study, a collaborative urban farm in Montpellier (France), and our methodology. The second part focuses on the results of interviews conducted with the founders of the farm and with members involved in the cultivation of the agricultural plot. These results are then analyzed through the lens of the relationships that gardeners develop with the soil as an element of nature.

2. Method

This study of urban gardeners' representations of the soil they cultivate forms part of a multidisciplinary action-research project conducted in 2019/2020. This one-year emerging project brings together researchers (two in soil science and two in social sciences), leaders and members of an urban farm with an associative status, and representatives of the Montpellier intermunicipal body (Montpellier Méditerranée Métropole). Its objective is to contribute to building a pool of knowledge on urban soils, permaculture practices, and urban agriculture to be shared by scientists, urban political actors, and citizens, and to initiate a collaboration on a pilot experimental site. The Métropole's involvement in the project is linked to its interest in approaching the issue of urban agriculture and its soils scientifically. The research we present here concerns the social science component of the project.

The research focused on the members of an urban farm described as " collaborative " by its founders, in the city of Montpellier (270,000 inhabitants), situated in the south of France. Named Oasis citadine, the farm was created in 2018 by four young project leaders -between 30 and 35 years old-, all with higher degrees and complementary skills (agronomy, business, personal development) on land provided by a winery. While the city's urbanization has left some wineries standing (Scheromm and Soulard, 2018), these now blend into the urban fabric, surrounded by busy roads and shopping malls.

The purpose of Oasis Citadine is to initiate urban dwellers into urban agriculture and the principles of permaculture.[2] Permaculture is about working with nature, the soil in particular, rather than against it (Mollison, 1988). Applying permaculture principles encourages members to think about human-nature relationships, making their representations of the soil interesting to analyze. But permacultural gardening is not the only activity that the members can practice. Oasis Citadine also offers others activities (yoga and tai chi workshops, meals, concerts, conferneces and debates through a community café). It is a place of conviviality where the social contact is privileged.

A hundred people were registered at Oasis citadine at the time of this study, but only about twenty are really involved in gardening activity. The members, most living in Montpellier, the majority ranging in age from 25 to 40, are mainly middle class and do not work in agriculture.

The farm covers a plot of 4000 m2 which is designed and organized as a collective space, without individual mini-plots. The choice of crops is left to the founders, but the members can participate in creating planting schemes. Crops are harvested collectively, and shared equitably among the members who practice gardening. The project leaders are very often to be found at Oasis Citadine cultivating the plot, so informal discussions can take place several times a week with members who come to garden.

A set of one- to two-hour interviews were conducted:

- 4 informative interviews with the project leaders to explore their points of view regarding the soil and the content of the messages they send to gardeners
- 9 individual comprehensive interviews (on appointment) with gardeners to study their representations of the soil.
- More informal interviews with little groups of gardeners during the field work, which enabled the content of the comprehensive interviews to be validated according to the principle of field data saturation (Sardan, 1995).
- A feedback meeting to report the findings to the members was held after the interviews and their analysis. This meeting, which was also attended by ten people who had not been interviewed, confirmed the validity of our results.

All interviews were recorded and transcribed. The informative interviews with the project leaders were conducted to understand the context in which the urban gardeners cultivate. The goal of the comprehensive interviews with the gardeners was to understand their representations of the soil and of its fertility. What soil are they talking about? What relationships do they establish with the soil ? How do they integrate it into their gardening practice? How do they envisage human interventions?

[2] Agroecology is defined as " the application of ecological concepts and principles to the design and management of sustainable agroecosystems " (Gliessman, 2007). It gathers a set of agricultural techniques based on the functioning of natural ecosystems. Permaculture matches this scientific definition of agroecology. Permaculture uses the tools and techniques of agroecology, but goes further by proposing a reflection on our relation to the world (Centemeri, 2019). Furthermore, Oasis Citadine people use both terms interchangeably for their agricultural practices.

3. Results

3.1. Oasis citadine: a site offering training in permaculture and exchanges on ecological transition

The city farm Oasis citadine is defined on its website[3] as an experience to share with friends or family in the natural setting of a winery, performing an activity that provides well-being through contact with nature. It falls within the "ecological transition challenge to create resilient human ecosystems", as the website states. The project includes not only cultivating the site under permaculture, but also an extensive social component, the goal being to create "a social fabric of people actively participating in the ecological transition" (Oasis citadine project leader). Multiple issues are addressed: fighting global warming, reconnecting with nature, with food, creating a place for well-being and for social ties, with a view to inclusion (helping people who are trying to find their way), transforming an agricultural wasteland into an oasis of biodiversity, occupying urban territory to protect it from urbanization. Oasis Citadine regularly welcomes environmental-oriented associations, which offer workshops to members.

Tackling global warming is undoubtedly the concern most common to the four project leaders:

> "It's what connects us the most, it's how we can take concrete action on climate change, it's our greatest motivation" (Oasis citadine project leader).

The site is seen by the founders as a pilot project aimed at creating a network of oases. It is used to test and validate the social, environmental, and economic objectives of their model. When thinking about the type of support to put in place, the founders analyzed the needs of the members, who confided in them their fear of anything time-consuming, their desire not to work alone in the garden and to be accompanied by experts in the field.

The permaculture training proposed at Oasis citadine relies mainly on practical workshops on the farm (Fig. 1). The soil and its forms of life are essential factors to be taken into consideration in permaculture. The project leaders emphasize the living dimension of the soil (the earthworm is seen as an indicator of soil life: if the earthworm is present, so are the other organisms), the natural biological cycles (phosphorus, nitrogen, carbon), the provision of nutrients used to feed not only plants but also a population of soil organisms that create soil fertility. The idea is to see the functioning of plants from a perspective of the functioning of the soil. For the trainers, it is fundamental that the gardeners learn to look at the soil: look at the clods, the color, the aeration, the argilo-humic complex, and the life it shelters:

> "Once you have become aware of soil life, your vision of the technical aspects changes because you will have to find material to feed these populations, identify what they eat, straw, very woody materials [.], to recreate soil balance and autonomy, [.] we must be aware that there is a permanent creation of matter" (Oasis citadine project leader)

The strong message from the project leaders is therefore that it is the soil life that matters, more than imported nutrients provided to feed plants and increase yields. The trainers recommend feeding the soil appropriately, rather than the plants themselves, since a properly balanced soil will guarantee proper plant growth.

3.2. Gardeners' representations: respecting and taking care of the soil as a habitat for life

It should be recalled that Oasis citadine is a place of coviviality where members have different degrees of commitment to gardening and where other activities are offered (do it yourself jobs like solar hoven construction, or yoga classes for example). This means that interest in gardening and intensity of gardening practice can differ greatly among Oasis Citadine's members. However, they share similar representations on a number of features, no doubt due to their regular contact with leaders.

Interviewed members are mainly attracted to the farm by a lack of nature in the city, by dissatisfaction with the urban way of life (interest in alternative projects to create social ties that may change social vision), by a desire to acquire food autonomy. Some are concerned about preparing for the aftermath of imminent social collapse.[4] Others clearly state a need to participate actively in improving environmental conditions:

> "I thought, how can I put this into practice to participate a little bit in stopping this pollution [.], get involved, personally?" (gardener, 28 years old, farm worker)

Although all the gardeners are interested in permaculture, only one intends to make agriculture a profession. They are there for their pleasure.

> "It's fun for me, I like to explore areas that I don't know and without necessarily aiming to become a specialist, I don't intend to be a permaculture pro, that's not my intention at all" (gardener, 30 years old, journalist)

Some are not confident regarding their gardening practices and rely heavily on the skills of the founders, whom they consider experts:

> "I'm more comfortable than when I first arrived, yeah, a little more, I still ask anyway so I don't do anything stupid." (gardener, 30 years old, translator)

Most of them state that their perceptions of soil have changed since they started attending Oasis citadine:

> "At the time, soil was just ground, we grew things on it, that's all, and now I'm more aware that it's more complex, that there has to be life in it, if you just have dirt there isn' t much that will grow" (gardener, 29 years old, green spaces maintenance worker)

> "Before, I thought soil was above all mineral, now I understand that it is above all alive" (gardener, 30 years old, journalist).

The gardeners say they want to try to get closer to the soil, to be more in tune with what a gardener call its "terroir" - a multi-referential concept as defined by Prévost et al. (2014) -, thus translating his attachment to both the soil and the place (Oasis Citadine). The general public, manufacturers, scientists, and farmers are frequently criticized for not taking care of the soil and for participating in its pollution by overdosing fertilizers in a short-term aim:

> "I am in opposition to what is currently being done in intensive monoculture where the soil can be seen to be turning into dust, completely dry and destroyed. So it's more in opposition to these practices that I am trying to learn more about a fertile soil, so I can reproduce it" (gardener, 40 years old, project manager).

They describe the soil in a fairly homogeneous manner, consistent with the approach of the Oasis citadine founders, namely as a habitat, "a

[3] https://oasiscitadine.fr/ accessed 25 June 2020.

[4] Collapsology is a pluridisciplinary approach which is interested in the possible collapse of our civilization and in its consequences. It is linked to the idea that man alters his environment in an ecological emergency, in particular in connection with global warming. In France, collapsology has been brought to the attention of the general public, notably by Pablo Servigne and Raphaël Stevens (2015).

Fig. 1. Work on the plot by Oasis citadine members and their project leaders.

mixture of ore and organic matte", hosting a wide diversity of micro-organisms (bacteria, fungi, worms, etc.).

> "The definition of a soil would start with having earthworms, having bugs of all kinds, spiders" (gardener, 31 years old, craftsman)

The soil is called by some gardeners a "living organism", which gives it a kind of specific organic identity. It is never referred to as a support or resource. Gardeners' remarks refer to representations of the soil as a living environment, a habitat, more than as an organized whole, except for two members with more extensive gardening experience acquired in other places. These experienced gardeners have more precise knowledge of soil composition and layered organization, and refer to "successive strata, matter horizons, soil fauna". The soil life mentioned is limited, for most of the gardeners, to earthworms, considered the real "chefs[5]" of the soil (an expression that comes from the trainers) which produce the argilo-humic complex and the humus, guarantors of a soil of good quality:

> "The mound is a feast, it's the Roman Bacchanalia for earthworms" (gardener, 40 years old, project manager)

Few gardeners cite other soil-dwelling species, which are very often generically referred to as "little animals" or "bugs". But even if the gardeners' naturalistic knowledge of the soil biodiversity seems to be limited to some species and if their comments are often not very detailed, they always identify the soil as something living, not inert.

Soil fertility is also considered from the angle of the life it harbors:

> "A fertile soil means that there is life in it, it's the biodiversity, the life in the soil that determines fertility, and thanks to fertility there are plants" (gardener, 30 years old, head cook)

Several gardeners mention that fertility is above all a natural feature of the soil. Fertility is thought of as an original property, with recurring references to the lands of the Nile and the soils of primary forests. For most of the gardeners, human presence, especially in recent decades, has diminished this fertility:

> "Before there were humans, the soil was doing just fine, there were primary forests" (gardener, 30 years old, head cook).

> "I think a soil is originally naturally fertile, then we made it infertile, we can re-make it fertile, we can increase its fertility […] it was because it was fertile that life was able to develop, humans arrived much later" (gardener, 47 years old, social worker)

Humans are often related to predators, so much so that some gardeners' words express the desire to blend into a perfect nature and not to intervene through actions considered as too destructive. The natural processes of the soil are idealized, sublimated, and artificiality and anthropization of soils are negatively perceived.

> "The soil works well alone, it does not need us" (gardener, 30 years old, head cook)

> "What would really be best, definitely, is to leave the forests as they are or not to destroy them, or to succeed in setting up a system where we could pick without having to plant" (gardener, 40 years old, project manager)

In extreme cases, some gardeners personify the soil:

> "The soil is earth, and the earth knows what it's doing, what it needs to do to ensure a balance" (gardener, 30 years old, translator)

> "The earth is intelligent, so what grows is automatically in the right place" (gardener, 28 years old, green spaces maintenance worker).

The gardeners and the leaders agree that any plants removed from the garden must never be described as weeds, consistent with the idea that the soil (and nature) does not produce anything useless.

The gardeners are however aware that some interventions are necessary. They report that it is necessary to supplement the soil with manure, ramial chipped wood, or compost to attract worms and make it lighter. But they insist on the fact that green manure for example has to be added sparingly, that the soil is naturally balanced and that too much of anything from outside can lead to saturation. They consider that they must intervene as little as possible and rely primarily on the autonomous functioning of the ecosystem. Interventions have to draw on observation of natural processes and on their imitation:

> "You observe nature, always reproduce or follow what nature does […], you allow nature and the plants their freedom to some extent, don't force them too much, observe, let them do their thing and have more confidence in them than in yourselves" (gardener, 30 years old, translator)

[5] Word used here in the culinary sense.

The founders show them practices that respect this idea, like creating mounds[6] that have their lives with as little interventions as it is possible, or mulching to imitate forest covers. Some gardeners question the status of the land they have helped to build:

> "It's a mound soil, yes. But it's not natural soil, well it's not soil… yes it's natural soil which has been built in a natural way, hmmm, how can I put it… Aaah, it's complicated" (gardener, 47 years old, social worker)

The reference to the respect of natural processes is permanent, and guarantees the sustainability of soil fertility. Human action must only accompany the natural processes at work in the soil, as described by a gardener speaking of a permaculture mound:

> "Let's say that for once, human action is restorative and non-destructive […] if we set up a mound there we'll just contribute to the development of soil fertility, but in a natural way" (gardener, 47 years old, social worker)

This gardener seeks to understand the processes at work with a view to engaging in an interrelationship with the soil, not taking arbitrary action on a nature-object:

> "It is important that we interact but in a good way, or at least with benevolence, without an attitude of 'me first, after me chaos, I don't care'. No, no, no, it is in a spirit of benevolence for the other organisms that exist on this earth".

The gardeners want to " cherish " and " care for " the soil, in such a way as:

> "to make it possible to cut out the use of pesticides, to cut out anything that depletes the soil, anything that causes erosion, anything that causes the death of our soils, to oppose destruction as far as possible, whether it's from monoculture or concreting over".

Comments of some gardeners, in particular the more experienced, show that their senses (sight, touch and smell) are mobilized in their approach of the soil, and that it is essential to take care of the soil properly.

> "Last time I dug holes, there, to plant tomatoes, and I see lots of golden cetacean larvae. […] the golden cetacean helps to degrade organic matter, and once the larva becomes an adult, it's a pollinating insect so they're very good larvae" (gardener, 28 years old, farm worker).

Concerning the smell, the gardeners repeatedly refer to the smell of decomposing matter, a smell akin to the smell of forests' soils:

> "If it smells like forest, it's a good sign" (gardener, 30 years old, head cook).

These descriptions of the soil calling upon the mobilization of the senses are part of a sensitive relationship with the soil and linked to the desire and the will to take care of it.

4. Discussion

Oasis citadine farm is a place where members like to gather to enjoy a natural environment and experiment with agroecologicall practices within the framework of shared values. In this sense, the gardeners form a community of agricultural practice, learning, thinking and having their own identity (Wenger, 1998). The interviews seeking to explore their representations of the soil generally rely on an ethical and spiritual approach of nature preservation and on environmental concerns. Central to these representations is the notion of life and respect of this life. The gardeners see the soil as a habitat for life, almost independently of what it produces. The notion of yield appears very secondary, which is often the case in shared gardens (Scheromm, 2015; Martin et al., 2017), as if producing was not the main objective. Their concerns are mostly about the intrinsic value of soil life and echo recent scientific works stating that it is "no longer understood as abiotic and static", and "has become a dense web intermeshing elements and organisms" (Granjou, 2019). Being aware of the vital importance of the soils, the gardeners see them as "living worlds" (Puig de la Bellacasa, 2019) that it is time to stop destroying and exploiting. The natural processes at work, even if they are not clearly described, are considered as a model, associated with soil inherent fertility.

Soil, and nature in a general way, are often idealized, taken into consideration for their perfection, and set in opposition to humans' actions that are considered as responsible for the devastation of non-renewable resources of the soils. Comments show indeed that some gardeners are drawing on a moral dimension based on the assertion that all that is natural is good (Beau, 2017), thus relaying the perpetuation of the myth of an ideal world where humans evolved in a wild, virgin, and immaculate nature, an outdated image widely deconstructed by a number of authors (Denevan, 2012; Descola, 2005). Adhering to this moral dimension, these gardeners tend to lose sight that humans must produce an abondunt food to survive.

If the soil is sometimes perceived as part of an idealized nature, the gardeners however develop in parallel the idea that it requires human intervention: it needs to be repaired, on the condition of respecting its natural content and functioning. The artificial appears acceptable when it imitates the natural, raised to normative status. In this way, the gardeners are in line with the principles of agroecology by establishing natural functions as models for the construction of agroecosystems that respect biological processes and their complexity (Malézieux, 2012).

In imitating nature, human action can be meaningful. Although comments sometimes sound contradictory (attraction of an absolute laisser-faire approach toether with needs of interventions), the gardeners express the idea of working in synergy with the soil. They enounciate relationships rehabilitating human action, considering " interdependent conceptions of human-soil relations [that] could challenge the unidirectional linearity and anthropocentrism of productionist and service approaches. " (Puig de la Bellacasa, 2015). Thus, the relationship between gardeners and the soil appears relatively symmetrical, not a relationship of domination theorized by a number of authors (Latour, 1997; Panelli, 2010; Ingold, 2013; Berque, 2014). Acting in the most natural way possible, while respecting the soil's life and its processes, is the principle behind the gardeners' intervention. The humility and modesty of this human attitude paves the way for a dialogical relationship, in opposition to the dualistic view of the human-nature relationships. They develop a thinking based on the "co-production of a more-than-human world [.] which excludes any strict separation between the domains of the social and the natural" (Meulemans and Granjou, 2020). This can lead them to question what nature is.

This dialogical relationship is reinforced by the will of the gardeners to provide care for the soil. The care-inspired ethic strongly permeates the representations of gardeners, in relation to their practice of permaculture which puts the care at the heart of its conception. Seen in this way, the relationships leave room to feel responsibility while repairing the damage caused. The importance of the environmental care has already been noted in some papers related to urban gardening in collective gardens (Pitt, 2018; Alarcon and Hochedez, 2018) and for alternative farming practices (Krzywoszynska, 2019; Foyer et al., 2020; Mincytė et al., 2020). Environmental care proposes a new quality of relationship with the elements of nature based on attention and protection. It posits seeing humans' relationship with ordinary, everyday nature in a way that goes beyond the traditional opposition between

[6] The permaculture mound is an experimental technique requiring no tillage and favoring ecosystem processes, which makes it an object that can be described as natural. Nevertheless, the soil has to be extensively remodeled to build mounds and this must be carried out with great care (Javelle, 2020).

natural and artificial, changing how we view our relations with non-humans (Laugier, 2012). Care generally makes relationships and their entanglements central, with the bodily solicitations and physical contact they involve and opens the way for emotions to build "a different moral voice" (Gilligan et al., 2010). "Denouncing the illusion of pure and perfect reason, care leaves room for perceptions, for affects, for sensitivity" (Petit, 2014). Reflected in the gardeners' words is an affective relationship with the soil that engages the gardeners in practices respectful of soil life and makes them pay attention to bioogical processes that take place in the soil. The gardeners' relationship with the soil is not viewed in utilitarian and instrumental terms, but rather in terms of mentoring and sollicitude, where the human takes a "compassionate assistant" stance (Pineau, 2019). Seen in this way, the relationship is consistent with a feeling of responsibility for the damages caused. Insofar as the gardeners consider the soil as living, nourish it, give it back the matter they have taken from it, they become "soil farmers instead of soil consumers" (Puig de la Bellacasa, 2015).

They are aware of the need to respond appropriately to a soil that is vulnerable. However, two considerations must be taken into account here. On the one hand, taking care of the soil and providing what it needs requires the care-giver to " take a certain degree of responsibility for an identified need and to determine the means required to meet it " (Tronto, 2008). On the other hand, where produce is involved, fertility is directly linked to the soil's ability to produce plant biomass; fertility is a socio-technical construct, the result of interaction between man and the soil, whose maintenance requires appropriate management via specific techniques and practices (Gasselin, . et al., 2010). As a number of gardeners rely heavily on the advice of the project leaders and do not immerse themselves much in the practice, they do not fully realize the degree of responsibility they bear for setting up this interaction. Nor do they fully understand the kind of care that is required; the " gardeners' care " is actually directed towards a soil that they know little about and idealize. Having only recently joined the newly-created Oasis citadine farm, they lack the specific agronomic knowledge recognized as essential to a productive agroecological approach (Cristofari, 2018; Tourdonnet and Brives, 2018), showing the importance of a regular confrontation with the soil and of assiduity in practice. A strong physical relationship with the soil is indeed necessary to reconcile humans with it (Puig de la Bellacasa, 2019).

Moreover, we have observed some tensions and contradictions in gardener's statements. These are characteristic of new representations are representations under construction. The gardeners have indeed told us that their perceptions have changed since they started visiting the Oasis citadine. The distance between gardeners and soil could be reduced thanks to time spent gardening, when the gardeners become more physically and intellectually accustomed to soil cultivating. The construction of new representations is a long and complex process; long term involvement in urban gardening practices should allow the would-be gardeners to go beyong the process of idealization that we have observed, establishing an even more dialogical relationship with the soil.

5. Conclusion

The disproportionate exploitation of soil is linked to the relations of domination that have developed between humans and non-humans in an urbanized world. This domination has resulted in massive use of chemicals and farming techniques such as deep ploughing, altering soil life while forgetting that this life determines soil quality. City dwellers have been unaware of these degradation since their daily lives offer them very little contact with the soil. Today, collective urban gardens and collaborative urban farms are attractive to city dwellers for many reasons, including their need for nature and social ties. Frequenting them allow to discover the soil and its functioning, to think about what is a soil. Although long-term follow-ups are required to confirm these first data, our results show that gardening modifies soil's representations of city dwellers. They suggest that the places where it is practiced could participate in building an ethic, both individual and collective, of the citizen's relationships with the soil. Frequenting such places initiates them to a dialogical relationship with soil. They are taught the living dimension of the soil and enter in a sensitive, affective, and caring relationship with it. New soil's representations are set up, that promote it from a support status to a living and dynamic status. The multiplication of gardening experiments in cities, that attract wider and wider audiences of practitioners, will allow city dwellers to participate to the project of thinking with soils (Salazar et al., 2020).

It would also be important to broaden the issue within the framework of an *environmental care geography*: how can the quality of the relationships established with the soil be extended outside the garden, so as to involve other inhabitants in this approach? The reconfiguration of citizens' relationship with soil (and elements of nature in a more general way) is fundamental for the construction of a sustainable city. Future research could usefully explore these essential reconfigurations with a view to promoting new approaches to urban planning based on new relationships with soil and nature.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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