

VISCERAL ECOLOGIES IN THE BORDERLAND:  
SOILS AND CARE FROM OLIVE TREES' HECATOMB IN SALENTO

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ABSTRACT

*This contribution focuses on soils and care as fundamental matters of inquiry, in order to retrace the processes determining the resurging possibilities of Salento's landscape. The South-East Italian territory is plagued by an epidemic of *Xylella fastidiosa*, a bacterium which has killed hundreds of thousands of olive-trees. We untangle the ecology of the olive trees' depletion, taking into consideration the most recent scientific research on the main vector of the bacteria, the little spittlebug *Philaenus spumarius*. We describe the quality of these relationships that entangle multispecies assemblies as 'visceral ecology' and explore it by interlacing the vector's ecology and the dying olive trees with a local oil miller's intestinal disease. Framing the soil of Salento as an 'open air intestine' allows us to merge materialist views and practices of care with the ecosystem's transformations. In conclusion, we argue for the interconnectedness of materialism and care in shaping both the imaginary and the material conditions for future local human-landscape relations.*

**Keywords:** Olive Trees disease, Epidemics, Human-Soils Relations, Politics of Care, Visceral Ecologies

INTRODUCTION

The presence and proliferation of the bacteria *Xylella fastidiosa* (*Xf* from now on) in Puglia (Southern Italy) has produced one of the most important phytosanitary containment strategies ever in Italy (Wells and Raju 1987)<sup>4</sup>. *Xf*'s triggering role in the production of OQDs (Olive Quick Decline Syndrome) was confirmed in 2015 (Saponari 2015): the reproduction of a strain of the bacterium (namely ST53) in the xylem vessels of olive trees causes dieback of the leaves, twigs, and branches so that the trees cease to produce crops of olives, until they die. In a few years, Salento's landscape went from one of millions

of lush olive trees to one of death and fires. Since 2015, biosecurity measures have been following the knowledge produced around the pathogen and its relationship with the host and the vector. The principal object of containment policies soon became the vector and the movement of the insect *Philaenus spumarius* was recognised as the principal propagator of the disease (Colella 2019). In order to contain the bacterium, the government prescribed mandatory phytosanitary measures to ‘control’ the *Philaenus* population. The territory was divided into areas of intervention with each area having a specific schedule of interventions during the year<sup>5</sup>. However, the containment policy didn’t work. The borders between these areas progressively slid north, following new findings of the presence Xf in olives.

In 2018, we moved to Salento where we conducted joint fieldwork for our Masters’ theses and our personal interest in environmental conflicts. We interviewed leading researchers from the main research institutes (Bari’s CNR – Council of National Research, University of Bari and CNRSFA – Agriculture Research, Experimentation and Formation Center Basile Caramia). These researchers were identified by institutions (including the Italian Ministry of Agriculture and the regional government, Regione Puglia) as being involved in producing containment policies. At the same time, we travelled across the Salento peninsula talking to several dozen farmers, oil millers, activists, and residents. As native Italian speakers we could enter the ethnographic field even though we did not initially speak the local dialect (we developed fluency after the first nine months of research). Conducting our current doctoral research in Salento has also given us a better understanding of the geography and society of the area. Our work hybridises ethnographic insight with a study of governmentality during epidemic emergence. Our approach was two-pronged: we aimed to understand the results of the environmental crisis in the perception of space and life in the territory; as well as examining the pivotal role of scientific knowledge, following scientific research on the OQDS, and its relationship with policy makers.

We strongly relied on an interdisciplinary approach: in addition to anthropology and geography, we explored ‘nearer’ disciplines such as science and technology studies and cultural history, as well as some more ‘distant’ ones, such as entomology, agronomy, and forestry sciences. This interdisciplinary knowledge has been shared and empowered by the whole Collettivo Epidemia, of which we are founding members. Interdisciplinarity was a useful tool for collaboration between a group of researchers. Indeed, how we were positioned in respect to the fieldwork has also become part of our research.

At our fieldwork site, as for many others, scientific knowledge brought about

a proliferation of borders in order to contain and eradicate the pathogenic organism (Latour 1993; Hinchliffe 2008, 2012; Barker 2014; Bandiera 2020) or those who are considered as such (Mezzadra and Nielson 2013). By narrowing down the type of relationship between host, vector, and pathogen, this article aims to better understanding the ecology of OQDs. We consider how containment policies produced borderlands between the actors involved in the ecology of the disease. A borderlands 'is a topological space where contrasting elements working to different rhythms and logics come together, or better still, intra-act' (Hinchliffe 2012). We argue that containment policies specifically extended a will of closure without considering the disease relationships between humans and nonhumans as a matter of making life safe. Rather than responding to the relational character of diseases, bio-securitarian policies created landscapes 'in which borders are detached from geographic territory, where the border can be embedded in pathogenic life itself, rather than at the edge of territories' (Hinchliffe 2012). Thus, in this article we refer to 'borderlands' as both those produced by the containment policies, and those between bodies of multispecies actors.

#### CARE AS MELTING-BORDERS PRACTICE

We start from the history of knowledge produced around the vector *Philaenus Spumarius*: the insect's behaviour is pivotal to how borders might be drawn to effectively contain *Xf*. We retrace the history of scientific knowledge about *Philaenus*, from Linnaeus' fifteenth century observations to newer entomology studies that recently became relevant for containment policies. Firstly, this knowledge highlights the insects' mobility and its continuous exchange with the surrounding environment, characterising its permeability and porosity within the ecosystem. Secondly, research over many decades focused on the different colours the insect assumes: moving around the globe led to its quick adaptation to different ecologies with a great degree of visual polymorphism (Halkka *et al.* 1976, Yurtsever 2000). Thirdly, developing knowledge about *Philaenus* resulted in a paradigm change, from being considered a harmful pest to a vector of disease.

Based on this analysis, we demonstrate that 'viscerality' defines connections between ecosystem actors, including humans, plants, insects, and even the micro-organism communities in the soil. Viscerality deconstructs the relationship between the classic triad of 'host-vector-pathogen' and offers a relational rather than biosecuritarian comprehension of borderlands. From the xylem vessels of the olive tree where *Xf* proliferates until it obstructs them, to the *Philaenus*' eating and vomiting of xylem, down to human intestines, the ecology

of the disease comes out as made of visceral innards' connections. The connections that bind actors' bodies together play on each body's individuality, such that every actor in this landscape becomes a borderland of systemic behaviour. Linear biosecurity borders melt as actors' bodies become lands of exchange.

Drawing on ethnographic insight from Antonio – a local olive oil miller who healed from a severe intestinal condition – we postulate the inadequacy of bio-securitarian borders to grasp the relationality in disease ecologies: Antonio's account of his healing advocates for narrowing borders between the entities that inhabit Salento's environment. In particular, the ecology of disease, both Antonio's and the olive trees', elicits the complex, relational dynamics of soil. Soils dynamics are at once both the container and the outcome of multispecies, multifactorial, and multitemporal processes, in which human actions are determinants on par with those of species of different size and nature (Bastian, 2014). Visceral disease ecologies bring us to consider a wider relationality than the one built on host-vector-pathogen interaction. In particular, soil's viscosity intertwines olive trees, *Philaenus*, and human intestines, as it shows the exchange and circulation of matter, substances, and reciprocal agency.

Care for the soil has been, and to a large extent still is, a meaningful material issue for Salento. Drawing on Puig de la Bellacasa's '*Matters of care*' (2017) we explore how the notion of care challenges the conception of borders. For Puig de la Bellacasa (2017), care is the relationship of reciprocity brought about by 'touch' among different entities. Care is tactile because what humans touch, sustain, and care for inside the environment is reciprocated by how they are touched, sustained back, and cared for by other species. To physically touch and be touched by non-human entities challenges the concept of the personal body and individual borders. In this regard, we claim that taking care of soils coincides with a progressive intensification of the immanent connectivity between humans and non-humans (Sullivan, 2010; Puig de la Bellacasa, 2017). Soil, far from being the background of actors' agency, took an active meaning in the scientific explanation of the disease (Sofa *et al.* 2014, Xiloyannis *et al.* 2015). Puglia's olive monocrop landscape has required care due to the extensive use of herbicide and chemical fertilizers over the last fifty years. The disease caused by *Xf* questions these common agricultural practices, as well as the relations between the care for soil, trees, insects, and human health<sup>6</sup>. Relations between soil, human activities, and non-human behaviour thus become an urgent question for Salento's futures<sup>7</sup>. While we are writing, billions of tons of olive tree carcasses are brought to burn into biomass power plants in other regions. This great displacement of 'dead materials' must actually be seen as a 'theft' of thousands of tons of organic matter from the land that created it, a

great amount of nutrients that the trees assimilated for years and could have fed back into the soil. Soil is the network of circulation between life and death (Thacker 2005, Parikka 2007 e Barker 2014), where all possible connections are in becoming.

FROM 'PEST' TO 'VECTOR': THE INVISIBLE LIFE STORY OF THE SPITTLEBUG  
*PHILAEENUS SPUMARIUS*

Early writers ascribed the origin of the spittle masses to the cuckoo bird and the name cuckoo spittle is still seen in the European literature. Gowk's spittle, frog spit, toad spit, snakes' spit, witches' spit, and wood sear have all been applied to the foam. The insect is known variously as a spittlebug, a froth hopper or froth fly, a foam cicada, a foam worm, or a locust flea. So common in Europe is the spittlebug that two of its favorite hosts take their common names from its presence. *Silene infata* is known as the spatling poppy, and the Swiss call *Cardamine pratense*, Weisenschaumkraut, the meadow foam plant. One early writer even catalogued plants as to their ability to produce, as he believed, the spittle masses.

(Weaver and King 1954, p.5)

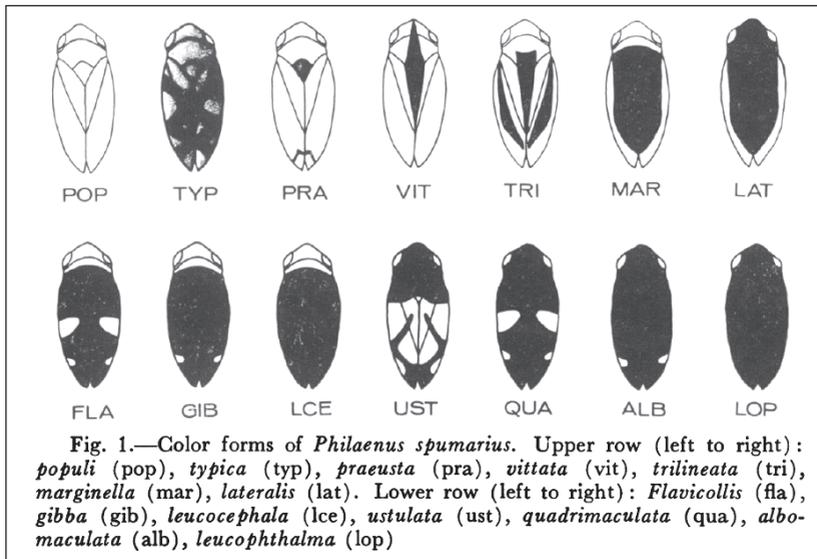


Figure 1. Color forms of *Philaenus spumarius*. Source: *ibid*, p. 12.

The spittlebug firstly appears in the Linnaeus' taxonomy with the name of *Cicada Spumaria* (1767 p. 708). Its name comes from the characteristic foam that forms as protection for the growing nymph when its eggs hatch. The nymph state is the most characteristic and easily identifiable. The foam then gives rise to the adult insect, between five and seven millimetres in size. Due to its great variety of colours and worldwide diffusion, a large number of varietal names have been proposed<sup>8</sup>. Even though the meadow spittlebug has been reported in Europe, Asia, Africa, Japan, North and South America, little emphasis has been placed upon its position as a noxious pest. Like many other meadow insects, it initially received scant attention because of the nature of its attack, which is harmless to valuable crops.

Around the second half of the 19th century, US entomologists began to assess its potential role as a 'pest'. Herbert Osborn, who devoted much of his research to the insects of the meadow lands, was among the first to consider the possible threats of *Philaenus*, although he gave little attention to the insect in his research. Only in the late 1940s, researchers such as T.H. Parks (1948) began to receive letter inquiries concerning the insects, thus stimulating further research. Indeed, Parks' subsequent work focused on the use of insecticides (Parks 1953). Hence, for the first time, the identity of *Philaenus* was built around its activities as a 'pest' on legumes and strawberries.

In the following decades, the Finnish researcher Olli Hakka continued to research *Philaenus*, focusing on the relationship between the species' geographic range and polymorphism. After isolating the six most important genes for colour reproduction (Hakka *et al.* 1966), Hakka related the occurrence of certain genes to geographical and additional local factors, such as the plants on which *Philaenus* feeds. Whittaker confirmed these hypotheses in the English population of *Philaenus*, stating that 'the evidence suggests that at least a part of the variation of *Philaenus spumarius* may be ecologically as well as genetically determined' (Whittaker 1968, p. 109). In sum, its capacity to build strong ecological relations led to the insect's fast adaptation and epigenetic becoming. In some ways, Hakka returned to the initial concern generated by the great genetic polymorphism of the *Philaenus*, which is that of nomenclature. This is relevant for us because the *Philaenus*' polymorphism was a reflection of the insect's strong ties with the surrounding environment, something that led researchers to a geographical and taxonomic confusion. Attempts to resolve the dispute about which insect Linnaeus was referring to when he spoke of *Cicada spumaria*, led in 1961, to the International Commission of Zoological Nomenclature deciding that *P. spumarius* was the species' only valid scientific name (Yurtsever 2000).

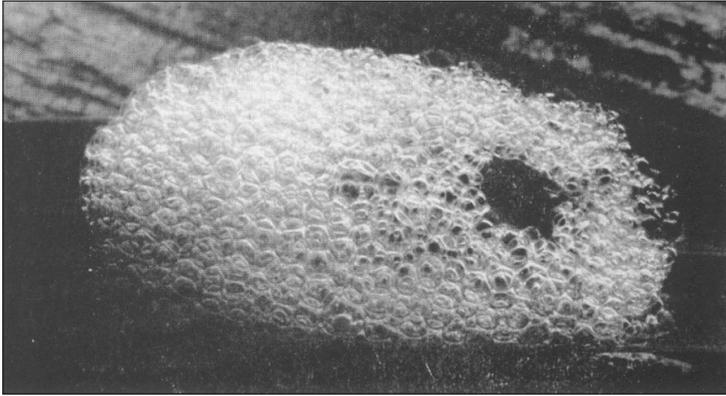


Figure 2. The characteristic foam of *Philaenus Spumarius*.

Source: Thompson and Halkka 1973, p. 348.

Studies from Hakka onwards seemed to have lost interest on *Philaenus* as a ‘pest’, focusing instead on its evolutionary biology (Drosopoulos and Remane 2000, Yurtsever 2000).

When, at the end of 2013, the presence of *Xf* was confirmed in Salento (Saponari 2013), *Philaenus* was an ‘illustrious unknown’. In 2014, its role as a vector was confirmed (Saponari 2014), renewing interest in this tiny insect.

*Philaenus* transmits *Xf* because it feeds on xylem, the fluid within woody plants that carries nutrients and where *Xf* itself proliferates. As researchers began to catch up with the existing literature on *Philaenus*, they identified ‘areas of ignorance’ requiring further research in order to build a containment policy. Given the impossibility of eradicating a bacterium like *Xf*, the objective of containment policies immediately becomes that of eliminating, or ‘controlling’, the vector<sup>9</sup>. The areas of greatest ignorance were those related to phenology (the relationships between climatic factors (temperature, humidity, photoperiod) and *Philaenus*’ development stages) and movement (Cornara, Bosco, Fereres, 2018). Research around movement is particularly interesting for this paper, for two reasons: firstly, because *Philaenus*’ movement inspires all subsequent *Xf* containment policies; and secondly, because thinking about *Philaenus*’ movement suggests something about its relationship with the environment of Salento, including the human population.

Prior to identifying *Philaenus* as a vector of *Xf*, literature on the insect’s movement was limited. While Weaver and King (1954) had identified the movement

of *Philaenus* as a maximum of 30 metres per single ‘flight’ and 100 meters per 24 hours, Freeman (1945) suggests that it may travel longer distances, sustained by wind or passive dispersal. This migratory character is fundamental to understanding the biological success of *Philaenus*: through movement and migration it has arrived in areas where it did not previously live, finding suitable environments for its survival and proliferation. As with many other species, one of the most effective means of transport is human beings and the materials they mobilise. Just as *Philaenus* had managed to arrive on the American continent as overwintering eggs in straw stubble (Whittaker 1973 in Cornara *et al.* 2018), so it is also characterized for its ability to ‘hitchhike’ (as noticed by Bosco, in Cornara *et al.* 2018). It is hard to quantify how much these movements are responsible for the proliferation of the bacterium in a biosecurity regime<sup>10</sup>. However, the regional government of Apulia adopted the European Decision 2015/789: a series of containment policies that identify the hypothetical figure of 100m as the maximum movement of an adult *Philaenus*. This was a very approximate figure and hardly the result of scientific investigation<sup>11</sup>. This became socially relevant because the legislation now requires the elimination of all host

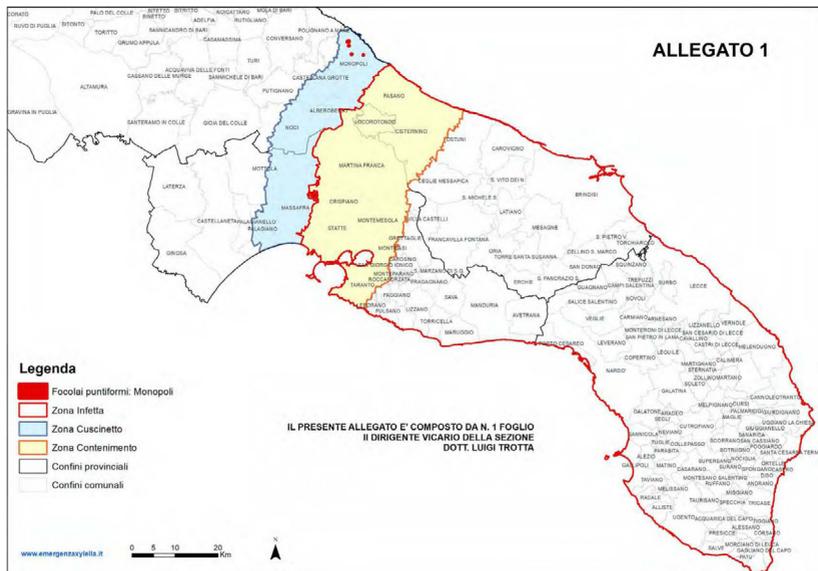


Figure 3. The last demarcation took place in Salento, November 2020.

Source: Annex 1. Regional Decision n 157 of 12/11/2020: 75269 of Regione Puglia, Dipartimento Agricoltura, Sviluppo rurale e tutela dell'ambiente, Sezione Agricoltura, Servizio Osservatorio Fitosanitario, 3 novembre 2020.

plants within a 100-metre radius of a plant found, via a PCR test, to be infected with *Xf*. This has led to the forced removal of hundreds of olive trees, without this practice having any real effect on containing the *Xf*'s proliferation (Bassi, Morelli, Salamini 2016). Organising containment around the identification of infection zones is made particularly problematic if we consider the vector to be a professional migrant.

Biosecurity policies have led to a progressive proliferation of borders, blanket monitoring of infected plants, and mandatory vector eradication measures in the containment and buffer zones (ochre and blue respectively in the latest mapping produced by the regional institutions, Fig. 3). Since 2015, these zones have inexorably advanced in space, encompassing territory further north. Yet, scientific research only recently moved on to looking at *Philaenus*' eating habits and, most recently, the physiology of its transmission of *Xf*. Some of the researchers' hypotheses contrast with institutional attempts at 'creating borders'. In the latest paper by Cornara and Fereres (2020) the behaviour of *Xf*-infected spittlebugs in fact suggests that the *Xf* bacterium is pathological for the spittlebug itself, colonising its head, stomach, and food canal. The disease is spread between different entities and does not reflect the institutional interpretation that the community should only be concerned about the olive trees' depletion, whereas the environment itself steps into a new different phase of interconnectedness.

From a personal conversation with Daniele Cornara, an entomologist who took part in the scientific committee set up by the Ministry of Agricultural Food and Forestry Policies, we learned that knowledge around *Philaenus* is not actually consistent enough to sustain a containment policy. For Cornara, the knowledge produced was general and even abstract, little more than a 'mere curiosity' (Cornara Daniele, 26/02/2021, personal conversation). For Cornara, a different approach must be embraced to obtain consistent results. This deeper, ongoing research consists of considering *Philaenus* inside a web of relations, made not only of the spittlebug-olive tree relation inside the laboratories, but of a much wider complex of exchanges on an actual open field<sup>12</sup>.

The pathogen's proliferation shows how theoretical divisions and compartmentalisations are, when relied on in practice, purely ideological. Understanding *Xf*, *Philaenus*, and the olive trees as a connected whole has important implications given how thoroughly the contaminated cicada's physiological behaviour responds to its environment. *Xylella* trespasses other species' vital spaces, first the stomach and the head of the *Philaenus* spittlebug and then the 'veins' of the olive tree, in a chain that humans have not yet managed to break. Conceiving

of QODS requires an ecology of illness that can retrace the connections that keep together the multiple entities involved (Thacker 2005). Considering the ‘illness’ as a connection places *Philaenus* on the actual open field. The cicada’s behaviour and impact on the environment may thus be retraced in real exchange and border-blurring processes within the surrounding environment. It is meaningful to think about *Philaenus*’ attraction for green and juicy olive leaves. The olive trees are well known for their floridity and extreme vegetative capacity, but when *Philaenus* arrived in Salento, they also were the most prevalent vegetable species in the landscape to provide the greatest amount of flourishing green leaves. The massive presence of only one species (olive trees), the lack of good management of the fields, abandonment, and wrong soil-care, created the environmental circumstances for *Philaenus*’ uncontrolled diffusion. For Cornara (personal conversation, 26/02/2021), even the specificities of the local weed wild flora favoured the cicada’s reproduction.

*Philaenus*’ change of behaviour is related to soils as well as to the plant biodiversity in the fields. Research has shown that the spittlebug vomits a few minutes after eating the olive leaves, as a sign of distaste (Cornara 2020). Following Cornara, this brings us to think that the *Philaenus* wouldn’t have a predilection for olive trees if they weren’t so prominent in its environment. When the spittlebug vomits, the transmission of *Xf* from the *Philaenus* and the olive trees is at its edge; vomit is the mode of interspecies proliferation of *Xf*. Insecticides stimulate even more vomit for the *Philaenus*: the enforcement of the containment policies would strongly induce the vomit wherever they are implemented (Cornara, 2020). Within this ecology, the pervasiveness of illness is configured through bodies and by viscosity: *Xf* slowly kills the *Philaenus*, colonising the exoskeleton, but working on the other organs, such as the insect’s head, stomach, and food canal, where *Xf* induces the propagating vomit.

This vomit is an example of the ‘complex exchanges’ that we call ‘visceral ecology’. Visceral ecology makes us question the current practical capacity for humans to understand behaviours and processes in microscopic non-human worlds. In particular, visceral ecology and the *Philaenus*’ vomit demonstrate how superficial the conception of ecology within the vision of the containment policies has been. The visceral ecology of hosts, vector, and pathogens’ relations empowers the idea of all actors’ interdependence: it also bonds new connections with humans, plants, and soil. Borderlands thus emerge between human and non-human entities, and allow us to understand the becoming-together of specific actors into wider circumstances. Following these assumptions, containment policies appear as superficial and anthropocentric control strategies, which do not limit contagion, and even worsen the environmental conditions of the area.

FROM BEHAVIOUR TO SOILS: THE MICRO-BIOTAL DRIVE

Visceral connections in and through the landscape show how the taxonomies of biosecitarian paradigms melt, in this case, into each other. Considered not just as host and vector, but also ill and hunt at the same time, *Philaenus* comes to describe the interdependence of ecological relations in the olive-trees landscapes of Salento. *Philaenus* was, under the biosecitarian strategies, the sole focus of *Xf* containment policies, whilst being the one element that could have illuminated the whole ecology of illness. Viscerality makes ecological ties material, specifically addressing the interconnectedness of exchanges between entities, like fluids, micro-organisms, and bacteria, and substances such as vomit, feces, and everything that passes through the body. The materiality of the ecology of illness, as exemplified by the *Philaenus*, finds an outstanding display of the dynamics that take place in the soil, where the core driving principle is intertwining exchanges and competition of vital substances between different entities and species. Soil, as a borderland, is the place of visceral relations and interconnectedness.

The profound proximity between viscerality and soils has been retraced here following the illness and the condition that *Xf* produces in different environmental entities. Yet, in the web of connection that makes soils the most salient expression of viscerality, what is the role humans play? We answer this question with ethnographic insights into Antonio's healing in Cape Leuca. We will be thinking of the vital role played by humans in either blurring or exacerbating borders between species. Again, illness is the figure that allows us to glimpse the viscerality of ecological relations, here meaning humans and non-humans negotiating each other's health with the entrails of their bodies, their waste, and leftovers. One element regarding viscerality, soils, and humans emerges from these events, with particular importance in multispecies relations and borders: care.

Care is a necessary practice, a life-sustaining activity, an everyday constraint. '[... It] is the affirmation of the centrality of a series of vital activities to the everyday "sustainability of life", that has been historically associated with women's lives' (Carrasco 2001, in Puig de la Bellacasa (2017) p.160–161).

Human lack of care for soils in Salento, worsened *Philaenus*' attacks on the olive leaves, making it easier for *Xf* to spread. However, attempts to help the olive trees directly, were completely absent in the institutional vision. Local people organized in associations and social movements against the institutional approach to the olive trees' disease, focusing instead on the soil's health and vital

resources. Doing so, meant re-elaborating with care the relationship not only between the olive trees and the soils beneath, but also with the wider complex of micro-organisms, fungi, and 'good' bacteria inhabiting the environment<sup>13</sup>.

It was while looking for soil practitioners in 2018 that we met Antonio, a traditional oil miller in Capo Leuca, the southeast end of Salento. As a young man, around thirty years ago, he was diagnosed with rectal ulcerative colitis, a severe pathology of the rectus in the intestine. It is a very serious disease, whose progression may lead to greater harm, such as cancer or a higher probability of contracting Crohn's disease. In itself, rectal ulcerative colitis is highly debilitating and is considered chronic: there is no cure, and physicians can only try to alleviate it with the correct management. Antonio, as a student in medicine, was aware of his clinical situation, and decided to leave university when things got worse. Things changed in 2000, when he opened the old stone oil mill in the small village of Gemini, with a group of friends. In his words:

I started overusing olive oil. Well, the ulcerous colitis disappeared. It is ten years now that I have not taken any medicine for the ulcerous colitis. I did everything, I did the colonoscopies. There is nothing there anymore. I don't know... then some journals were referring to the recto ulcerous colitis, saying that extra-virgin olive oil heals this disease. I found out about it later. But I noticed it. (Gemini, 18/07/2021)

Antonio's was introduced to us as a good friend by Roberto Polo, one of the most prominent soil-regeneration practitioners of the area, and his mill is particularly well known because of the uncommon techniques he practices to press the olives. Antonio has the best reputation because his techniques try to retain in the most respectful way the features of organic olives. The amazingly green olive oil he produces has a particular taste, smell, and colour. The reason for this is the giant stone wheel Antonio uses, that breaks the olives so slowly and gently that it becomes, in Antonio's words, 'different – healthier'<sup>14</sup>. The point is, for Antonio, that 'something that is done in 4 hours cannot be compared to something done in 15 minutes'. He refers to the fact that the giant stone wheel of his mill breaks the olives at low temperatures, requiring nonetheless a certain amount of hours. At the micro-biological level, the stone wheel is an essential part of the process that draws more on the natural qualities of the olives than modern techniques do. Because the slow and gentle movement of the stone is capable of not breaking most of the healthy molecules, Antonio and his colleagues can affirm that their oil is different. As Antonio pointed out, the effect of extra-virgin olive oil on the intestine is particularly beneficial to

the microbiome inside our organism (Prieto *et al.* 2018). The microbiome is not only present in our intestine, but also is one of the fundamental pillars of life as we know it: soils are communities of microbiomes, which is, in turn, a community of microorganisms. For this reason, soil has been elsewhere defined as an open-air intestine (Milazzo 2019). The communities of millions of microorganisms in the intestine resemble those living in the soils: some are even the same, ingested with meals and water. Nonetheless, Antonio is very thoughtful about attributing his healing process to the sole consumption of this particular extra virgin olive oil, even if he truly believes that the stone-cold press preserves the connection between the olives and the soil microbiome:

Clearly, we cannot ascribe everything [the healing] to the olive oil. We would enter fields where the discourse gets wider and we would have to demonstrate what we are saying. I can think it, I can believe it, but from here to demonstrate it... There is somebody who would counter back our thesis. They tell you that you have changed life, activity and they dismantle the thesis. How could you demonstrate something like that? But I say so because it is so. They don't know... I didn't know either. Besides, we chose that way because we believed in something, we did know something. (Gemini, 18/07/2021)

What Antonio and his family and friends did believe had to do with their awareness of decades of chemical abuses on the land. The poor condition of the soils has been embraced as a shared community experience, where chemical contamination and environmental degradation risk breaking the narrative directly connecting the healthiness of the soils with that of the body. This common understanding finds particular salience in food production and consumption because as a fundamental social driver, food in south Salento is considered worthy and of good quality if it provides nutrients, energy, and respects the richness in biodiversity as expected from a Mediterranean diet (Sutton 2001). To be so, it often has to be homemade, traditionally grown, and harvested nearby (Seremetakis 1994). But most of all, food must enhance the healthiness of the body (Harris 1985; Montanari 2010). It is surprising, we believe, how such a subjective feeling of healthiness can so easily become the basis for a community to develop a shared sensation and knowledge. This kind of shared sensorial knowledge connects one's own material conscience with one's intestines. Through food, the microbiome in the guts is connected to the soils – where food is picked and farmed. These links bring soil microorganisms inside our very body, where they join our own intestine's floral population, which represents micro-entities of already-embodied alterity (Aguilera and Harvey 2018). The concept of soil-intestine interrogates how bodily sensations

of food and environmental health connect with most recent scientific findings about the microbiome. Some of our interlocutors, including Antonio's friends, even recalled some 'experts' suggesting that the importance of the population of microorganisms is such that it directs our actions and thoughts more than our brain. Yet, the tension we want to underline, drawing on another interview with Antonio, is how the way soils are cared for, worked and fed becomes relevant for a community.

Before, the kids were careful because their parents instructed them on this, when the donkeys, horses, cows and oxen passed by, they went to the countryside to plough they went to collect manure from the roads. As soon as the horse was passing by, immediately they ran, how precious it was. The manure was more precious than bread. Then all the organic matter... or even before... I'm saying things that are also disgusting, but there was no sewer, no drains... in the bathroom you went in a 'buccichiattolo' [a little hole in the pavement]. I remember my father went early in the morning in the pit with my mother, and with the hoe removed all this manure and took it to the country and, oh! I mean who knew of the existence of chemical fertilizers? [...]

60 years ago people did not die of cancer, or rather they died of cancer and did not know it. Then they didn't associate the diseases, today we know much more. And in any case, it is a fact that there was not all this pollution, there were no electromagnetic waves, there was no trash... (Gemini, 05/03/2021)

In Salento, the food-soils relation perceived as healthy acquired a specific meaning in relation to traditional ways of farming, free of chemicals. Labelled as '*genuine*', these traditional ways of farming deployed a particular care upon the soils, something that is now being called back into action in the attempt to save the olive trees attacked by *Xf*. Producing food and feeding the soils is not a neutral action, in this view (Puig de la Bellacasa 2017). Thinking-with the soils implies practicing with care: the inter-specific food chains, that include micro-organisms and insects as much as human actions, embed materialistic relationships from which a political ecology of entrails takes shape. We call visceral ecology the compenetration and intermingling of embodied matter within the environment (Abrahamsson and Bertoni 2014).

VISCERAL ECOLOGIES MATTER: SOIL MATERIALISMS IN POST-XYLELLA PRACTICES OF CARE.

In order to argue the materiality of visceral ecology, exemplified by the relationship between soils, plants, food and intestines, we engage with Puig de la Bellacasa's understanding of soil care. Care as a practical concept is too important to leave to the reductions of hegemonic ethics. Rather, its meanings must be debated, unpacked, and re-enacted in implicated ways that respond to the present (Puig de la Bellacasa 2017, p.10). As Puig de la Bellacasa wonderfully expressed it:

This requires taking part in the ongoing, complex, and elusive task of reclaiming care not from its impurities but rather from tendencies to smooth out its asperities – whether by idealizing or denigrating it<sup>15</sup>.

Puig de la Bellacasa engages with the ecofeminist literature that has extensively addressed the issue of care work (Mies and Shiva 1993, Shiva 1989, Haraway 1991, Federici 2020, Barca 2020) and how it is fundamental to reproducing society's productive needs, and thus is always kept 'cheap', or even free (Moore, 2017). With the emergence of environmental issues that we have been warned about over the last two decades, like desertification, loss of biodiversity and soil erosion, the debate and 'the question' of care has broadened. Now the care-matter includes the understanding of relationships with beings other than human, and how humans care for the environment – how they conceive of their actions. The trajectory of Puig de la Bellacasa's work intercepts the special interests of this paper: she has studied both human-soil relations and soil sciences (Puig de la Bellacasa 2013, 2015, 2019).

The soil-oriented responses to the problem of *Xf* are today one of the few efforts that local farmers feel is worth trying. This is particularly relevant in light of a number of professed 'magical' and often costly solutions to the disease. Nonetheless, the official guidelines on *Xylella* emergency management do not consider nor mention the need to extensively care for soils. Probably, the fact that soil-regeneration practices have been considered as 'worth-a-try' methods during all these years, is linked with the ability of soil care to be a real breakthrough in this field of research. Caring for soil takes places in wide ecological equilibria and cycles, that in this case are not specifically aimed at eradicating bacteria from the plants, but rather rely on the common view that an organism such as the olive tree can be considered healthy only inside a healthy environment. Biodiversity is thus considered the indicator of health, understood not only in terms of plant diversity, but also in terms of insects and

most importantly soil's microorganisms (Berendsen *et al.* 2012).

The impossibility of acting in specific ways against the bacteria *Xf* or the spittlebug, did not stop the stakeholders from taking steps, both practical and intellectual, to counter the unfolding environmental depletion. Firstly, local communities connected the need to extensively care for the soils with efforts to equilibrate and stabilize the wider environment's immunity. Secondly, the scientific community became aware of the need to place the *Philaenus* inside a web of relationships in actual environments, drawing from diverse disciplines outside entomology. These processes suggest that a specific problem can be better addressed with a wider focus – in this case, by turning towards larger insect-socio-botanic interactions in the soils. Our reflection turns in conclusion to how sensory-based and experiential awareness overlaps with scientific thinking and research (Paxson 2013). Though in the public sphere there are many occasions of distress between the permaculture community and scientists, including around *Xylella*, the relationship is also growing into rare but valuable trust-worthy exchanges between scientific insights and embodied knowledge.

#### CONCLUSION

In this article, we have considered the proliferation of the *Xf* bacterium in Apulia and its containment policies. Starting from the research produced around the pathology *Xf* induces in olive trees, we considered the links that bind different entities in a territory, and that here manifest as pathological. Knowledge that is absent from biosecurity policies turns out to be important to thinking about the 'vital metabolic relation' (Bertoni 2013, p. 73) that exists between the actors in this ecology of disease. We proposed the term 'visceral' to interpret the relations between bacteria, spittlebug, xylem of the tree, humans, and soil. This term allows us to underline a series of features. First, the adjective 'visceral' helps us dissolve boundaries between bodies: biochemical and metabolic processes merge together many different entities (Coccia, 2018). The human as well as the animal body thus become the subject of materialist attention (Dolphijn *et al.* 2012) that embraces the physical and biochemical properties of matter itself<sup>16</sup>.

Secondly, the term 'visceral' allows us to focus on soil as a manifestation of this exchange, where various actors' practices of existence are mixed up in its design. Eating, vomiting, and defecating, are intricate, asymmetrical activities that have direct consequences for soil production. The spittlebug's life is intimately interlaced with the soil, not only because it feeds on the xylem, which runs from the crown of the tree to the roots and vice versa, or because soil

makes Philaenus' life possible, but because of the 'dangerous' relationship it establishes and literally embodies.

Finally, the soil allows us to link to Salento's rural material history and its vibrant matter to post-*Xf* planning. In regard to the olive trees' depletion, the soil has indeed been the focus of some recovering practices – even though there is as yet no remedial effect. Politics of soil-care are rooted everywhere in Salientian people's material history. What many astute observers and witnesses notice is that Salento's land was made of stone: after the stones were torn from the ground, with immense effort, you would find yourself with lifeless soil, or no soil at all. Farmers had to create it, literally, anew. As the poet Tommaso Fiore wrote in his letters to Piero Gobetti about the Murge, another Apulian land whose stony terrain resembles Salento's: 'I think that this – the tearing up of the stone-ground – masterwork would have frightened a giant's people [...]. And it didn't take less than the laboriousness of a people of ants' (Fiore, 1952). What about Antonio's parents, every week moving the family's precious feces from the sinkhole – what we nowadays call a 'compost toilet' – to the dunghill in the fields? Let us sit with the image of Antonio as a child running behind the donkeys and the horses when they passed through the streets of his village, to collect the feces of the animals before the other children<sup>17</sup>.

We acknowledge the land-creating process as more semantic than scientifically accurate, but only to the extent that we recognise how historical materialism's focus on material needs and economic behaviours bonds with the visceral condition of the body – *my body, your body and the body of the world* (Taussig 2020, p. 189). The necessity to stone the land in order to make farmland is the ant-like work that places this community's cosmos and spirituality on and inside the soils. Soils must be understood as the emblem of farmers' work in Salento, even before the olive trees. These exchanges (material and symbolic) provide us with a tool for describing the movement from the social to the biological, from the material to the 'spiritual', to sense how today, in Salento, a political vision of soils becomes a cosmological fact for the future. The importance of soil care is in the human body's condition and visceral becoming, as health, intestine and olive-oil ecology unfold in Antonio's biography.

#### NOTES

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- 3 This text is the result of a joint reflection, each author having contributed equally to the article.
- 4 Of course, the movement of plants due to the international nursery market – especially concerning ornamental ones – have a major role in the proliferation of this bacteria, and in its hybridization. We could consider it a feral biology following the work of Anna Tsing (2015).
- 5 The main research's field is also known as Finibus Terrae (latin for 'the land at the end'). Ancient history frames Salento and especially Capo Leuca as a borderland, meeting and mixing point of different Mediterranean cultures. This is from time to time recalled in informal conversation between common people about Xylella, which lands in Salento from Costa Rica, in the other part of the world.
- 6 Mansfield (2008) speaks of 'Health as a nature-society question', echoing Guattari's suggestions in 'The Three Ecologies' (1989 – ed. 2000).
- 7 For instance, the last report from Lilt (the italian league of cancer disease) highlights an increase of cancer in the region. According to the center of Lilt in Lecce this is partly caused by the presence of harmful substances in the soil. For this reason a project called 'Geneo' ([http://www.geneosalento.it/dss/index.php\\_Last\\_consultation\\_23/08/2021](http://www.geneosalento.it/dss/index.php_Last_consultation_23/08/2021)) was founded, in order to connect cancer to the pollutants presence in the soil.
- 8 In the different nomenclatures of Linnaeus (1746, 1758), Fabricius (1775), Fallen (1805), Germar (1821) Westwood (1840) Stal (1864), Horvath (1898), Kirkaldy (1906), Haupt (1917), Van Du'zee (1917), Schumacher (1919), Jacobı (1921), Regmer (1936), Lallemand (1949), and Ossiannilsson (1950) *Philaenus* adopted about 40 different names (Weaver and King 1954).

- 9 The spittlebugs *Neophilaenus campestris* and *Philaenus italosignus* have been found to transmit *X. fastidiosa* to olive and other plants under experimental conditions, although less efficiently than *P. spumarius* (Cavaliere *et al.* 2019)
- 10 Note that *Xylella* symptomatology is only noticeable when it is present to a certain extent within the tree, one inoculation is not enough.
- 11 This is the result of an estimate made by the Efsa in 2013 (EFSA Journal 2013; 11(11):3468), which incorporates the same research we are citing in this paragraph. It is not the result of any further experiment or scientific paper.
- 12 Unsurprisingly, a series of seminars entitled ‘Political Entomologies’ has recently been proposed by the Department of Geography at Cambridge and Berlin’s Freie Universität. Seminars propose different research paths to look at matter, politics and economics through the lives of insects.
- 13 In relation to *xylella* and fungi presence in Puglia’s soils see Carlucci *et al.* (2013).
- 14 We believe the following article to be the one Antonio mentions in the quoted conversation: S. Sánchez-Fidalgo *et al.*, 2010, ‘Extra-virgin olive oil-enriched diet modulates DSS-colitis-associated colon carcinogenesis in mice’ in *Clinical Nutrition*, n. 29, pp.663–673.
- 14 Puig de la Bellacasa 2017, quote on page 11.
- 16 We share with Heyes Conroy Allison and Jessica the idea of the visceral, and its implication in political ecology. We likewise believe that our attempt is more reasoned around the case we find ourselves living and studying: less methodological and more grounded.
- 17 For a drafted cultural history of poop, consider reading McGlotten, Shaka and Weibel Scott. 2016. ‘Poop Worlds: Material Culture and Copropower (or, Toward a Shitty Turn)’ *The Scholar & Feminist Online* 13(3):1–14.

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