What is the worth of an olive tree?
Political ontology and epistemic conflicts in the case of *Xylella fastidiosa* epidemic in Apulia, Southern Italy

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ANT	Actor-Network-Theory
CAP	Common Agricultural Policy
CNR	Centro Nazionale delle Ricerche (National Research Council)
CoDiRO	Complesso del Disseccamento Rapido dell'Olivo
COSATE	Comitato per la Salvaguardia dell'Ambiente e del Territorio della Valle d'Itria
EFSA	European Food Security Agency
EU	European Union
OQDS	Olive Quick Decline Syndrome
STS	Science and Technology Studies

Abstract

In the past few years, a very serious agricultural pest epidemic has affected the southern Italian territory of Apulia, with thousands of olive trees dried out and a whole economic sector put seriously under threat. Despite having being framed mainly as a technical problem, related to the spread of a quarantine pathogen for which there is no cure known as *Xylella fastidiosa*, this paper aims at offering a rather socio-anthropological study of the outbreak, re-framing the debate in its more political terms. What does such an agricultural emergency implies for the whole agricultural model, and how does that affect subjectivities, emotions and identities of the local people in the area? Indeed, beside its economic value, olive trees express in that region a deep feeling of connection with nature and the territory, and therefore such a threat represents at the same time a threat to the history, the identity, and the landscape of a whole community. By using ethnographic material, combined with semi-structured and narrative interviews as well as the analysis of secondary data, the paper shows how each actor involved expresses a different ontological understanding of the olive tree as an entity, making use of different languages of valuation and expressing a different relationship with the surrounding nature and the environment.

Relevance to Development Studies

This research is located within the broad context of critical agrarian studies and political ecology. It goes back to the never ending Marxist debate around the development of economic and productive forces in the countryside known as the agrarian question: what is the role played by agriculture and natural resources exploitation in economic development? And what are the environmental and social consequences of capital penetration in the countryside? This is especially important in an historical epoch such as the Anthropocene, where the impact of human activity on the planet has become so high that life on earth is starting to be considered potentially under threat. Rising concerns around climate change, environmental degradation, and ecological destruction ask for a new conceptual tools which allows to rebuild collective meanings in order to learn the “art of living in a damaged planet” (Tsing et al. 2017). Specifically, what I bring to the front here is the need to overcome the human-nonhuman duality which lays at the core of Cartesian rationality and contend that meaningful sustainable development can only be achieved if we abandon ethnocentric and antropocentric positions and start to respect nature (which also means: us) and co-produce the world we want to live in together with other species.

Keywords:

Olive trees, Landscapes, *Xylella fastidiosa*, Actor-Network-Theory, Environmental humanities

"In the 1990s, just as I was becoming aware of my social, political, and ecological surroundings, salmon runs hit all-time lows, and fishing seasons were cancelled. The situation was so dire that several salmon populations hovered on the brink of extinction. Soon, several kinds of salmon – once our town's staple – were listed under the federal Endangered Species Act. It is hard to capture the sense of emergency that these fish declines provoked. Salmon were not just an economic resource; they were the stuff of our lives. Hardly a day passed when the town's newspaper did not have a story about the waning numbers of the fish. Although almost everyone agreed that we needed to "save the salmon" in order to revitalize our region, no one could agree on what to do. A big part of the problem, we soon realized, was that there was no consensus about what should be "saved" – and no consensus about what counted as a salmon" (Swanson 2013:2-3)

Chapter 1
Introduction

"Look, it's a disaster". Giuseppe points at some of the olive trees located in a field adjacent to the road, while we drive towards one of his olive orchards in the surroundings of Oria, a small town in the southern Italian region of Apulia. Indeed, from having a quick look at them, they don't seem to have the ordinary luxuriant and verdant appearance with which olive trees usually look back at distracted visitors like me all year round: with some of the branches completely withered, while others still in vegetation, they show an unusual spotty leopard dress which they never wore in their whole centuries-old life. "We can only hope that they will find a treatment… other than that now it's too late, it's not gonna stop".

Giuseppe is an olive farmer from three generations. Sixty years-old now, he owns almost a hundred hectares of olive trees orchards distributed over the districts of Lecce, Brindisi and Taranto, the southernmost districts of the region. "I really don't know what to do", he says while telling me his story, "this morning while I was doing some treatments I've realized that *Coratina* has been hit, *Cima di Melfi* has been hit, *Lezza* has been hit… only *Leccino* is still resisting, but in three years I expect nothing will be left". He is referring to some of the different varieties of trees present in his orchard: in Italy, the most biodiverse country in terms of olive cultivars, we can find more than five hundred different varieties, equal to around 40% of all those known globally (Magni 2017).

What we are discussing about is something that for many olive farmers of the region, for some years now, has become the daily source of trouble and concern: the symptoms of a disease called *Complesso del Disseccamento Rapido dell'Olivo* (CoDiRO) – Olive Quick Decline Syndrome (OQDS) in its English translation. CoDiRO started to show its first symptoms around 2013 in the countryside of Gallipoli, on the southern-west coast of the Lecce district, and spread unexpectedly fast over the territory causing a massive change in what was, for a local like me, the familiar landscape. In a very short time, over vast areas of the heel of the Italian peninsula, the typical robust, magnificent and evergreen lush-foliage silhouettes of centenary olive trees stood aside and left their place to shrunken and skinny, dying trunks: clearings of dead bodies extending over many and many kilometers hit the eye of any human going across the area (see Figs. 8-9, Chapter 3).

Few kilometers north, in the town of Cisternino, the landscape is radically different: no sign of desiccation can be spotted at first sight, and florid tree crowns smile at me when I visit the site. Here, few months ago, Franca and other activists of the environmental association COSATE – Comitato per la Salvaguardia dell'Ambiente e del Territorio della Valle d'Itria – were carrying out a "permanent defense" (*presidio permanente*) around an olive tree which regional authorities wanted to eradicate after having assessed the presence, within his lymph, of the bacteria *Xylella fastidiosa*, considered by scientific and institutional authorities the main agent of the desiccation. "They came at night, police blocked the access roads to the site and forbade the person who was here to record anything. When we arrived, the tree had already been cut", she tells me when we meet on the "crime scene" in August, during my fieldwork.

Xylella fastidiosa is a quarantine pathogen classified as high risk by the European Food Safety Authority (EFSA) (EFSA 2015). Historically confined to the Americas (mainly Brazil, Costa Rica and southern California, but also Argentina and Mexico – see Map 1), where it is

endemic and associated with numerous diseases such as Pierce's disease in vineyards and various leaf scorch diseases which affect citrus and almond plantations, "in 2013 the pathogen was reported for the first time in the European Union (EU), on olive trees in the south of the Italian region of Apulia. Subsequent discoveries were made in the EU in Corsica, in the Provence-Alps-Cote d'Azur region in France as well as in the Autonomous region of Madrid, the province of Alicante and the Balearic Islands in Spain, Tuscany in Italy and Porto district in Portugal" (EFSA 2019:3).

In light of its dangerousness, with Decision 2015/789 European Commission deliberated on the emergency measures to implement in order to limit the further spread of the pathogen in the EU territory. The decision implied "establishing a demarcated area around infected areas with specific requirements associated with surveillance, plant removal and other management measures including agricultural practices to control vector populations" (ibid.). The most disputed measure was the "plant removal" one, namely the injunction of eradicating all trees which were found infected by the bacteria, plus all surrounding trees, *regardless of their health status*, within a radius of 100 meters around the infected plants. This is exactly what Franca and COSATE activists were trying to impede with their "permanent defense" in Cisternino. As we will see, they claim that "you don't die of Xylella" and believe that eradication is just a way to take advantage of the emergency in order to impose over the territory an industrial agricultural model (intensive and super-intensive monoculture) which does not fit into their view of environmentally sustainable future.

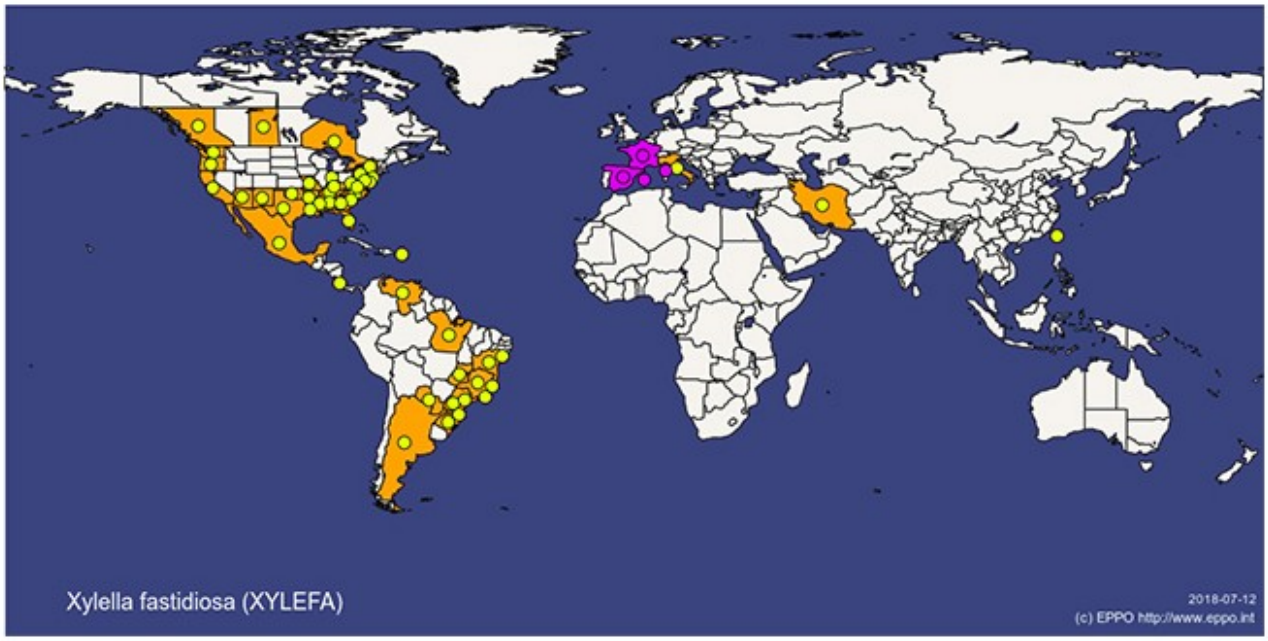
More details will be dispensed in the following chapters. Suffice it to say for now that following such resolution, with decree D.M. 4999/18 Italian government implemented a containment strategy which consisted in (1) the heavy use of pesticides (none of which allowed in regime of organic farming); (2) compulsory agronomic measures (such as ploughing) to eliminate weeds among the trees and in this way suppress nymphal stages of the insects which act as its vector; (3) the division of the Apulian territory in different demarcated areas. More precisely, Apulian territory has been divided in three different areas called *infected*, *containment* and *buffer* zone (Map 2). In the *infected zone,* the presence of the bacteria has been verified by molecular investigation methods but the infection is so spread that authorities gave up the ambition to remove the bacteria completely from the territory, and therefore no compulsory measures (either plant removal or pesticide use) apply. The *containment area*, conversely, it is the zone where most of the authorities' efforts are concentrated: it includes the last infected 20km up to the point where the last infected tree has been found. Here, eradication and compulsory agronomic measures are believed to be the most effective way for containing the spreading of the bacteria. At last, the *buffer zone* includes the neighbouring 10km of the containment zone, and is the uncontaminated part of the territory with the higher risk of further infection. As soon as one tree is found infected in the buffer zone, the containment zone moves up to that point, and the buffer zone shifts accordingly.

This research paper (RP) aims at locating such agricultural pest epidemic and the management strategy of the outbreak within the broader context of critical agrarian studies and political ecology. Secondly, it attempts to link such debates with discussions around the "agency of nature" and the "ontological turn" in social sciences (Escobar 2007), which typically speak to the fields of science and technology studies (STS), anthropology and environmental humanities. Focusing on the intimate relationship with olive trees, and on the mutual interdependence between human and non-human entities which characterizes the co-creation of landscapes as well as the production of livelihood sustaining agricultural products (eg. olive oil), the goal of this study is to provide some new tools for tackling "kinds of

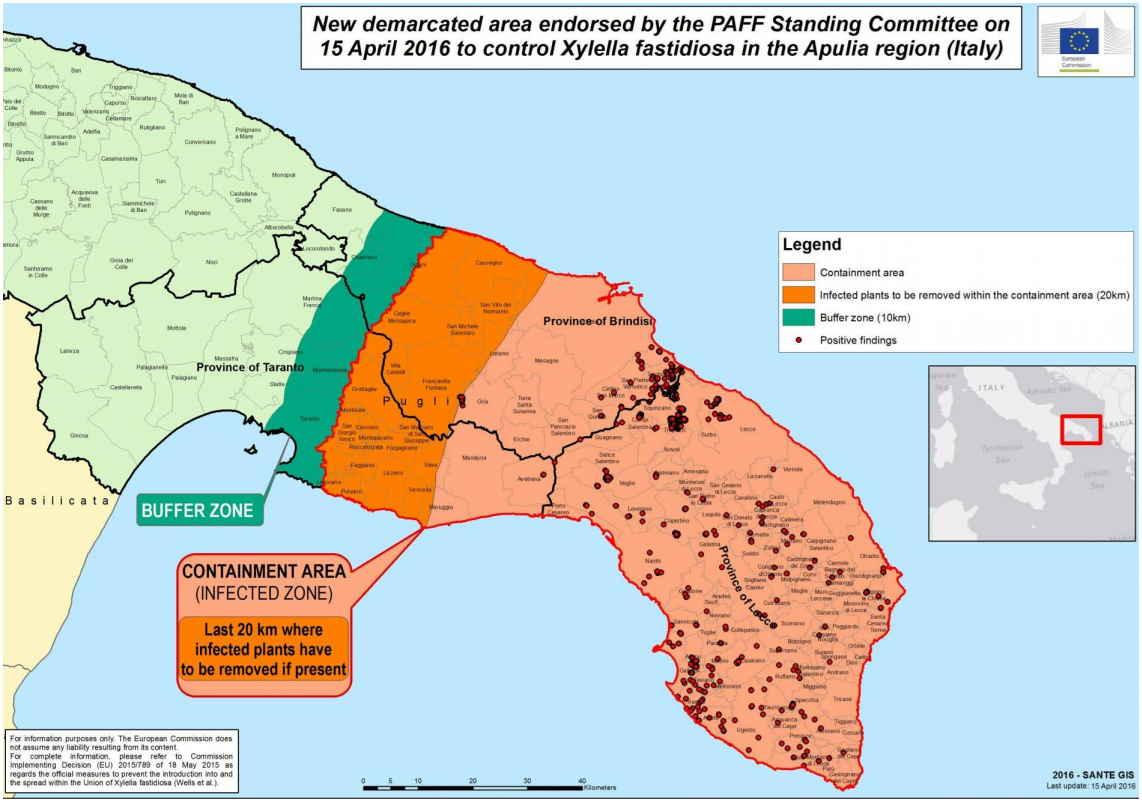
problems that are confronting us in the so-called Anthropocene—an epoch in which human and non-human kinds and futures have become so increasingly entangled that ethical and political problems can no longer be treated as exclusively human problems" (Kohn 2015:311).

As it will be shown, the conflict can be located within broader debates around the different views over the role of the countryside in the economy and society, and can be framed as a struggle for *epistemic* and *ontological autonomy* from the hegemonic neoclassical idea of economic development. More than that, the case reveals the coexistence of different ways of valuing the olive tree as an entity, different world-views which in Apulia have been coexisting for long time but now experience incompatible tensions and clashes due to the sensation of loss caused by the "blasted landscapes" (Tsing 2014) generated by such "feral biologies" (Tsing 2015a).

The quote which opens the RP resonates with the empirical evidences I collected from the field and resumes the main argument of my research: in Apulia everybody wants to save olive trees, but an univocal understanding of what has to be saved, namely what still counts as a viable olive tree, is lacking. Making sense of what is the value of an olive tree (even when it may be infected by the bacteria, or within the close radius of the disease), for whom and in light of which kind of ontological understanding of the world plays and important role in the bigger political project of creating "a world where many worlds fit" (Cadena and Blaser 2018), a safe space where alternatives which do not fit into the homogenizing and exploitative nature of western modernity can exist and flourish.



Map 1. Presence of *Xylella fastidiosa* in the world, according to the European Plant Protection Organization (EPPO) database. (Source: www.eppo.int)



Map 2. Demarcated areas following the pathogen spread containment strategy of Apulian government: the infected zone (*zona infetta*) in light red, the containment zone (*zona di contenimento*) in orange, and the buffer zone (*zona cuscinetto*) in green. (Source: Arijs, as referenced in Catalano et al. 2019:7)

1.1 Research question and subquestions

Following such considerations, my main research question is:

To what extent and why do farmers and social movements in Apulia (Southern Italy) oppose themselves to the containment measures imposed by European, Italian and Apulian authorities in the management of the Xylella fastidiosa epidemic?

Subquestions are:

1. Which role do differences in socioeconomic position (class) play in affecting the way different subjects oppose (or not) to the eradication measure? In other words, how does their class position affects the way and extent they oppose to the containment measures?

2. How does the conflict manifests itself in the epistemic domain, namely which kind of alternative knowledges are brought in the arena where the dispute for building decisional consensus is fought, and why?

3. To what extent does the resistance to the eradication represents a different way of looking at Nature and at the interaction between human and non-human subjects?

1.3 Condensed theoretical framework

Rather than presenting in detail the theoretical framework I will use in the following chapters, in this section I will only briefly outline some of the theoretical *insights* this paper is indebted to, and move to the methodology part rather quickly. Theory is going to come later, set off and informed by the ethnographic material I collected during fieldwork, and in a loosely structured way. The reason for this is twofold. First, inspired by Swanson (2013:47, italic added), I consider theory "*a mode of description and storytelling*, not an act of front-loading chapters with citations to well-known texts and situating oneself in relation to them". Second, I intend to address the core of what I see as the crucial weakness of modern rationality: if modern science originates from the Cartesian separation between Man – the subject of knowledge – and Nature – the object of such a knowledge which has to be dominated and controlled to allow its exploitation for economic development (Acosta 2013), and therefore carries in itself the structural seeds which some believe to be connected with certain imperial and colonial pretensions (Clark 1997, Gatti 2019), it follows that trying not to comply with the conventional style of academic writing it's in itself a small revolutionary act.

I believe that there is a compelling need to "decolonize methodologies" (Tuhiwai Smith 2007) avoiding reinforcing the dualism between theory and practice which reproduces the exact ontological basis on which modern western rationality is built, as well as to "undiscipline political ecology" (Armiero et al. 2019): this is the reason why emotions, affects, the sense of loss due to the death of the olive trees and the radical transformation of landscapes (together with the memories and the subjective meanings they bring away with them) play a central role in this research.

This said, the following chapters tell some of the stories I collected during my fieldwork, as well as stories which tap into my personal life and experience with olive trees. Stories which "our ongoing political-ethical-environmental situation demand [us to] tell not in isolation, but in relation to non-human socialities" (Swanson 2017:95). Intimacy is here an important aspect: in order to understand what I mean with "different ontological understanding of the olive tree" I would first need you to "feel" such a relation. The challenge is "to capture the richness of the intimate while mapping the intimate's trajectories of global connection" (Ogden et al. 2013:11). It is a "storytelling for earthly survival" (Terranova 2016) whose aesthetics owns a lot to the work of Anna Tsing (2012, 2015b), and more in general to environmental humanities, "a field where insights about human-nonhuman relations bubble up within lengthy and richly detailed stories" (Swanson 2013:47-48).

As already mentioned, the RP wants to bridge discussions related to critical agrarian studies and political ecology with STS, anthropology and post-humanist disciplines such as environmental humanities. In an era which some call Anthropocene (Crutzen and Stoermer 2000), some others, in a less apolitical way, Capitalocene (Moore 2016), rising concerns around climate change, environmental degradation, and ecological destruction ask for a new conceptual tools which allows to rebuild collective meanings in order to learn the "art of living in a damaged planet" (Tsing et al. 2017). More specifically, in Chapter 2, I will use the concept of Plantationocene, a term coined by Donna Haraway, Anna Tsing and colleagues to designate the historical time characterized by the spread of plantations, namely the simplification of ecological landscapes in order to improve agricultural yields and fuel economic expansion (Haraway 2015, Haraway et al. 2016). More than Anthropocene or Capitalocene, I think it is the most useful conceptual tool for analyzing landscapes, a recurrent concept through the overall paper.

I will turn now to the theoretical insights I am indebted to as regards the theoretical groundings of the RP. First, from the contemporary debates in the field of critical agrarian studies, I locate this study within what is known as the Agrarian Question (Akram-Lodhi and Kay 2009): “the long-standing Marxist discussion around the development of the countryside and the fate of the peasantry” (Calmon 2017:6). Is industrialization and capitalist penetration in agriculture an irreversible process which must be supported despite the consequent disappearance of the peasantry, or it is possible for peasants to actually escape the differentiation process (Lenin 1982) set out by the penetration of the market in the countryside? Radical agrarian populism (Chayanov 1966, Shanin 1973, Ploeg 2013) will be used here in order to interpret what I found within the “pockets of resistance” I encountered in my short fieldwork experience. Mainly, I will follow Ploeg (2008, 2013) and contend with him that smallholders farming expresses a specific rationality which differs significantly from the capitalist one: rather than capital accumulation and expansion, small farmers seek for balance (between people and living nature, as well as between autonomy and dependence). My claim is that such features reflect also in a different understanding and relationship with the other-than-human world.

Second, I build on political ecology, the study of “ecological distribution conflicts” (Martínez-Alier and O’Connor 1996), namely the uneven distribution of the access to livelihood sustaining natural resources and the negative impacts of environmental externalities. Following Leff (2017:241), “ecological distribution leads to consider the way in which economic rationality and a colonial desire for control have deterritorialized cultures and are altering the ecological distribution of the planet”. Above all, I am interested in what Martinez-Alier (2002:27) calls the “incommensurable values and unresolvable uncertainties” which appear in most such conflicts. Since “ecological conflicts are fought out in many languages, and [...] the economic valuation of damages is only one of such languages, [then] purely political, [rather than technical or scientific,] questions arise: What is the interplay between non-material values […] and livelihood interests? Who has the power to impose particular languages of valuation?” (ibid.:vii).

Third, political ecology becomes the arena where different ways of understanding the world come into dialogue: using the words of Escobar (2007), this is the “ontological turn” which sets the move from political ecology to political ontology (Blaser 2009). Instead of only looking at the inequalities in access to natural resources, it is crucial to look at how different world-views compete in order to play an hegemonic role or rather are able to coexist. Political ontology is thus “a field that stands where political economy and political ecology, formulated with ideas of nature and economic growth, are insufficient (at times even unable) to think antagonisms that, for example, involve things like mountains and forests that emerge as resources through some practices but also as persons through other practices” (Cadena and Blaser 2018:5). The Zapatist motto “A world where many worlds fit”, as well as the idea of “Pluriverse” (Escobar 2018, Cadena and Blaser 2018, Kothari et al. 2019) are all related to such ontological understanding of environmental struggles.

Fourth, I have been inspired by the work of Bruno Latour and Actor-Network-Theory (ANT) scholars (Callon and Latour 1981; Latour 2005) on the one side, as well as the work of Donna Haraway and Anna Tsing, especially for what regards the idea of “companion species” (Haraway 2003, 2008) and the above-mentioned analytical concept of Plantationocene. For ANT scholars nature (and objects) must be considered as “agentic” as humans in what becomes an inextricable matrix after which “there is no absolute or final division [...] between the capacity of humans and non-humans to exercise agency” (Callon and Latour, cited in Sayes 2014:141). Humans, trees, bacterias, insects vectors, are all interlinked and constitute a

“network of actants” (Latour 2005) characterized by mutual interdependence and giving rise to a multiplicity if interspecies relations. They are companion species with whom we should learn to coexist and find *balances*, rather than wipe out or “eradicate”. This has some political implications: “If human culture is inextricably enmeshed with vibrant, non-human agencies, and if human intentionality can be agentic only if accompanied by a vast entourage of non-humans, then it seems that the appropriate unit of analysis for [political] theory is neither the individual human nor an exclusively human collective but the (ontologically heterogeneous) 'public’ coalescing around a problem” (Bennett 2009:108). How does the presence of *Xylella fastidiosa* on the Apulian territory influence political decisions, and mediates power relations on the ground? How do we make sense of the bacteria not only as a “feral biology” (Tsing 2015a) but rather as a co-actant in a hybrid network of highly interlinked human and non-human entities?

At last, I try to “bring political economy back into ANT” (Swanson 2013:15), conscious of the fact that intellectual speculations of environmental humanists and post-humanistic disciplines run the risk of being criticized as apolitical (with rare exceptions, such as Haraway). “By stressing that actors emerge only within relations (and not before them), ANT has largely disavowed context” and “have […] turned away from “history” as such, arguing that it, too, only emerges in relations” (ibid.). Trans-historical geographies and colonial legacies which have shaped the olive trees landscapes of Apulia (Chapter 2) must not be overlooked.

1.4 Methodological orientation

Coherently with the main underlying project of this RP, namely overcoming the Man/Nature divide which environmental humanities and ANT have set as their main analytical move, the main methodological approach employed is what scholars call multi-species ethnography, “a new wave of scholarship addressing human interactions with animals, plants and other life forms in what scholars once unproblematically called ‘nature’ or ‘the natural world’ ” (Aisher and Damodaran 2016), an “ethnographic research and writing that is attuned to life’s emergence within a shifting assemblage of agentive beings, [where] by ‘beings’ we are suggesting both biophysical entities as well as the magical ways objects animate life itself” (Ogden et al. 2013:6).

Following Moore (2016:2), I contend here that “Society without nature, Nature without humans – are part of the problem, intellectually and politically”. Trees, bacterias and insects are here not to be considered only objects of knowledge over which humans exert their rights as subjects of such knowledge, but rather as a network of agentic subjects which contribute to the creation of what being human means: “If humans (the typical subject of anthropology) come into being within networks of practices that include non-humans – including animals and technologies – one must take non-humans seriously in order to understand how different modes of ‘being human’ emerge” (Tsing, quoted in Swanson 2013:10). Multi-species ethnography thus places itself at the “contact zone” between human and non-human worlds, and represents a permeable membrane between classical ethnography and STS (Swanson 2013:8): “multi-species ethnographers insist that in order to better understand social worlds, we must better attend to the non-human socialities that anthropology, with its narrow definitions of the ‘human’ and the ‘social’, has often neglected” (Swanson 2017:84).

In light of such considerations, fieldwork was divided in two parts. In the first part I mainly spent time with and for the olive trees belonging to some small piece of family land (see Chapter 2), pruning them and taking care of their needs after a few months in which we were not meeting each other. During this time, I could also experience the encounter with some of the non-human entities involved in the case, for example the spittlebug insect vector, which until then I had only perceived through newspapers and media articles as an abstract entity. “An actor is something that acts, […] makes a difference, […] is therefore detectable in the scene” (Law and Singleton 2013:491). Accordingly, along the whole paper, such actors will be presented to the reader pointing out their agentic role and their capacity to “influence politics”, which is the strong claim of ANT.

According to some, ANT could actually be considered closer to a methodology than to a theory. Law and Singleton (ibid:489) assert: “perhaps […] ANT is best treated as sensibility, as a craft or a set of practices that works slowly both on and in the world, as uncertain, as empirically sensitive, as situated, and as passionate because it stays with the trouble”. Explicit here is the reference to the work of Donna Haraway (2016) and her “staying with the trouble”. Once again, the duality between theory and practice gets overtaken by a “sensibility”, a way of staying in the world, as well as an attitude of engagement of the researcher/ethnographer with the world he moves in, gets to know and to describe in the research process. A “becoming with” of the researcher within the research environment over time (Law and Singleton 2013:488).

In the second part of my fieldwork, I dedicated myself to interviewing some of the human actors involved, both in the infected and in the containment area. Specifically, I interviewed: scientists of the CNR - National Research Center, in the University of Bari (2 interviews); olive farmers: owners of olive tree orchards ranging from small (4ha) to big extensions (150ha), bot in the infected and the containment zone (7 interviews); one member of the Apulian Regional Council; and a few activists and members of local social movements engaged in the resistance to the eradication measures, and/or in the dissemination of counter-hegemonic narratives (3 interviews).

Most of the interviews where performed at the boundary between the infected zone and the containment zone, specifically in the towns of Ostuni, Francavilla Fontana, Cisternino, Castellana Grotte, in the Brindisi and Bari province. There are also some personal motivations for this choice: this is the area where I have most of my family network, as well as where I grew in close contact with olive trees. Besides being common heritage of the inhabitants of the area, they also trigger memories and emotions in who is writing. Some visits to the infected areas, complemented with semi-structured and narrative interviews to farmers in the towns of Salve, Giuggianello and Oria, were also performed.

1.4 Chapters overview

The paper is structured into five chapters, including this introduction and the conclusion.

Chapter 2 provides an overview over the practice of olive farming in Apulia, and attempts to emphasize some global connections over space and time. It is meant to shows how olive trees landscapes have taken shape as a result of a continuous interaction between humans and the environment, therefore creating that culture-nature hybrid that "materialize[s] as specific communities within ecologies of human practice" (Paxson 2008:25) and needs to be taken into account in order to understand the (material and emotional) context in which the case under study is taking place. It furthermore draws on the concept of Plantationocene and tries to make explicit the connection between monoculture and colonial legacy of Southern Italy.

Chapters 3 and 4 narrate the advent and evolution of the disease by telling stories which focus on different kind of feelings which have shaped (and keep shaping) the "emotional landscape" of the epidemic.

Chapter 3 (Disease) introduces the bacteria *Xylella fastidiosa*, and looks at the construction of knowledge around the epidemic and the social representation of the disease, as well as on the epistemic conflict around the problem setting and problem solving (Colella et al. 2019). Emotionally, it focuses on the sense of death and loss arising from the widespread distressing landscape which characterizes the district of Lecce, where the outbreak first appeared, and tells some dramatic stories with the belief that, using the words of Anna Tsing "we can't just sit back and think everything is going to work out. Part of what going forward means to me is telling some really terrible stories about what's going on in the world" (Haraway and Tsing 2019:17).

Chapter 4 (Eradication), introduces the containment measures imposed by European, National and Regional authorities and presents "stories of anger and fear", focusing on aspects such as the resistance to the eradication and the opposition to the containment measures. Emotionally, it brings out sensations of anger and fear, both from those who contest the eradication as a meaningful measure for controlling the spread of the disease and those who have lost everything "because of four ignorants who didn't want to cut a tree" (a farmer, from interview).

The Conclusion, at last, closes with the paper with an appeal to multi-species resurgence. Quoting Tsing (2017a:51), "meaningful sustainability requires multi-species resurgence, that is, the remaking of livable landscapes through the action of many organisms. [...] Where human ways of life are sustained across generations, it is because they have aligned themselves with the dynamics of multi-species resurgence". It is this multi-species resurgence that this research has been looking for and seeks to feed and support.

The plain
of olive trees
unfolds and closes
like a fan.
Above the rows of olive trees,
a sunken sky
and murky rain
of cold-day stars.
Reed and half-lit shadow quiver
at the edges of the river.
The grey air ripples into pleats.
The olive trees
display their freight
of shrieks.
A skein
of birds encaged,
that sway their long, long
tail plumes in the haze.

(Landscape, Federico García Lorca)

Chapter 2
Olive trees, olive oil, and Apulian landscapes: interspecies relationships over space and time

"Any thing – caught at a particular place and moment – enfolds within its constitution the history of relations that have brought it there" (Ingold 2011:160)

2.1 Introducing actors and nature-culture hybrids: olive trees, olive farmers, and olive oil production

Apulia is one of the most important olive groves sites in the whole Europe with about 60 million olive trees and 277 000 hectares of land cultivated with olive trees (32% of the total national amount) (Ismea Report 2018). Within these 60 million, about 5 million are estimated to be millenarian: their trunk circumference can reach eight to ten meters, and assume the most disparate shapes (Fig. 1). In light of such majestic morphologies, some of them are designated as "monumental olive trees" (*ulivi monumentali*) and are protected by the Apulian regional legislation "by virtue of their productive function, of ecological and hydro-geological defense, as well as the peculiar and characteristic elements of the regional history, culture and landscape" (regional law n.14/2007 - Art.1). Most of them, in many parts of the Apulian territory, give shape over the territory to extended monocultural landscapes. The questions which I want to try to address in this chapter is: how did olive trees take their shape over the years? And how did Apulian landscapes got to assume the monocultural look they have nowadays?

Olive trees (*Olea europea*), in their wild state are shrubs. Known with the original botanical name of *Olea europaea L. var. Sylvestris (olivastro selvatico*), they have been growing spontaneously in the warm areas of the Mediterranean since pre-roman times (Primavera et al. 2017) and present characteristics which are quite different from the "domestic olive tree". Besides the shrubby habit, young branches (the ones which start from the base of the tree) are hard and spiky, leaves are smaller and have a more rounded shape compared to its domesticated relative, and fruits are smaller and with a bigger stone. Transition from the wild variety to the domesticated one occurred over the years through genetic selection derived from various changes in climate as well as human selection of the plants with larger fruits and better features for human use.

"The forms of trees, as of other beings, emerge from relations with others. […] Individuals of the same tree species take a particular shape depending upon where they are growing and upon their history of encounters with animals, fires, and diseases" (Mathews 2017:G151). The agricultural practice which most of all symbolizes the relation between olive trees and humans is probably pruning (Fig. 2). First, pruning is the main responsible for the change from shrubby to the arboreal aspect: every olive tree, with its unique shape, expresses years and

years of interaction with human practices. Second, pruning is important for canalizing the energies of the tree on few branches and increase in such a way the production of olives, other than for sizing the shape and the height of the tree in order to facilitate recollection. Third, it is crucial for preserving the well-being of the tree: olive trees are well adapted to dry environments and suffer humidity, hence the importance of removing internal branches which make stagnate the air inside the crown and facilitate the attack of fungi and parasites. In other words, it is an act which plays both a productive and reproductive role within the life of the tree.

More than the olive tree alone, what is also extremely important in Apulia is the result of its cultivation: olive oil. This is not the place for describing the richness of properties of olive oil, which some people consider comparable to a medicine, as well as describing in detail the art of olive oil making. What matters here is to stress how important is olive oil in Apulian culture: every year, thousands of people gather in the countryside for collecting olives and bringing them to the oil mill. Not all of them are actual farmers, people who make a living out of olive farming and olive oil production. Many of them, including me, just make the olive oil they need for family consumption, from pieces of land belonging to the family and inherited over the years. It is a feast: at the end of the harvest it is very common to see families and friends gathering around a meal and tasting the first, rigorously raw, olive oil of the season. It is a ritual which keeps the memory of the family alive, a collective act of remembrance.

Olive oil, and the olive trees which contribute to co-produce it, become then an intergenerational link: as some peasants in Apulia use to say, “you do not plant olive trees for yourself. You plant them for your sons, and for those who will come after them” (Chialá 2019:69). In Fig. 3 you can see a young me (about 4 years-old) next to some olive trees which my father planted when I was born. The reason behind this RP can be probably summarized with this picture. Every time I go back to visit my house, I have a walk between the trees, look at them, pay attention to their health state. Every year, I try to be there when the harvesting season starts (Fig. 4 shows an older me during one of the last harvests). Even without having studied agronomy, I have learned over the years to understand how trees grow, to visualize the vital energy which gets out of the trunk (with the new vegetation) after the trees gets pruned. In some way, I feel olive trees in a very intimate way.

Fig. 1 – Ancient olive tree in the surroundings of Oria, district of Brindisi.

Fig. 2 – An olive farmer pruning the upper branches of an ancient olive tree.
(Photo: Janos Chialá, www.postphotography.eu)

Fig. 3 – Me at the age of 4, photographed next to some young olive trees in the family field.

Fig. 4 – Me at the age of 29, during the olive harvest in the month of November.

2.2 Landscapes and plantations at the time of Anthropocene

Let's now "zoom out" a bit and look at olive trees from a slightly different perspective, a different spatial scale which will turn out to be useful for analyzing the case: landscape. In Fig. 5 we can see the typical landscape which an external observer looking at Ostuni, a small town in the Brindisi district, would see in front of her eyes. Ostuni is also the place where my grandparents have been living most of their life, and my parents own a small piece of land inherited from some ancestors. As we can see, thousands of olive trees envelop it, in what is considered the flat land with the highest number of *ulivi monumentali* – monumental (protected) trees – in the whole region. It's not the only place where such landscapes have taken shape, but is definitely a very significant ones, leaving aside my personal connections with the site, as I spent countless weekends and most of my childhood summers there visiting my grandparents and the rest of my family.

Seen under a human-nature interactional lens, landscapes turn out to be useful tools for anthropology. In the same way "centuries of grafting, cultivation, trade, taxation, and disease are inscribed onto [olive trees] structure and shape […] landscapes emerge from ghostly entanglements: the many histories of life and death that have made these trees, this place" (Gan et al. 2017:G5). The "ghostly entanglements" Tsing et al. (2017) talk about in *Art of living on a damaged planet* are nothing else than traces of the past, signs of previous historical transients that have seen a "myriad [of] intra-active entities-in-assemblages" (Bubandt 2017:G125). Landscapes, moreover, are useful tools also for environmental humanities, as they push us to move away from anthropocentric perspectives and to consider other entities in shaping the world (Tsing 2014).

Let's focus then on a different landscape: Fig. 6 shows a super-intensive olive grove in the countryside of Foggia, in the north of the region. Modern systems such as these are being proposed as a replacement for Apulia's traditional olive groves, much before the arrival of the bacteria, leading to much controversy about their environmental sustainability. They allow to increase mechanization and subsequently reduce labour costs, and according to some represent the only way for Apulian olive farmers to be able to compete in the global market. Efficiency and productivity increase are indeed the familiar goals of neoclassical economic policies, under the idea that only technical innovation can succeed in feeding 10 billion people. As a side effect, industrialization of agriculture and markets liberalization has made the process of "peasant differentiation" we have seen in the Introduction a hard reality for many farmers: the slow and irreversible squeeze of peasant economy into the press of the market.

Angelo Godini, one of the main experts of olive farming in Italy, in a conference held in 2010 showed how "in the period between 1966 and 2008, with an increase in the price of the main useful materials (including labour) between twenty-one and one hundred times, there was an increase in the sales price for the production of extra virgin olive oil, depending on whether before or during the current crisis, only twelve to eight times, respectively" (Godini 2010:2, my translation). He concluded that "Italian olive farming is struggling between high production costs and low sales prices, with balanced budgets thanks to EU subsidies" (ibid.:1, my translation): Spain and Tunisia, with their higher level of mechanization on the one side, and lower cost of labour on the other, are the main competitors of Apulian olive oil producers. Giuseppe, the farmer we met at the beginning of the Introduction, expressed his concerns to this regard as follows:

> "The sector was already having great difficulties. Prices of oil are going down since two decades. In Spain they mechanized everything forty years ago. Landscape was exactly like this[1], when Franco said: here there's no gain anymore, take them out of the way, I subsidize your income, replant intensive monocultures. Today they can produce one liter of extra virgin olive oil for 2 euros, 2.30, if market price is 3 euros they can definitely stay within the costs. If I sell olive oil for 3 euros I don't cover even maintenance costs..."

He is actually very much in favour of mechanization. The need for a national plan (*Piano di settore Olivicolo-Oleario*) with which to set investments and policies for relaunching the sector, mainly through innovation and State support for increasing automation and industrialization, is according to him something which was never done properly and which should be a priority for the national government ("we must fight [the crisis of the sector] with mechanization!"). What matters here is that many olive farmers in Apulia, even before the arrival of CoDiRO and the bacteria, where already struggling with pressures from the market. Even if for some people traditional farming is still an option, mainly thanks to the production of high quality of olive oil destined to niche markets, for the ones who are producing for the mass market being able to perform conventional maintenance agricultural practices was becoming already an issue. Giusy, a female farmer who will be introduced in the next chapter, provides a useful witness with respect to such difficulties:

> "We were doing the conventional treatments ... and then we have slowly reduced the amount of treatments, the fertilizers ... because you could not make it [to the end of the month]. I mean, we spent twenty, thirty thousand euros a year on fertilizer and the end of the season, we earned fifteen thousand from selling the oil. […] So gradually there was a slow abandonment, or at least a poor cultivation that favoured the Xylella even more."

As Giusy told me, and as we will see in more detail in the next chapter, abandoning of the countryside is unanimously considered one of the factors which helped the spreading of the CoDiRO disease. Moreover, there is the widespread belief among farmers that decoupling agricultural subsidies from the from current or future production levels – a tendency which was initiated and intensified after the reforms of the Common Agricultural Policy (CAP) in 1992 and 2003 respectively (Garzon 2006) has further contributed to the abandoning of the countryside. Ultimately due to the lack of authorities' controls over whether subsidy receiver actually fulfilled the subsidy requirements (i.e. actually producing olive oil), more and more farmers opted for keeping the subsidies while at the same time stopping the actual production, rather than keep cultivating the land with the help of the subsidies. As Giuseppe told me:

> "many farmers in the past years were falsifying documents: they had no olives but they were declaring they were making the oil… and from the controls, several cases were discovered. I mean, they knew the farm was stealing, but in the end they did nothing because Italy is the land of thieves, and so we continue to move forward with thieves"

As a consequence, nowadays about 40% of olive trees groves in Apulia are abandoned and lack of basic maintenance operations such as pruning or ploughing. Such "good agricultural practices", as we will see, have been proposed by some opponents to the management strategy, namely infected trees eradication and indiscriminate pesticide use, as a possible way to contain the spread of the disease (Xiloyannis et al. 2015).

1 He is referring to the traditional planting layout, with few ancient olive trees located at a distance of 10, sometimes 15 meters from each other.

Fig. 5 – Olive trees monocultural landscape surround the town of Ostuni,
one of the places where fieldwork took place.
(Photo: Janos Chialá, www.postphotography.eu)

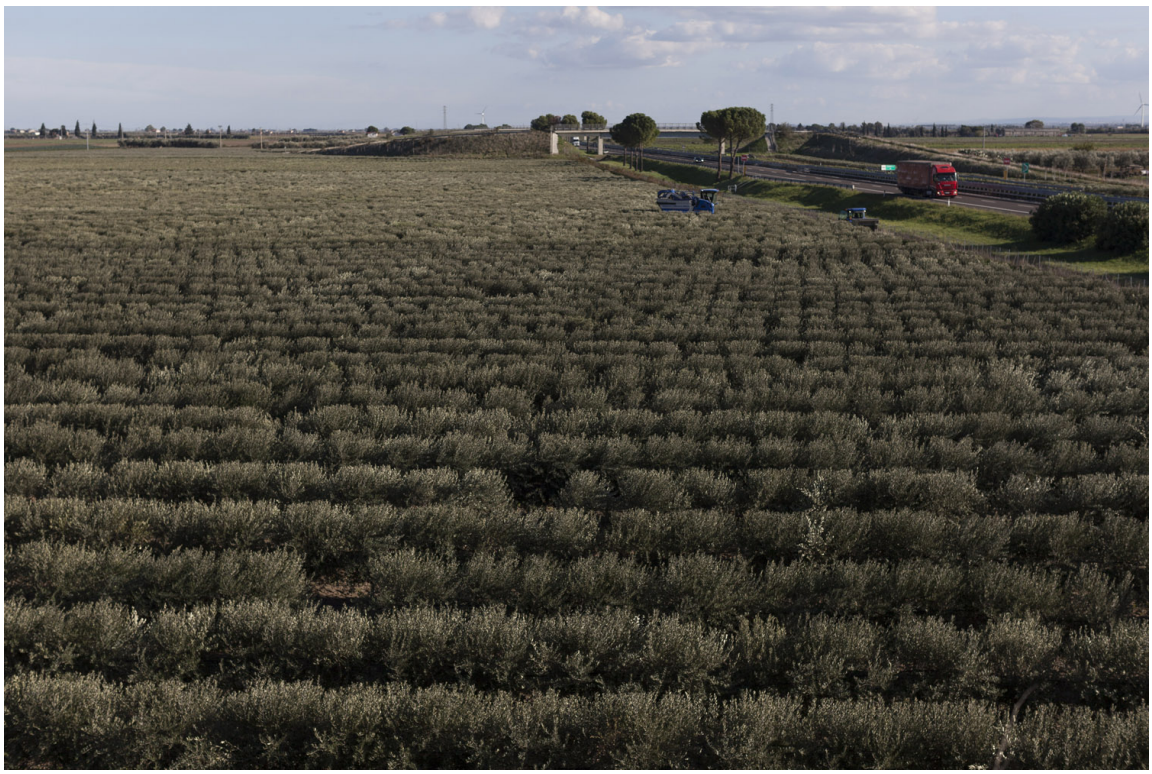


Fig. 6 - Super-intensive monocultural plantation in the countryside of Foggia,
in the north of the region. On the bottom, in blue, you can spot the harvesting machine.
(Photo: Janos Chialá, www.postphotography.eu)

2.3 Trans-historical geographies of olive trees cultivations

"The history of olive oil in Puglia is also a history of colonialism". This is how Mario Spredicato, professor of Modern History at the University of Salento[2] (Lecce), began his talk at a meeting titled "The past for the future: the pathologies of the olive tree in Salento", held on 14 April 2018. During that conference, the historical origins of olive tree cultivation in Apulia were outlined: "with the aim of seizing the opportunity of a constant growth in Northern European wool markets, Charles III of Bourbon made himself an advocate, in 1739, of a tax exemption measure for the planting of olive trees in southern Italy, a process considered key in the the beginning of a modern olive cultivation practice, with monocultural features" (Bandiera 2019:46, my translation).

Olive oil, by then, was either a raw material for soap industries or a good lubricant for the newly rising machines of northern Europe industrial revolution, rather than the appetizing seasoning we use for salads nowadays. It was similar to what is called today *olio lampante* (lamp oil): a low quality oil, made starting from olives recollected from the ground, and crushed only after fermentation had already started and had contributed to make them softer. Fermentation increases acidity and degradation in the organoleptic properties, and it is only in the 19th century, after a few innovations in the milling process (Mazzotti 2004), that olive oil started to acquire the features which made it appropriate for food use, namely became what today we call virgin and extra virgin. Also in this case, however, "modernized methods of making olive oil did not evolve in some sort of natural development but were rather the consequence of the new meaning attached to oil production by reformer-entrepreneurs" (Mazzotti 2004:293)

Trade remained firmly in the hands of British and Venetian merchants, who were guaranteeing for themselves most of the proceeds (Bandiera 2019:47). Gallipoli, the city from where the CoDiRO epidemic started to spread, was at that time one of the major Mediterranean oil harbors: "on a clear day its harbor might easily contain seventy foreign vessels waiting for a load of liquid gold. A Swiss traveler visiting Gallipoli in 1789 noted that low-acidity oil was sold to the English and the Dutch, while common oil went mostly toward Marseille" (Mazzotti 2004:292-293). In a similar fashion, but referring to even earlier times, Spredicato stated: "the oil market in Europe was run by the British in competition with the French. In the seventeenth century the price of Salento oil is made in London" (Spredicato, quoted in Bandiera 2019:47). In other words, olive tree plantations in Apulia were pretty much the same as sugar cane plantations in Puerto Rico or palm plantations in Malaysia nowadays: extractive tools for capital at the expenses of nature and people (Patel and Moore 2017).

The take-home message from this Section is that many aspects of the olive oil production have to be seen in close relation with "the power and politics that inhere in colonial histories and global political economy [which] ANT scholars […] repeatedly miss" (Swanson 2013:15). If we now go back to Fig. 6, we can observe this landscape under a new light. What we are seeing here is not a general landscape but rather a very specific type: monoculture, or using a slightly different word, a highly intensive plantation of olive trees. Donna Haraway and Anna Tsing use the term "Plantationocene", an analytical concept that "forces [us to pay] attention to the growing of food and the plantation as a system of multi-species forced labour" (Haraway and Tsing 2019:5). Plantations are then strongly related to colonization and the economic development of early European empires:

2 Common way to refer to the territory which comprises the whole districts of Lecce, plus part of the Brindisi and Taranto districts

> *"Plantations were the engine of European expansion. Plantations produced the wealth—and the modus operandi—that allowed Europeans to take over the world. We usually hear about superior technologies and resources; but it was the plantation system that made navies, science, and eventually industrialization possible. Plantations are ordered cropping systems worked by non-owners and arranged for expansion. Plantations deepen domestication, re-intensifying plant dependencies and forcing fertility. Borrowing from state-endorsed cereal agriculture, they invest everything in the superabundance of a single crop. But one ingredient is missing: they remove the love. Instead of the romance connecting people, plants, and places, European planters introduced cultivation through coercion" (Tsing 2012:148)*

Love is, according to Tsing, the missing ingredient here: plantations alienate humans from their environment and cut the connection with the living beings that contribute to the co-production of the lived environment.

Radical agrarian populist Jan Dowe van der Ploeg (2008, 2010) comes back often on this. According to him, "farming [has to be] understood, and practised, as co-production: the interaction and mutual transformation of human actors and living nature" (Ploeg 2010:4). Peasant farming is not only based on an "economic exchange", but also on an "ecological exchange" (Toledo, quoted in Ploeg 2010:4): economic value is not the only aspect which matters here, other languages of valuation (Martínez-Alier 2002) come actually into play. Ploeg also adds: "The centrality of co-production implies that farming, and especially peasant agriculture, cannot be conceptually located in a Cartesian space, in which all the co-ordinates are precisely known and where the specific vectors that link past, present, and future can be calculated with mathematical precision. Peasant agriculture is not a derivate of assumed laws: it is constructed, moulded, and remoulded through practice" (Ploeg 2010:15). Cartesian rationality, which lays at the foundation of modern science, is here openly questioned.

We will come back on this in the following chapters. What I want to stress for now, which is relevant in our context, is the link between plantations and coercion – plantations are emblematic of the pretension of modern scientific rationality to control Nature, by imposing simplification and legibility over complex environmental arrangements (Scott 1998) – as well as the connection between plantations and pathogens: "plantations destroy their own base, exhaust soils, exhaust peoples, exhaust plants and animals, and proliferate pathologic pathogens" (Haraway and Tsing 2019:10). The link with pathogens is crucial: pests and pathogens are a by-product of monoculture agricultural crops. Again following Tsing:

> *"Plantations cultivate, if you would, pests and pathogens, and in several different ways. One is that plantations gather pathogens and change their reproductive strategies because of the monocrop availability of huge amounts of food resources for the pathogens. This swamps an area with pests and pathogens. Second, plantations allow sometimes quite rapid transformations of pests and pathogens that create forms of virulence that didn't exist before" (Haraway and Tsing 2019:11)*

Let's therefore move to the next issue: the pathogen with its virulence, and the blasted Apulian landscapes it generated in the past years.

Chapter 3
Disease: stories of loss and death

"We can't just sit back and think everything is going to work out. Part of what going forward means to me is telling some really terrible stories about what's going on in the world" (Haraway and Tsing 2019:17)

"Suffering from the ills of another species: this is the condition of the Anthropocene, for humans and non-humans alike" (Swanson et al. 2017:M4)

The first time Salvatore realized there was something wrong with his trees was in 2015, a couple of years after the Gallipoli hotbed was found. He was harvesting the olives of his four hectares olive trees orchard, in November, when he felt that "it was more difficult to get the olives off the branches". According to him, this was the sign that the branches were in water shortage, despite the multiple irrigation treatments he had performed in the earlier months. A few months later, "they had literally collapsed". We are in Salve, a small village about 40 kilometers south of Gallipoli and a few kilometers from the southernmost point of the region, Santa Maria di Leuca. Salvatore is one of the first farmers in the area who started – "thanks to my father's intuition" – to recollect olives from the tree instead of waiting for them to fall and harvest them from the ground. This allowed him to produce an award-winning, extremely high quality olive oil which he sells on a nice market and allowed him to make a living with only four hectares of land: "I was selling mainly to Germany, and to a smaller extent to northern Italy". Nevertheless, the epidemic hit on him in the same way as it did with the "less innovative", lower quality olive oil producers.

Giusy is one of them. Forty kilometers north-east, in the small village of Giuggianello, she is in a similar, if not more desperate, situation. Farmer from three generations, in 2008 she and her co-owners, one of her brothers and her cousin, decided to restructure the family farm betting everything on olive farming. They applied for a mortgage of 450 thousand euros and bought the machines and the shed for building a new olive mill. In July this year, they had to sell everything "for an insanely cheap price" to a Tunisian buyer, after having sold year by year pieces of land with which to be able to meet the mortgage payment deadlines. Land which, in the same way as their milling machines, had seen a falling down in value since the start of the outbreak: "before Xylella, one hectare of land was valued twelve, fifteen thousand euros. We sold it for four or five thousand. It's a sacrilege, especially for the ones who cultivated the land legally and with their own efforts". When I ask who is buying the land, she says:

> "Speculators. Those who have the cash at the moment, those who have a farm on the papers but in reality do not cultivate the land. What they do, in fact, is to buy big extensions, get the subsidies from the State to buy agricultural machines, and then they buy olive oil from outside and they sell it [as if it was theirs]. Who has been really working the land in the last 15 years had serious difficulties to survive"

In her words there is the disenchantment of whom has been facing a constant drop in market prices, while at the same time having to invest more and more in labour and maintenance costs. It is the market squeeze we already talked about, which goes back to the Agrarian Question (Akram-Lodhi and Kay 2009). We will focus again on this in Chapter 4, where we will see that some of the critiques to the imposed policies claim that institutions and bigger farmers are taking advantage of the situation in order to overcome "obstacles" to the development of an industrial agriculture. For now, it is important to understand that according to Giusy and other farmers, "sick" are not only the olive trees affected by the CoDiRO, but rather the whole countryside:

> "the problem is not Xylella, this is just the cherry on the cake [...] They have decided to kill an entire sector slowly, not with Xylella. It was already dead, it was already dying. Then the coup de grace arrived. [...] In agriculture nobody helps you and there is no economic gain"

Giuseppe, the farmer we have met in the Introduction, beside such kind of problems also added an aspect which is related to climate rather than to markets and policies:

> "In recent years, climate change has caused a lot of problems: temperatures are hot until December, then suddenly they go down. Hot temperature ... leprosy (another sickness). We [were used to] close the mills in May. [...] Now if you are lucky you close in February... last year in November there was not a single olive anymore"

Climate change, usually associated to shifts of seasonal temperatures but also related to higher frequency of extreme events (Rosenzweig et al. 2001) is also affecting olive farming. In the 3 cases, the story of Salvatore, the story of Giusy, and the story of Giuseppe, we are seeing the classical dynamic of agrarian change: the peasants differentiation which for Lenin was an irreversible process and for Chayanov was avoidable through autonomy from the market in virtue of a different rationality. What Lenin and Chayanov did not include in their analysis, however, was something which does not belong to the realm of economics, nor to the sphere of human politics: plant disease, in this case a three micrometers long bacterial entity called *Xylella fastidiosa*.

3.1 Epistemic conflicts: *Xylella fastidiosa* and the conflict over the causal agent

> *"To do the work of crafting multispecies stories, we need […] scientists, not as objects of study, but as collaborators in learning about non-human worlds." (Swanson 2017:95)*

In order to understand who is this fearsome bacteria that has been killing thousands of olive trees in Apulia, I went to the National Research Center (CNR) of the University of Bari looking for clarification. Angelo De Stradis, a microscopist of the CNR, is the one who first visualized the bacteria with his electron microscope in 2013. In light of his daily "visual" relationship with the pathogen, I thought he could be a good human actor for learning more about this non-human entity. Fig. 7 shows how *Xylella fastidiosa* looks like under a transmission electron microscope (TEM). Around 3 micrometers long, the bacteria lives inside the xylematic vessels of the plant, and tends to colonize slowly the empty vessels where he can find a higher presence of plant nutrients and a better environment for his reproduction (Fig. 7, *left*). The tree, in order to avoid the spread of the bacteria to other parts

of the trunk, reacts by closing the channels which bring additional lymph to the bacteria, namely “sacrifices” its infected branch in order to try to avoid the infection to spread over the whole body. It is therefore this reaction, this *resistance* attempt from the tree side, that causes the symptoms of CoDiRO.

Transmission from one tree to the other happens mainly through an insect vector called *Philenious Spumarius* (see Chapter 4). This insect belongs to the family of “xylem sap-feeding insects”: it acquires the bacteria by feeding himself from the xylem of an infected plant and can inoculate it to healthy plants immediately after acquisition. He lives mainly on weeds, where it spends the first months of its biological cycle (between November and April, corresponding to the nymphal and juvenile stages of his development), and becomes infective when becomes an adult and moves to the freshly vegetating trees (between May and July) (Catalano et al. 2019:18-19). This is the rationale behind the pesticide use and the compulsory agronomic measures imposed by Italian and Apulian government in 2015: keeping the number of insect vectors as low as possible, and in this way to reduce the probability of contagion. Namely, a mass extermination of one species in order to try to protect another, more valuable one: olive trees.

When I ask Angelo whether he considers Xylella a friend or an enemy, he opts for the latter. Nevertheless, his voice when talking about it is quiet and relaxed, there is no anger in his words, and seems like he is talking more of someone he knows quite well and with whom he had some misunderstandings, than of a adversary to defeat and destroy. I believe it’s intimate relationship with the bacteria, due to a day-to-day interaction, for some reason brings him to look at it more as a “companion species” than as an opponent. Nevertheless, he states that “there is no cure for the disease” and endorses the official institutional position over the epidemic: “the only solution we have is to eradicate the trees in order to reduce the sources of the infection”.

Angelo owns about 500 secular trees in San Pietro Vernotico, a small village in the Brindisi district which belongs to the infected area, which he inherited from his father. This makes of him the researcher (among those I interviewed) who most seems to understand the anger of the farmers. Interestingly, he agrees on the fact that monoculture, pesticide use and climate change have stressed the trees (“the issue of pesticides has its validity”, “as we have monoculture, soil got depleted”), but claims that “it is useless to think about the causes, what we need to do now is to find the solution”. It is the main difference with respect to organic small farmers and social movements, who conversely push for a radical critique of the agricultural model and believe in the need for a structural change with the aim to change the root causes of the disease. However, he acknowledges that:

> “The problem is that here [in Apulia] we have always considered olive trees eternal. Now, this small being is destroying not only olive trees, but also our conception of olive trees. […] Xylella is not only harmful for olive trees, is harmful also for the people: the olive tree as the reference point has disappeared. You loose production, but you loose also a point of reference: this is what secular olive trees were for Apulian farmers”

This resonates with what I have already stressed in the introduction and I will keep arguing throughout the rest of the essay: secular olive trees are not only a source of income, but represent an identitarian and historical heritage, a reference point that is now threatened by this previously unknown bacteria.

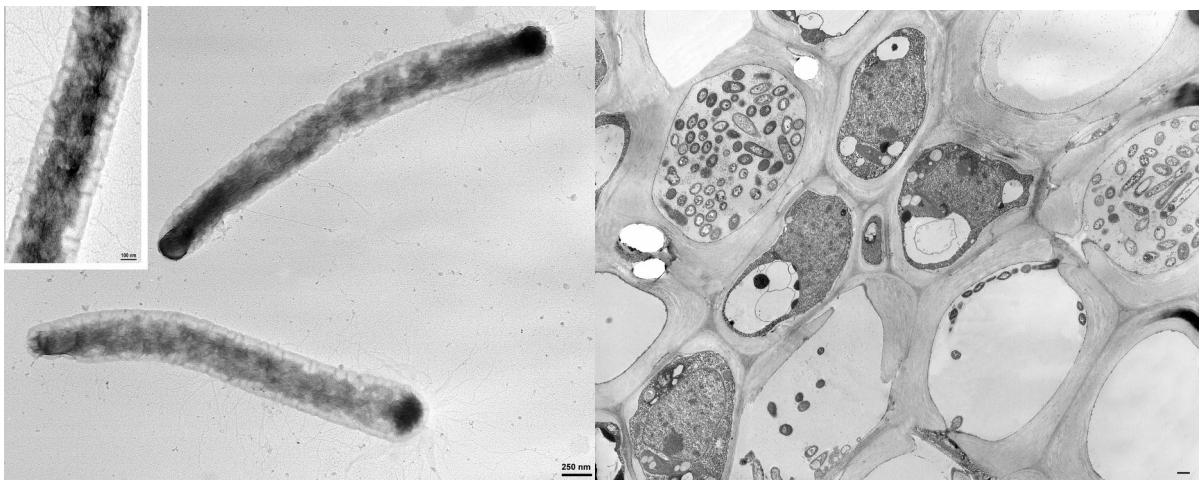


Fig. 7 – Transmission electron microscopy of the bacteria *Xylella fastidiosa* (left) and of the section of a branch from an infected tree. (Courtesy: Angelo De Stradis, CNR Bari)

I will elaborate more on this in Section 3.3 and in the following chapter. For now, I want to focus on what I call the *conflict over the causal agent.* At the beginning in fact, when the first trees in the countryside of Gallipoli started to show the symptoms of the CoDiRO, nobody knew exactly what was happening. Possible causes were considered to be the insect *Zeuzera Pyrina*, some different varieties of fungis such as *Phaeocremonium*, *Phaemoniella*, *Pleurostomophora* and *Neofusicoccum*, as well as the bacteria *Xylella fastidiosa* (Nigro et al. 2013, Saponari et al. 2013). Since Xylella was such a dangerous pathogen, however, "its detection created a lot of attention over a field which had never received so much recognition" (a researcher – see Section 3.2 – from interview), and scientists from different research groups jumped on the topic in order to try to determine which was the main etiological factor of the epidemic, namely which was the causal agent of the desiccation.

After a few months, the scientific demonstration that Xylella was the main etiological factor of CoDiRO was published on the journal *Scientific Reports* (Saponari et al. 2017). From that moment on, the representation of the disease shifted from a *complex of causes* (embodied in the original name CoDiRO) to a *complex of symptoms of a sole cause*, namely the bacteria *Xylella fastidiosa* (Colella et al. 2019). The word CoDiRO disappears from most of scientific publications, leaving the place to its English acronym OQDS. Far from being a trivial etymological controversy, this point represents the core of the *epistemic conflict* taking place in Apulia among scientists and social movements. Some farmers and most environmental associations such as the COSATE I introduced in Chapter 1, in fact, reject the role of Xylella as the only factor causing the desiccation, and never abandoned the use of the word CoDiRO instead of OQDS. In a recent Facebook post, for example, Ivano Gioffreda, farmer and founder of the association Spazi Popolari, affirms:

> "If the so-called "science" had wanted to discover the true cause of desiccation, instead of isolating only what interests them (Xylella) it would have been enough to isolate ALL the pathogens present on a numerically high sample of olive trees, and verify the only common denominator present in all the samples, and the true ones would have been discovered immediately" (Gioffreda 2019, my translation)

What is being questioned here is the reductionism and simplification of modern western science. According to James Scott (1998), in all agricultural modernization processes nature

gets to be simplified in order to be made legible and more easily controllable: complexity does not belong to the controlled laboratory environment and "the isolation of a very few variables – ideally just two, while controlling all others – is a key tenet of experimental science" (ibid.:289). This is exactly what happened with the construction of knowledge around the *Xylella fastidiosa* epidemic: as soon as *Xylella fastidiosa* was discovered, it soon came to occupy the scene as the main character of the play, together with its insect vector *Philenious Spumarius*, and invisibilized all possible causes at play.

Social movements, conversely, identify many different biotic, abiotic, environmental and even political-economical and social criticalities, as co-factors which must be taken into account for explaining the cause of the epidemic: the heavy use of pesticides which have caused soil pollution and nutrient depletion (Ciervo 2017), a deep water resource crisis caused by the same monocultural model (Perrino 2015), as well as the lack of "good agricultural practices" (Xiloyannis et al. 2015) connected to the abandoning of the countryside caused by the global dynamics of olive oil markets which we have seen in Chapter 2. They push for structural interventions aimed at a completely new paradigm: restoring biodiversity and betting on agro-ecological practices in order to restore the ecological balance. Their view over the countryside and the ecosystem in which olive trees are embedded is an holistic one, which takes into account the complexity of the interaction between soil, roots, trees, and animals (humans included). It is a "probiotic environmentality" (Lorimer 2017) which is opposed to the institutional antibiotic vision. As Salvatore, the farmer I introduced at the beginning of the chapter, puts it: "we need to learn to co-exist with the bacteria, rather than eliminate it".

3.2 Nuances within groups of human actors

We have however to pay attention not to oversimplify the human actors landscape. There is no "science and institutions" on the one side and "farmers and social movements on the other": situation is more nuanced, both on the scientists and the farmers side. Within the scientific community, especially at the beginning of the epidemic, there was no consensus over which was the etiological agent of the desiccation. The reason for that, rather than a technical one, was from the words of plant pathologist Franco Nigro, a purely social one. He is part of the team, at the University of Bari, which first started to investigate over the causes of what was being observed on olive trees in Gallipoli. When asked why, according to him, all this resistance against the official scientific position appeared, he told me:

> "So, everything happened for two reasons. [...] The first is related to what we can call the *human weakness* of feeling a bit of envy for the fellow researcher who managed to do this kind of thing by himself. [...] At the beginning the fact that a researcher alone, or a research group alone was able to solve a problem of this kind, in the field of Italian research on plant pathology, certainly created some kind of envy… and in fact at the beginning there were also colleagues who supported positions, I do not say denialists, but nevertheless very critical as regards the scientific certainties that the research group of the CNR and [our] department was bringing. Why did this happen? For exactly what I said earlier: Italian research in plant pathology or in agriculture in general has been neglected for many years. Having found such an important pathogen surely indicated the possibility of obtaining funding"

What is interesting from this quote, where Nigro explicitly mentions that according to him scientific community, in the context of *Xylella fastidiosa* research, has not been immune from "human weaknesses" and feelings of "envy", is that the image of Science as something

neutral, disconnected from Society and the power dynamics the human world is embedded into, is openly questioned. Moreover, the value of olive trees for such community of researchers is related to "the possibility of obtaining funding". When I ask him what he thinks about the "alternative solutions" organic farmers and social movements propose in order to tackle the emergency, such as restore soil fertility and resort to agroecological practices which aim at supporting the trees in order to react by themselved, however, he expresses an opposite belief with respect to Angelo:

> "Look, it has absolutely nothing to do with it. It is the presence of the bacterium that makes the difference. The condition of the terrain has nothing to do with it […] the fact that the territory of Salento has been abandoned for a long time, with herbicides or products that have decreased the "immune defenses" of the olive tree, as some *madman* calls them... does not make any sense"

And he even adds:

> "there are quite a few scientific works which have investigated the interaction between some herbicides (such as glyphosate) and the susceptibility and resistance to the [CoDiRO] disease. Paradoxically, there is only one case in which the herbicide increases the susceptibility to the disease, and it is the case of citrus fruits […] in all other cases glyphosate induces resistance in the plant against the attack of pathogens".

In its reductionism and simplification, modern science is incapable of "incorporate knowledge created outside its paradigm" (Scott 1998:264). The political aspect of this has been developed by Bruno Latour (2004) in his *Politics of Nature:* since Plato's times, Science has been used in order to "render ordinary political life impotent through the threat of an incontestable nature" (ibid.:10). By reinterpreting the myth of the cave, he sees the separation between a small number of few elects which are able to get out of the cave and access the Truth, and the great majority of people obliged to stay in the darkness of ignorance as the origin of "the most fabulous political capacity ever invented: [the possibility to] make the mute world speak, tell the truth without being challenged, put an end to the interminable arguments through an incontestable form of authority that would stem from things themselves" (ibid.:14). From the quote, where Nigro calls "madman" who is offering a different view (e.g. talking about trees as complex living beings equipped with an immune defense system) emerges the widespread contemptuous attitude that I found in many scientists when talking about the situation.

Also among farmers and civil society the situation is not homogeneous. We will go deeper in this in the next chapter, but for now we can divide farmers in two groups: big farmers and trade associations, on the one side, and small/organic farmers and social movements on the other. The former agree on the *diagnosis*, namely the fact that the main causal agent of the desiccation is the pathogen *Xylella fastidiosa*, but do not agree on the containment management measurements (which we will see in Chapter 4), mainly for economic reasons. The latter, conversely, *disagree on both the diagnosis and the prognosis*. Not only they do not agree on the eradication and insect vector population containment measures, but they reject the whole narrative around the epidemic, from start to end[3]. Using the words of Colella et al. (2019), the former agree on the problem setting but disagree on the problem solving, while the latter dispute both.

3 I draw here from the work of Fiona Panziera, PhD student at the French National Institute for Agricultural Research (INRA), which was presented at the conference "Resilienza: la ricerca Xylella parla al pubblico" (*Resilience: Xylella research talks to people*) held in Racale on 19-20th September 2019.

Such epistemic controversy, namely what is the valid knowledge which informs policy and political measures, is in fact rooted in a different ontological understanding of nature and of the role of olive trees as an entity. If for most of scientists and institutional authorities olive trees are mostly a substrate for a dangerous quarantine pathogen, which has to be stopped at all costs and which at the same time represents a useful object of knowledge which has suddenly allowed scientists to receive research fundings and occupy a leading role in the policy arena (I call this *disembedded instrumental world-view*), for farmers they are a cultural and vegetal heritage, emblem of this process of mutual understanding and co-production between man and nature I have outlined in the previous chapter, and must be protected *together with the whole agricultural sector* in order to save a profession, the olive farmer, which is under threat (*embedded instrumental world-view*). For social movements, additionally, olive trees are trans-historical witnesses of a territory, cultural artifacts which must be saved regardless their role in the economy (*embedded non-instrumental world-view*). What the three world-views share, however, is the sense of death and loss generated by the visible effects of an invisible threat: the blasted landscapes which are spreading all over the region.

3.3 Blasted (emotional) landscapes

Figs. 8 and 9 show how landscapes look around the area of Gallipoli and Ugento, respectively, in the Lecce district. Trees are completely withered, with their branches cut in the desperate attempt from many farmers to stop the evolution of the disease. It is like a graveyard. More than that, it is a death that farmers have seen in front of their eyes before they could do anything. This has generated an emotional landscape which, in the heart of the infected area, is defined by a deep sense of loss, a sense of loneliness and powerlessness, and a sense of hopelessness. Giuseppe, the farmer from Oria, when I asked him if he believes any treatment could be done in order to cure the trees told me:

> “Don’t listen… those are all bullshits! There is nothing you can do, nobody talks about it anymore. You die, that's it... You just die.”

Along similar lines, but this time referring to the “death of the farmers” consequent to the death of the trees, Giusy remembers:

> “[…] we had a considerable extension, from three generations ... but now we are dead. In other words, there is no hope. All the farms in the area, the normal ones, are all cut short. [...] there is no solution...”

When I ask her how she feels when she sees all her trees dried out, she tells me:

> “When I was young I was used to cycle among the trees, in our land. I loved to cycle, and I was going there very often. I was calm and peaceful as that was our land and nothing could happen to me. Also when I grew up, I kept cycling among them. Now, it’s two years that I don’t touch my bike: it’s full of rust. [...] I can't turn around in the midst of olive groves that are all dried up… It hurst too much to look back and remember what it was: the family, the farm...”

It is evident from this quote how the landscape connects to her childhood and her family, but also with to agricultural activity which was helping her to make a living: the embedded instrumentality emerges. What she also interestingly mentioned was that

> “I kept going because mine is a family farm, I had an emotional bond with it… and *you can't run a business with your heart*, this is where I was wrong. You have to manage it with your accounts. We handled it with our hearts, and this put us in trouble, because I had to stop ten years earlier. If I had stopped ten years ago, everything would be fine now”

It is the tension between plantations and love Anna Tsing was talking about and which we have analyzed in Chapter 2: Plantationocene arrangements do not expect love to be one of the parameters of agricultural production management. More than that, what emerges from Giusy’s words is that mixing the management of an olive trees plantation with love, makes you risk to run into troubles, as you might not be able to analyze the economic situation with clarity.

Where love is still possible is in smallholder, organic farming: Salvatore is the only one, among the farmers I introduced so far, who explicitly “loves his olive trees” and does not resign to try to find a cure (“I will save them, cost what it may”). Despite the “traces of hope” my conversation with him transmitted me, however, feelings of loneliness and powerlessness transpire also from his words:

> "These plants are asking me for help and I feel helpless. I am alone. It's like if my son was falling into a ravine, and he... climbs, clings with his nails... and I can't ... I'm there a few inches from him... and I can't help him, save him"

Here, we start to notice one of the main ontological differences with respect to the other positions encountered in the field: he talks of his olive trees as sons. This is the ontological turn which introduces a different language of valuation: trees “emerge [here] as resources through some practices but also as persons through other practices” (Cadena and Blaser 2018:5). This time, the connection with the family is not mediated by childhood memories and views over the tree as something which helped the family to live thanks to the co-production of olive oil (*embedded instrumental world-view*), but rather trees emerge as something which is fully-fledged part of the family. More than that, he claims that having time to spend on the field is extremely important for him in order to be able to “be with the trees”. This overlaps with the idea according to which abandoning of the countryside is one of the causes of the spread of the disease. While for embedded and disembedded instrumental world-views this is related to the spread of the insect vector, which grows and multiplies among the weed, as well as to the lack of productivity-related good agricultural practices (eg. pruning) for him it relates with the fact that spending time on the field allows him to *understand* the trees and *communicate* with them:

> “If that plant is sick... if I'm always in the fields I will see it, I will look at it, and I will understand it. But if I go to the fields only when I have to harvest, and I'm always in a hurry... I will stress [the olive trees]! Trees communicate! I communicate with the trees. And between them they also communicate, they know if I am there in order to help them, or if I'm going to exploit them”

In conclusion, we have three different competing word-views around olive trees and olive farming conflicting in Apulia. In order to go deeper in this issue, we need to move on the political arena and look at the institutional responses to the epidemic, namely to the containment strategy which European, Italian and Apulian government arranged in order to limit the diffusion of *Xylella fastidiosa*: eradication of infected trees and use of pesticides to keep the population of the insect vector as low as possible. This will be the topic of next chapter.

Fig. 8 - A dessicated trees landscape in the countryside of Gallipoli, August 2019.

Fig. 9 - A dessicated trees landscape in the countryside of Ugento, November 2017. (Photo: Janos Chialá, www.postphotography.eu)

Chapter 4
Eradication: stories of anger and fear

"[…] That is how the shock doctrine works: the original disaster—the coup, the terrorist attack, the market meltdown, the war, the tsunami, the hurricane — puts the entire population into a state of collective shock. [...] Like the terrorized prisoner who gives up the names of comrades and renounces his faith, shocked societies often give up things they would otherwise fiercely protect" (Klein 2007: 17)

"Anthropocene is a scenario of politics characterized by an undeclared war" (Cadena and Blaser 2018:6)

4.1 Contagion: *Philenious Spumarius* and the conflict among farmers

I met the insect *Philenious Spumarius* (Fig. 10) during my fieldwork in the family field I introduced in Chapter 2, in the surrondings of Ostuni. I was removing the young branches which grow all over the trees during the vegetating season, when suddenly I spotted one of them on the tree bark. It was very small, maybe three of four millimeters long, but I was immediately alarmed: what if that tree had been exposed to Xylella? It was only after a few days and multiple of these encounters that I realized this insect is one of the most common living beings who can be found in the countryside. For some reason, however, in the media and in the daily conversations it had become the only visible enemy one could fight in order to "avoid the tragedy". It was inevitable: *Philenious Spumarius* population had to be reduced to zero with all possible means.

Contagion "of the European continent", according to the official positions, occurred before 2013 via the introduction of a coffee plant from Costa Rica (Loconsole et al. 2014, Giampietruzzi et al. 2015). Consequently, global trade and globalization of markets started to be seen not only as responsible of the market squeeze we already talked about, but also of the act of contamination of the previously pristine territory of Apulia. This, in turn, created a sense of distrust towards European authorities:

> "European Community went unpunished, while I believe it has some responsibilities, because a bacteria does not arrive from Costa Rica in a carrying case […] Apparently it arrived in a nursery with some oleander plant (it was actually coffee) […] What a fuck, you know that everything which arrives from Latina America must be locked down [until you don't make sure they are safe]. However, they would need millions of hectares in Rotterdam to do a proper quarantine, so they sign the papers and let it go! And this is… fucking globalization" (a farmer, from inteview)

Additionally, it alimented some conspiracy theories related to the fact that some people believe that "they wanted to destroy Salento". Franca and the activists of the COSATE, for example, claim that Xylella was always present on the territory and it only became so virulent by virtue of the rest of co-causes, such as the use of pesticides and the soil fertility loss

(Ciervo 2017). Some claim that “Xylella is a mafia”, and that the emergency has been built in order to impose on the territory an industrial agricultural model. This resonates with what Naomi Klein (2007) shows in her book *The Shock Doctrine*, from which the opening quote of this chapter has been taken: shocks, crises, emergencies, have been historically used by capital in order to achieve the application of otherwise unthinkable measures, in this case the emotional shock such as the one represented by the epidemic in order to facilitate substitution of low productive, labour intensive traditional farming with highly intensive monoculture.

Not all olive farmers, however, support such denialist or conspiracy theories nor are against the eradication measure. Mimmo, a farmer I interviewed in Francavilla Fontana, a few kilometers from Oria’s hotbed, told me: “I put so many candles (laughs) to protect all the 40 hectares of land that I have... prayers, you understand? When I see something… I pray”. He was clearly expressing concern about the serious risk of getting his olive trees infected in the near future: every time he sees a slightly dry branch, he calls prof. Nigro and asks him to perform molecular analysis. Interestingly, contrarily to social movement’s positions, he would immediately eradicate his trees if one of them would be found infected. He owns forty hectares of olive trees he planted around 30 years ago, when he decided to invest in olive farming aside his job as representative for a pesticide company. There is therefore an important difference as regards the perception of the epidemic from, for example, Salvatore. Mimmo’s olive orchard is made of young trees, planted only 30 years ago for making business (*embedded instrumental view*) they are not the trans-historical witnesses of the territory: Salvatore is “trying to save our identity, our history”, Mimmo is (legitimately) trying to save his income.

It is important also to highlight that the perception of the contagion created hostility and distrust among the farmers themselves, which started to blame the few farmers and members of social movements who prevented or delayed the eradication of infected trees (see Section 4.3) for being responsible of the infection of their trees. Mimmo blames his neighbour for not removing the weed and not performing the compulsory agronomic measurements imposed by the regional government “because he does not live of olive farming, so he does not care”. Giuseppe was blaming social movements for being “greens”, people which care about politics but don’t know anything about olive farming and what it means to make a living out of it: “In that area all the farmers, when they have been told ‘eradicate’, have eradicated”. There is therefore the widespread perception that some of the owners, as well as social movements, as co-responsible for the contagion. What Giuseppe also mentioned, however, was that if they would have told him to eradicate, he would have done it with all his orchards *except the very ancient ones* he had in the field closer to his house. Age of the tree and connection with family history plays therefore a crucial role in farmer’s attitude toward the containment measures.

Fig. 10 - *Philenious Spumarius*, also called with the popular name of *Sputacchina media*, the spittlebug responsible for the transmission of the bacterial infection from sick to healthy tree. (Source: www.infoxylella.it)

4.2 Containment

It should be clear by now that not only scientists, farmers and olive trees are the important actors in this story: also the bacteria and its insect vector became leading figures in the affair. *Xylella fastidiosa* has not only generated scientific publications and research funding, but, more importantly, it also generated policy. Such policies, together with the social and political conflicts they generated, are the main focus of this section.

As mentioned in the introduction, after the start of the epidemic and the isolation of *Xylella fastidiosa*, in 2015 Italian and Apulian government implemented the measurements which should have limited the spread of the outbreak in the rest of the region and, ultimately, to the rest of the European countries. The story goes like this: as there is no cure for the infection of the trees, and the bacteria gets transported from tree to tree by the insect *Philenious Spumarius*, management strategies must focus on reducing the sources of inoculation (the infected trees) as well as the number of insects which potentially can function as vectors of the disease (EFSA 2015). European regulation regarding quarantine pathogens such as *Xylella fastidiosa* imposes the need to eradicate all infected plants, and additionally all plants within a radius of 100 meters from the infected plants. The reason is that this is considered *Philenious Spumarius'* range of movement. Additionally, there is an incubation time of about 18 months between infection and the manifestation of the first symptoms, and therefore a precautionary principle applies.

If one thinks about that, such extermination of plant and even animal species are everyday practice when pests and diseases explode in industrial farming factories. Intensive animal farm industry is used to the need of an extremely high level of control over the sanitary environment, or to the necessity of antibiotics as well as quarantine measures in order to avoid contamination from the outside (Pachirat 2011, Weis 2018). Even if modern industrial practices are seen as having high higiene standards, yet, due to the enormous concentration of livestock and increasing immunity due to overuse of antibiotics, they are in fact a breeding ground for epidemics. Schneider (2015), after looking at pigs industrial farming in China, states that "animal health crisis was turned into justification for deeper industrialization"

(ibid.:342). Visser et al. (2015) look at similar features in Russia: after a swine flu in the Belgorod region, they report that “the governor decided to slaughter all the pigs held by the households in the region and to pay them compensation” (ibid.:523). In both cases, the similarities with the *Xylella fastidiosa* epidemic management are evident. The main difference here is that we are talking of open spaces with many interspecies ecological relations. Additionally, while many other kind of agricultural crops have a life cycle of one or two years, olive trees need at least 3-5 years to become productive, leaving aside the millennial ones which are there since centuries. This is even acknowledged by Franco Nigro, who fully supports the scientific assessments and is in favor of the eradication measurement:

> “European legislation had to be, so to say, calibrated a bit in relation to the territory. Infected plants eradication has surely an iron ratio, it works. But obviously one thing is to talk about a tomato plant, which I plant now and in two months will give me a tomato, another thing is a secular plant where there is a relationship between culture and territory. Probably, at the beginning we needed a different approach, that is not an indiscriminate killing of the infected plant and of all those present within 100 meters, but something a bit more ‘surgical’ ”

According to him, this is an additional reason we must take into account when looking at the resistance against the epidemic management measures. On the one side, as we have seen, we have the internal controversies within the scientific community around the determination of the causal agent, due to the need to gain or compete for research funding’s visibility, which affected the “communication of science towards the final user”. On the other side, there is the fact that olive trees cannot be treated as an ordinary species, but have to be recognized as a culture-nature hybrid which implies a different relationship with nature and agriculture. This is an interesting point: while analytically distinguishing between three different world-views, we have to acknowledge that such world-views can sometimes overlap or permeate each other: especially between disembedded and embedded instrumental positions, some dialogue has actually happened and have given rise to some policy, as we will see in Section 4.3.

Eradication (Fig. 11) is the main point of dispute among the different actors involved. It is also the issue on which internal divisions among farmers appear: not all farmers are against the measure, and the majority of those who make a living out of olive farming would actually eradicate, as we have seen in the words of Giuseppe. They usually express anger towards those few who have opposed to the eradication and therefore caused the spread of the infection to other trees (“I am about to loose the totality of my farm because of four ignorant people who have nothing to do with agriculture”). The tension between this group which values mainly the instrumental role of olive trees, and the different group which conversely values more the non-instrumental aspects, that is their role in the identity and the history of the territory, becomes apparent here.

An additional point that has to be considered is the differences which I encountered when moving from the infected to the containment area. First, in the infected area there is no obligation anymore, for the reasons I explained in the Introduction, while the containment area is where the intensity of state operations reaches its maximum. Second, in the infected area positions slowly shifted from “Xylella does not exist” to “It’s a complex of causes” to “What do we do now”. In other words, the blasted landscapes generated in the infected area, together with the removal of the obligation to eradicate forced to focus more on what to do rather than on what has or has not been done. It is in the containment zone, conversely, where most of the resistance efforts are concentrated.

Fig. 11 - An eradicated olive tree in the countryside of Torchiarolo, 2015.
(Photo: Janos Chialá, www.postphotography.eu)

4.3 Resistances

What is resistance in the context of the *Xylella fastidiosa* epidemic? As briefly outlined elsewhere (Gatti 2019), resistance, conceptualized as an intentional act of opposition to an external oppression and subjugation, has always been considered an exclusively human capability: “although nature may resist and complicate human actions, producing all sorts of unintended consequences, it has neither the *intentionality* nor the choice that humans do” (Nash 2005:67). As we have seen in the introduction, however, in their overcoming the Man/Nature duality, ANT and environmental humanities claim that “nature too has agency” (ibid.).

In Apulia, scientific, national and transnational institutions are trying to resist to the spread of the epidemic in other parts of the Italian peninsula (and ultimately to the spread of the epidemic over the European continent) under their disembedded instrumental view which values olive trees and their role in the global commerce of olive oil. Large-scale farmers are trying to resist to the disappearance of their profession, threatened by both the bacteria and the global market forces which are making harder and harder for them to sustain their income with agriculture. Social movements and “chayanovian farmers” are trying to resist eradications, under the rejection of *Xylella fastidiosa* as the only cause of the epidemic and the fear that the emergency has been “built” in order to generate fear and confusion and therefore make the “politically impossible [...] politically inevitable” (Friedmann, quoted in Klein 2007:6). But also nature has a role here: some olive trees cultivars are considered “resistant” to the bacteria, as they do not express the symptoms of the disease even if infected. Ultimately, *Xylella fastidiosa* itself can be seen as an other-than-human entity resisting against the oppressive coercion and simplification imposed over the environment by Plantationocene arrangements.

4.3.1 Other-than-human resistance

Let us start from this last point: *Xylella fastidiosa* epidemic can be considered a case of "resistance of nature" against the unsustainable forms of industrial agriculture which are threatening ecosystem balances and interspecies relationships. It is the Plantationocene era that forces humans and non-humans into ecological arrangements into which multi-species response-abilities (Haraway 2016) are inhibited. To some extent, nature has always represented a limitation for capitalist expansion: natural cycles, physical limitedness of the extension of land, or the multiple difficulties in order to control uncertainties in agricultural production has been historically seen as a barrier to accumulation which has limited capital penetration in the countryside (Visser 2017). Seen under this light, the epidemic can be seen as an active process of Nature trying to restore the lost balance, and *Xylella fastidiosa* as the actor which is telling humans: if you continue like this, there's not going to be future for you and your olive tree cultivations.

Also trees can be seen, and actually are seen, as "resisting". As at the moment there is no official cure for the CoDiRO disease, scientists and regional institutions are in fact focusing on "resistant cultivars", namely olive tree varieties which do not show heavy symptoms of desiccation even when infected with the bacteria. Apulian regional government has implemented a subsidies scheme in order to support the replanting of cultivars such as Leccino and FS-17, which are considered the only resistant ones. Even if the financial supports only covers 50% of the replanting expenses, therefore making replanting viable only for large-scale farmers and companies which have some capital stock which can be invested in covering the remaining part of the replanting and managing costs, this measure is actually only possible after 2018 as a result of continuous negotiations and dialogue between the regional government (disembedded instrumental view) and farmers associations (embedded instrumentality).

4.3.2 Disembedded instrumental resistance

From the disembedded instrumental perspective, what we need to resist is the spread of the bacteria in other parts of the world. It's the undeclared war with which I opened this chapter. Olive trees are extremely important for the Italian and southern European economy, and it is this aspect which must be protected above all things. Their value is exclusively an economic one. This is a statement published on October, 11th by the EFSA (ANSA 2019, my translation)

> "If it were propagated in Europe, the *Xylella fastidiosa*, the bacterium responsible for the rapid desiccation of olive trees in Puglia, could damage the productions by over 5 billion euros, putting at risk almost 300 thousand jobs in the EU"

It is apparent here the focus over the economic aspects of the emergency: jobs are at risk, and a whole economic sector is threatened. There is no reference to the culture-nature dimension nor to any emotional related aspects. As we have briefly seen, agriculture as an economic activity is at high risk of contraction. According to the disembedded instrumental world-view, moreover, what has to be fought is not only the bacteria, which must be eradicated, but also "ignorance of all incompetent people who after so many years still talks of 'conspiracy' and 'diabolical pact with the money God'… We are light years away from the hopes and certainties generated by research" (Franco Nigro, the plant pathologist from the previous chapter).

Theirs is a resistance against the bacteria and the insect vector, but also against the owners and farmers who refuse to implement the containment policies and against those who reject scientific positions as a consequence of their “ignorance”. Pesticide use and eradication of infected trees is the only way to limit the spread of the epidemic, in what, along the lines of what Conrad (2007) calls “medicalization of society”, we could call the “medicalization of the countryside”. Rather than addressing the structural (social and environmental) causes of the outbreak, this position claims that higher degree of control over the territory, better (reductionist) knowledge and monitoring techniques, and stronger enforcement of the law in order to perform timely eradications is needed.

4.3.3 Embedded instrumental resistance

The embedded instrumental position, namely big farmers and farmers associations, fight for preserving their profession against both the forces of the market and the feral biology which is threatening their activity. While they agree on the diagnosis, and do not question the role of the etiological role of Xylella in the CoDiRO, their opposition is related to the eradication measure and the 100 meters rule in the absence of a fair replanting scheme which would allow them to keep their profession alive. They have an embedded perception of the world: olive trees are important in view of their productive role, but motivations related to their emotions, their memories with respect to the past and the family, and their inter-species embodied relationship with the trees are all interweaved.

This position focuses on the possibility to replant new “resistant cultivars”, as well as to perform grafting[4] of such cultivars. Their struggle was actually effective: before 2018, under the risk of moving infected material, no other olive trees could be planted. After many protests, however, the Apulian government allowed replanting of such cultivars. The remaining issue now is how to fairly support olive farmers in order to do it. As Giusy told me:

> “I had to sell the olive mill to avoid to let it become wreckage, ok? And I already had to sell it for nothing... I didn't earn anything last year, I won’t earn anything this year… How can I do the replanting myself, with what income? Then, once I've replanted, don’t I have to water it? I have to connect the water well, I have to pay for electricity... how do I live then? How do I go on?”

This is the main struggle of the embedded instrumental world-view: the possibility to survive as farmers, the struggle for having the chance of keeping the human-olive tree culture-nature relationality alive.

4.3.4 Embedded non-instrumental resistance

At last, there is the embedded non-instrumental type of resistance. This position claims the legitimacy of a completely different world-view to exist, within a world where the dominant hegemonic view sees traditional agricultural practices as backward, inefficient, and loosely productive. Activists like Franca and farmers like Salvatore criticize the governmental policies as authoritarian measures in order to take advantage of the epidemic and impose and intensive and superintensive agricultural model which would allow to overcome barriers to capital accumulation. Their main opposition is against the eradication measurement, this time

4 An ancient technique consisting in “adding” different farieties on already existing trunks.

not because of its material consequences (namely, the impossibility to continue farming) but more for its symbolic value: the eradication of ancient trees overlaps for them with the erasure of their history and their identities. It is a fight for recognition as actors on the political arena, for being recognized as able to provide alternative empirical knowledge rooted in counter-hegemonic ontological understandings over the countryside. As Salvatore told me during our interview:

> "I have just attended primary school... but I have the experience! You have [formal] education, which is useful. Let's join forces, and let's move on... but if you have education you don't have to attack me... I'm proud of being a farmer. And I'm proud of the education and the sense of respect for things, for people, and for trees, which my dad gave me"

What he expresses here is his deep frustration for being considered "an ignorant", for his world-view where trees and people, communicate, and need to keep company to each other ("sometimes I go to the field and I sit a bit under that plant, a bit under that other plant, and we talk... they need company, like old people"). According to Colella et al. (2019:30, italic added) "what is at stake for Apulian [farmers and] social movements are not only the olive trees of Salento or Valle d'Itria, but their roles as epistemic and political actors. The invisible bacterium not only threatens agriculture, it threatens social and anthropological *balances*". Balances, which are key in the view of peasant farming from a radical agrarian populist perspective. The embedded non-instrumental rationality here is therefore close to the peasant rationality described by radical agrarian populists, with its seek for balances and the other-than-economic languages of valuation. Such features are evident in the following quote from Salvatore:

> "[…] we have broken a balance, the balance of the earth ... with our pesticides, starting with me the first. [...] We must recompose the balance, if we recompose the balance we have already taken a step forward. They need organic matter and micro organisms. We must start from the soil, we have to allow the root system of the plants to restart, with biodiversity.

And more:

> "Balance, is balance that is lacking to the soil. And then, a fundamental thing. We must respect plants, the earth, and mother mother earth […] If we take care of her, we feed her, she will give us back what we gave her with interest. But if we have hurt her, evil gives us back. Respect, first for mother earth, and then for everything else."

Rather than a resistance against the bacteria, with whom we should try to co-live rather than eradicate, their resistance is against the expansion of a hegemonic universalism of neoliberal economic rationality, it is a fight for a world where many worlds fit. It is a revendication for a pro-biotic rather than anti-biotic environmentality, for looking at the role of bacterias, fungi, trees, and humans in shaping together a livable habitat for multi-species resurgence.

Conclusions
Olive trees, hope and resistance in a more-than-human world

The main goal of this paper was to show how an agricultural pest epidemic like the one which has been affecting Apulia since 2013 is able to unveil different world-views, different ontological understandings of the natural world as well as the relation between human and other-than-human entities which co-exist on the southern Italian territory. Merging theoretical concepts belonging to the fields of critical agrarian studies, political ecology, STS and environmental humanities, I have tried to show that, rather than a technical problem for which the solution resides in just finding the cure to the disease, what we are facing here is an "ontological conflict", namely a conflict among different languages of valuation and different views over what the worth of an olive tree is.

I have contended that olive trees in Apulia are much more than an economic asset to be exploited in order to extract value for fuelling economic expansion: they are a culture-nature hybrid that sustains both livelihoods, identities, and sense of belonging of Apulian inhabitants. Using a human-nature interaction lens for looking at landscapes, I have shown how they allow us to see traces of the past while at the same time pushing us to re-imagine the future. I have dug into the nuances among different groups of actors, and showed how considering scientists or farmers as homogeneous social groups runs the risk of oversimplifying and therefore missing the complexity of reality. And I have contended that resistance here must be conceptualized not only as a human peculiarity, but rather as something which can be exerted by nature as well, by what ANT scholars call "networks of agents", or "hybrid assemblages".

More than this, I have attempted to make the reader feel the emotional landscapes which the epidemic has shaped over Apulian farmers and peoples. I have been thus telling the story of a mutual grief: the grief of century years old olive trees dying of sorrow because they are either left behind or exploited and abused by modern industrial agricultural practices; and the grief of their people, who had build their livelihood and identity based on the olive trees, and had co-created a landscape which is now under threat. It was the story of a profession, the olive grower, which has been seeing radical changes in the past years and has become harder and harder to be sustained, therefore being, also, slowly abandoned. And it was the story of a bacteria, *Xylella fastidiosa*, which entered the political scene of an agricultural emergency and showed the capability to exert agency in the arena where the management of the crisis was discussed.

Looking at the role of olive trees, bacterias, and other-than-human entities in shaping Apulian landscapes and, ultimately, the world we all live in, plays a crucial role in our present times with environmental degradation and the ecological crisis threatening both human and non-human survival. Overcoming the human/non-human dichotomy which lays at the core of western modern rationality is therefore of uttermost importance. Following Tsing (2017a:61) "we need to understand the human-nonhuman sympathies that make Anthropocene arrangements possible as well as the more-than-human historical trajectories that come together in both terrible hegemonies and patches of hope and resistance" (Tsing 2017a:61). This was, ultimately, the not-so-veiled goal of this RP: make such more-than-human historical trajectories visible, and such patches of hope and resistance to emerge. Only in this way we can succeed in creating a world where many worlds (including the more-than-human ones) fit.

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