

**ARTICLE**

# Cultivating biodiverse futures at the (postcolonial) botanical garden

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**Abstract**

This article examines ecological practices at the Palestine Museum of Natural History in Bethlehem, West Bank. Through an analysis of the museum's botanical gardens, the article explores what it calls 'biodiverse futures' as a spatio-temporal alternative to the ecological domination of settler colonialism in Israel/Palestine. While much scholarship has focused on the environmental imaginaries that have informed colonial conquest in Palestine, this paper draws attention to the ways in which these relationships extend into constructions of the future. Combining the literature on environmental violence with the literature on futurity and decolonisation, this article develops an approach that foregrounds the relevance of 'ecological temporalities' in examining alternatives to settler futures in Israel/Palestine. To date, only a limited number of contributions have examined environmentalism as a powerful discursive tool for constructing the future. The case of the museum gardens highlights three interrelated aspects of the production of ecological counter-futures: futures as knowledge, futures as (bio)diversity, and futures as survival. Drawing on ethnographic material and interviews with museum staff and volunteers, this paper contributes to the study of the temporalities of environmental violence and ecological resistance in Israel/Palestine.

**KEYWORDS**

botanical garden, environmentalism, ethnography, futurity, Palestine, settler colonialism

## 1 | INTRODUCTION

Surrounded by terraced gardens, the Palestine Museum of Natural History (PMNH) overlooks the hills of Bethlehem. On my first visit in October 2018, I met Elias, a zoologist at the museum. He told me about the rapid decline of plant and animal species in the region and stressed the importance of conducting research on local flora and fauna that could reflect the Palestinian perspective, which has been overwritten by Orientalist and Zionist accounts of nineteenth and twentieth-century Palestine. Since the museum's establishment in 2014, volunteers and staff, both local and international, have worked hard to develop outdoor spaces and indoor exhibitions. In addition to research, daily activities at the museum included spreading compost on the soil, planting seeds, watering plants, maintaining the irrigation system,

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feeding rehabilitated animals and collecting eggs from the aviary. The museum staff see these practices as important not only in the context of ecosystems that are disappearing at an alarming rate (Al-Sheikh & Qumsiyeh, 2022), but also in anticipation of a future where environmental violence against indigenous peoples and the planet no longer exists. The daily tasks carried out by volunteers and researchers at the PMNH evoked a radically different future; one that is no longer dictated by the settler nation-state.

While it would be easy to dismiss this view as naive or romantic, this article argues that the alternative futures evoked through the ecological practices at the museum challenge the settler colonial production of the future. By using a broader timeframe to read the history of Palestine, the PMNH offers a critique of the ethno-national state as a model doomed to fail because of its unsustainable, exploitative and destructive relationships with the ecosystems it comes to inhabit: what happens after the demise of the nation-state? What can be done in the meantime to rethink modes of coexistence between humans and non-humans? Embedded in the museum's practices is a critique of settler colonial relationships to land and underlying notions of nature and difference. The case of the museum gardens highlights three interrelated aspects of ecological counter-futures: the production of knowledge, the appreciation of biological and cultural diversity, and the development of strategies of self-sufficiency to survive. Building on the concept of indigenous futurity developed by Tuck and Gaztambide-Fernández (2013), I read these practices through the lens of futurity. Broadly, I understand futurity as a form of prefigurative politics enacted by oppressed groups that focuses on alternatives to settler structures.

By bringing together literature on environmentalism in Israel/Palestine with literature on futurity and decolonisation, this article makes two main contributions. First, it contributes to the literature on futures and decolonisation. A growing literature has attended to the ways in which settler colonial governance affects Palestinians' relationship to time (Abu Hatoum, 2021; Hickey, 2019; Jones, 2022; Joronen, 2021). This paper offers tools to examine futurity primarily as an ecological and epistemological critique of settler colonial relations to soil and land. Futurity, as a crucial framework for theorising decolonisation (Ritskes, 2017; Tuck & Gaztambide-Fernández, 2013; Tuck & Yang, 2012), stresses that settler colonialism perpetuates the status quo not only through constructions of the past but also through constructions of the future. However, this framework proves often elusive and abstract if limited to the realms of conceptual art and literature. Through an analysis of the museum's botanical gardens, this article offers insights into three interconnected processes that shape the relationship with time: future as knowledge, future as (bio)diversity, future as survival. To date, few works have discussed alternatives to settler futures grounded in Palestinian ecological practices (Meneley, 2021). This article sheds light on practices that resist what Ann Laura Stoler (2008, p. 202) called 'a sense of futures lost' and a 'sense of arrested futures' caused by ecological ruin (Figure 1).

Second, the article contributes to an expanding field of research on human–non-human political relations in Israel/Palestine (Braverman, 2021b; Gutkowski, 2021). These works illustrate how the settler colonial order is reproduced through colonial relations with non-humans, in contrast to perspectives that emphasise the interconnectedness of the natural environment in the region across political boundaries (Braverman, 2021a). Building on Gutkowski's (2018) examination of environmentalism as a powerful discursive tool for governing the future in Israel/Palestine, this article aims to further explore how environmental violence spans multiple temporalities. This approach also sheds light on how constructions of the future, which are informed by enduring colonial epistemologies (Higgins, 2019), are resisted on the ground.

I took part in the museum's activities between August and November 2019 as a volunteer, while conducting participant observation and interviews as part of my doctoral research on cultural-environmental activism in Palestine. As an Italian-Palestinian woman, my engagement with the ecological project of the PMNH is part of a broader interest in disrupting the logics of the nation-state as an inherently monocultural project. Since Palestine is an important context of anticolonial struggle, its ongoing knowledge practices offer important insights for unsettling the colonial epistemologies that underpin the nation-state logics. Attending to the possibility of 'multi-species kinships and hybrid alliances that enable more than human coexistence' (Braverman, 2021b, p. 25) offers tools to challenge fixed notions of identity that are deeply entrenched in the territorial logics of the nation-state.

The empirical material presented in this article was collected as part of a wider examination of environmental practices such as seed planting, permaculture and endangered species documentation. The case of the PMNH is one of many other activities in the West Bank, including Om Sleiman Farm in Bil'in, Vivien Sansour's Heirloom Seed Library and art-ecology initiatives such as Sakiya and Makaneyyat. The scope of my analysis in this article is limited to the museum's gardens and is not exhaustive of the many activities, including caring for wounded animals in rehabilitation, that take place at the PMNH. For the purposes of this paper I have decided to focus on the relationship between time and soil by asking: what does it mean to reimagine the botanical garden, a space traditionally associated with colonialism and imperialism, as a site of decolonial politics in the face of settler colonial violence and environmental catastrophes? The article



**FIGURE 1** Map of Israel/Palestine and the Bethlehem Governorate—red coloured. The map shows the location of the Palestine Museum of Natural History (PMNH) in relation to the green line and the urban centres of Ramallah and Jerusalem.

is structured as follows. The next section discusses settler colonial environmental violence in Palestine as the product of wider colonial entanglements between botany, nature and nationalism. Then, the paper proceeds to discuss these relationships through the lens of futurity. The remaining sections of the article offer an analysis of the museum's botanical gardens along three interrelated themes: knowledge, monoculture, and progress.

## 2 | FROM DESERT TO GARDEN: A CONCISE HISTORY OF SETTLER COLONIALISM AS ECOLOGICAL DOMINATION

The Israeli state's systematic exploitation of the environment in Palestine/Israel is well documented (Braverman, 2021a; Stamatopoulou-Robbins, 2019). Palestinians are affected by Israel's ecological damage while being dispossessed of their land, water and other natural resources. Building on geographical work that highlights the intersecting features of epistemic and environmental violence (Braun, 2000; Kirby-Straker et al., 2023; Willems-Braun, 1997), the discussion examines the nexus of scientific knowledge, territorial conquest and nature display that characterise settler colonial relations with indigenous people and the environment. These notions date back to the Enlightenment and the formation of modern nation-states (Whitehead et al., 2007). In the eighteenth and nineteenth centuries, museums, botanical gardens and private collections took on a central role in the production of knowledge and the institution of 'universal' systems of classification (Braun, 2000; Johnson, 2011; Latour, 1986; Livingstone, 2003; Naylor, 2002). Specimens, measurements and sketches of the natural world were gathered and exhibited at museums and botanical gardens. In these spaces knowledge was made universal, standardised and transferable through the circulation of specimens across countries and educational institutions (Cornish & Driver, 2020; Driver, 2013).

Botanical gardens were key spaces of knowledge production and education within an expanding Empire. Early botanical gardens or 'physic gardens' began to appear in Europe in connection with universities during the Renaissance. The first precursor of modern gardens was established in 1545 in Padua, Italy to enhance knowledge about plants that could be used for medical and learning purposes. By the eighteenth century these spaces had expanded and were often funded by states, which were competing for social and scientific prestige (Johnson, 2011). Plants were embedded within modes of production and systems of accumulation which served a moral purpose of improving 'human life', Kew Gardens being one of the most popular examples (Cornish & Driver, 2020; Luke, 2000). At the heart of these practices are notions of progress and improvement through the development of land and natural resources (Ginn, 2009). Gardens also reflected a sense of national pride. Forms of botanical nationalism involved using plants to represent the greatness of the nation-state. For example, as Franklin Ginn (2008) shows in his analysis of the Christchurch Botanical Gardens in New Zealand, the gardens were transformed into a neo-English landscape to mark a sovereign European space.

In Mandatory Palestine botany contributed to constructing the land as a space of potential for improvement and exploitation. Botanical gardens formed part of the cultural and environmental practices that progressively expanded and demarcated the territory of Israel. In the early 1920s and 1930s, botany helped build a Zionist national geography and to make authoritative knowledge claims about the homeland. The botanical gardens of the Hebrew University in Jerusalem, which were established in 1931, provide an example of institutionalised botanical knowledge produced by Jewish European immigrants as part of the Zionist movement (Bieling, 2022). Botanists like Otto Warburg and Alexander Eig contributed to improving agricultural practices that would make Palestine more suitable for European settlement. For example, Omar Tesdell (2017) demonstrates how European scientific research on wheat in the first decade of the 1900s contributed to constructing Palestine as a promising dryland region.

Palestine was constructed as an empty space waiting to be revived by superior technologies (Braverman, 2009; Long, 2009) and Palestinians were confined to the realm of nature, that which is inert, removable and erasable (Hughes et al., 2022; Salih & Corry, 2020). Zionist aspirations to 'make the desert bloom' involved mending the absence of forests and fixing unproductive soils and dry lands (Long, 2009). The idea of the desert as a laboratory for techno-scientific intervention by states and scientists, however, was not unique to the Zionist imagination as it encompassed many settler colonial endeavours (Koch, 2021). Zionist imaginaries of the Palestinian landscape incorporated earlier principles of Westphalian sovereignty and land rights developed by European Enlightenment thinkers such as John Locke (Fields, 2012) based on the doctrine of *terra nullius*. The domination of space, understood as an absolute and objective entity, involved the transformation of arable land into the property of states and settlers.

The construction of the national landscape reflected both modern understandings of nature as an exploitable resource and biblical imaginaries. The extensive monocultural planting of pine trees, funded by the Jewish National Fund (JNF) in the early 1900s, is a notable example of how the landscape was reshaped to reflect the image of the state. Hannah Boast (2012) explains that from the 1930s onwards, Zionists chose the Aleppo pine to shape the dry lands of Palestine in the image of a 'more European' landscape. Since 1901, over 240 million trees were planted by the Jewish National Fund (Braverman, 2009). This display of ecological nationalism, however, also had material consequences on the landscape, as the pines damaged the soil by reducing biodiversity in the region, preventing the growth of underbrush plants and being extremely susceptible to fires. These perspectives supported a declensionist narrative that portrayed Palestinians as responsible for the environmental degradation of the previously flourishing land of Israel, before being 'rescued' by

British and Zionist powers in the twentieth century (Gutkowski, 2018; Novick, 2014). After the creation of the state of Israel in 1948, nature continued to be instrumental to territorial expansion through multiple practices, ranging from the construction of national parks on the ruins of Palestinian villages (Sharif, 2016), organic gardening practices by illegal settlements in the West Bank (Groszlik et al., 2021), or the designation of Nature Reserves and environmental conservation (Gray & Sheikh, 2018).

### 3 | THE GARDEN AS A SPACE OF FUTURITY

A limited number of studies have begun to consider the ways in which ecologies and future governance intersect in settler colonial projects. Contemporary examinations of human–non-human political relations in Israel/Palestine illustrate how the settler colonial order is reproduced through colonial relations with non-humans and the environment (Braverman, 2021a, 2021b; Gutkowski, 2021). These highlight how the state not only appropriates land through environmental policies, but also maintains the status quo through the production of environmental futures. For example, Gutkowski's (2018) insightful analysis of Israeli environmental policy in the al-Batuf/Beit Netofa Valley illuminates how the threat of extinction in the age of climate change functions as a powerful political-discursive tool that is instrumental to the state's governance of the future. Ecological domination thus extends through time as well as space. To develop this area of inquiry further, it is crucial to attend to experimental practices, asking what it might mean for future generations to care for the soil and for the non-human other as part of a decolonial project (Tabar & Desai, 2017). The lens I propose considers botanical gardens as spaces where people can reclaim their right to shape the future. This perspective draws attention to ongoing struggles to envision hopeful futures.

Building on the work by Andrew Baldwin (2012) on futurity and whiteness, Tuck and Gaztambide-Fernández (2013) developed the notion of indigenous futurity as a set of practices that aim to transform present settler colonial structures and enhance futures for indigenous people. Baldwin defined futurity as practices aimed at rendering the future knowable through calculation, imagination and performance. His work examined the perpetuation of racism and the politics of whiteness through the lens of futurity, arguing that present injustice is sustained not only through constructions of the past but also through constructions of the future. Initially, the focus on future-making practices was linked to geographical debates about risk management and threat in liberal societies (Anderson, 2010). However, through the work of Tuck and Gaztambide-Fernández (2013) futurity has become increasingly relevant for discussions on emancipatory practices of indigenous and oppressed groups (Gergan & Curley, 2021; Goodyear-Ka'ōpua, 2017; Hickey, 2019).

Tuck and Gaztambide-Fernández examined settler futurity and indigenous futurity as two opposed ways of producing futures. Crucially, while settler futurity envisions the replacement of indigenous life, indigenous futurity 'does not foreclose the inhabitation of Indigenous land by non-indigenous people, but does foreclose settler colonialism and settler epistemologies' (Tuck & Gaztambide-Fernández, 2013). The settler colonial project, as a project of elimination (Wolfe, 1999), anticipates a future in which all of the land has been appropriated and other indigenous relations to the land have disappeared. In contrast, indigenous futures are not informed by the same territorial logics of elimination. Rather, indigenous futures are about actively promoting a future in which indigenous ways of life, epistemologies and languages can flourish on their own terms. These goals do not depend on erasing the presence of other people from the land, but rather on changing the structures that support settler dominance. Scholars have examined spaces of futurity as diverse as educational spaces (Tuck & Gaztambide-Fernández, 2013), art spaces and visual culture (Hickey, 2019), and non-violent demonstrations organised by environmental activists (Gergan & Curley, 2021; Goodyear-Ka'ōpua, 2017). What they have in common is a 'prefigurative' approach towards current injustice that performs visions of a better world to come. It is not about reinforcing problematic and essentialist divisions between coloniser and colonised, but rather about illuminating spaces where oppressed groups are enabled to produce knowledge, imagine and invest in futures against unjust political structures (Dyson & Jeffrey, 2018; Gowland, 2021; Jeffrey & Dyson, 2021).

### 4 | THE PALESTINE MUSEUM OF NATURAL HISTORY

The empirical material presented in this paper was collected as part of a broader ethnographic study conducted between 2018 and 2019 for my doctoral research. From August to November 2019, I visited the museum to conduct interviews and participant observation. I then combined ethnographic materials with secondary sources such as published

academic articles, annual reports and brochures. The ethnographic approach was shaped by my multiple positionalities as a Palestinian-Italian woman and as a researcher/occasional volunteer who, unlike the international volunteers who lived close to the premises, was not perceived as an integral part of the team. Since its inception, the museum has operated as an independent organisation, supported by donations and volunteer work. While members of the museum staff were mainly Palestinians affiliated with Bethlehem University, most volunteers were international (although some of the volunteers I met travelled from different parts of the West Bank) (Figure 1). To learn more about everyday life at the PMNH and make myself useful, I offered to help staff and other volunteers with their daily tasks. Therefore, I would travel from an apartment I had rented in Ramallah to spend two or three days at the museum every two weeks. While this was uncommon amongst international volunteers, Palestinian volunteers who did not live near Bethlehem also spent a limited amount of time during the week at the museum. One volunteer, for example, used to travel to the museum once a week from his home in Hebron because he saw the PMNH as an opportunity to experience a different context from his everyday life in Hebron. A graduate in English literature from Hebron University, he used some of his free time at the museum to practise English and teach Arabic to international volunteers. Like him, I enjoyed a high degree of independence while participating in the volunteer rota, which included watering plants, feeding animals in rehabilitation, helping to cook communal lunches and cleaning the kitchen facilities, helping to organise indoor exhibitions and welcoming visitors (Figure 2).

Established on a piece of land provided by Bethlehem University, the museum complex was founded in 2014 by Dr Mazin Qumsiyeh and his wife Jessie Chang as part of the Palestine Institute of Biodiversity and Sustainability (PIBS). The museum's gardens were created out of a 12-dunum area (three acres) and constitute a space of experimentation for different techniques, including organic gardening and permaculture, composting, aquaponics, rain harvesting systems, biogas and solar energy. Officially inaugurated in April 2017, the PMNH works as a 'knowledge base' to support individuals, communities, as well as governmental and non-governmental organisations towards adopting policies for environmental protection and sustainability (Figure 3). Its main objectives are: to mitigate the effects of climate change on ecosystems; to help marginalised communities develop strategies to cope with poverty and poor access to resources, including water scarcity; and to document habitat destruction (Hammad & Qumsiyeh, 2013; Khlaif & Qumsiyeh, 2017).

Considering the high level of social and political fragmentation within Palestinian society in the West Bank, the PMNH was generally well received by the community as a local hub for several issues, which include attending to injured animals, carrying out educational and outreach activities with children from local schools, and developing training



FIGURE 2 A volunteer plants flowers in the museum gardens, Palestine Museum of Natural History, Bethlehem, West Bank.



**FIGURE 3** Section of the gardens and water pond at the Palestine Museum of Natural History.

projects with local farmers. The museum has been filling many of the gaps left by the Palestinian government. The Environmental Quality Authority (EQA) was established after the Oslo-accords under the umbrella of the Palestinian National Authority. However, the collapse of the Oslo process, the agency's limited funding and confinement to Area A of the West Bank, have since prevented the capacity of the EQA (Weinger, 2021). The PMNH collaborates with both governmental and non-governmental bodies. For example, the PMNH research team has recently taken on an advisory role to EQA, including leading the National Biodiversity Strategy and Action Plan and currently working on a National Strategy for 2050 (Figure 3).

When I interviewed the museum director about the main purpose of the museum, Qumsiyeh explained that documenting biodiversity loss and protecting a fragile ecosystem was essential to ensure the collective survival of humans and non-humans in the face of settler colonial violence and climate change. The director stressed that the greatest threat posed by settler colonialism in Palestine is the eradication of its biological and cultural diversity. From his perspective, the violence against indigenous peoples and the environment enacted by the Israeli state is one expression of a dominant ethno-nationalist model that seeks to govern, contain and homogenise difference. Qumsiyeh is known for his work as a scientist, human rights activist and prolific writer on issues of biodiversity, environmental justice and human rights in Palestine. After nearly 30 years of research and teaching in the United States, he and his wife Jessie returned to Palestine in 2008. Together, they initiated the PMNH project with a donation of US\$250,000. Born into a Christian Palestinian family in Beit Sahour in 1957, Qumsiyeh moved to Jordan and later to the United States to pursue his studies in zoology and genetics. Qumsiyeh's project was inspired by the work of his uncle, Sana Atallah, who conducted research on mammals and documented specimens in the Bethlehem area in the 1960s and 1970s (Figure 4).



FIGURE 4 A group of students visit the Palestine Museum of Natural History.

## 5 | KNOWLEDGE: RESEARCHING ECOSYSTEMS, DECENTRING SETTLER-NATURE

Research and knowledge of local plant and animal species is a priority for the museum. Since 2014, staff have been documenting the diversity of flora and fauna in the West Bank, cataloguing animal and plant species in the area and producing numerous scientific publications on plants, insects, reptiles, birds and the illegal trade in endangered animals. The museum team has produced databases, such as the Global Biodiversity Information Facility analysis, which lists over 600 plant species of concern in the West Bank. Museum staff work in some local areas, such as the northern West Bank, that are undergoing rapid change due to increased urbanisation, agricultural intensification and land use while being under-researched due to the establishment of military and firing zones in their vicinity (Al-Sheikh & Qumsiyeh, 2022).

The production of knowledge for the future is understood as a central investment in the development of durable and transferable skills (Figure 4). For example, the gardens are used as experimental spaces for growing food and plants with limited water resources. But the implications are even broader, as the production and dissemination of knowledge is a central battleground for decolonial struggles. Edward Said's critique of Orientalism (Said, 1978) examined the many ways in which European experts constructed the 'other' as inferior and asserted their dominance over the production and dissemination of knowledge. In the late 1800s and early 1900s, European travellers and scholars interested in the 'Orient' documented the flora and fauna of Palestine. Through Orientalist eyes, however, the inhabitants of the land were deemed incapable of producing scientific knowledge. The museum provides a space to reflect on how futures are produced on specific epistemological grounds and to address pressing questions: what kinds of knowledge can benefit fragile ecosystems, environments and people in the face of environmental change? How can ecological practices contribute to disrupting hegemonic definitions of what counts as knowledge without reinforcing problematic Western/non-Western binaries?

During an interview in his office on my first visit at the museum I asked Qumsiyeh why he had chosen to use the umbrella term 'museum' for the many activities carried out at the PMNH. He stressed that the PMNH was 'more than a museum'.



The idea is not to have a museum where we exhibit beautiful objects, no, the idea is [to encourage] behavioural change and societal change. That's what we want and this is part of an evolutionary and revolutionary change in society, so don't let the word 'museum' detract from the many layers of our project.

(Interview, 30 October 2018)

Choosing to gather diverse environmental and knowledge practices under a museum 'hub' is a strategic move, which provides a recognised framework to facilitate collaboration with other centres around the world. An example is the ongoing PMNH's collaboration with the Natural History Museum in London, or its membership in the Botanic Gardens Conservation International and the European Network of Science Centres and Museums in 2018. As Harding (2018) notes in her discussion of possible relationships between modern Western natural sciences and other scientific and technological traditions: 'participating in modern science brings with it a kind of higher status and increased power' (p. 45).

Producing knowledge from and for Palestine is not only haunted by the past; it is also haunted by the future: settler colonialism, as a 'replacement project', is enacted through the production of knowledge that secures the permanence of settlers (Hickey, 2019; Tuck & Gaztambide-Fernández, 2013). Settler colonialism anticipates a future where the indigenous population has gone extinct by natural and evolutionary causes. What stands out is the question of the future as both a political and environmental space of agency and emancipation from the settler apparatus. Undertaking research is understood as resistance to settler futurity through an affirmative position. The development of a long-term vision for the environment and for human and non-human lives produces 'counter-futures' to those planned by the Israeli state. As argued by the museum staff, one cannot simply wait for the end of the occupation because when the time of liberation comes there will not be a place left to inhabit. Enacting environmental practices involves taking ownership and enacting the change one wishes to achieve in the future.

We must ask ourselves: can we afford to defer considering issues of biodiversity and sustainable development until we end the occupation and gain freedom and independence?

(Qumsiyeh et al., 2017, p. 342)

By producing research about the environment from the perspective of those affected by its entanglements with settler modes of exploitation, the museum challenges the hegemony of Eurocentrism as the one true perspective of knowledge and dismissal of specific groups as incapable of serious research and intellectual thinking (Smith, 2021). The connection between environmental practices and the future is made explicit in a conference paper written by Qumsiyeh et al. (2017).

Gardening, one of PMNH's main activities, is a waiting game. Planted seeds do not bear fruit immediately. This museum's existence reflects Palestine's belief in the future. Our research focuses on the Palestinian flora and fauna that has been able to sustain in the face of steep odds, including ourselves. Our education programming is an investment in our community and our future leaders.

(Qumsiyeh et al., 2017, p.11)

The gardens are also described as empowering, as written in the museum's volunteer guidebook:

The museum grounds ... and its botanical garden, an integrated ecosystem, is an oasis for wildlife in Bethlehem and an inspiration for young people seeking alternatives. By actively relating to their environment, they see themselves as empowered participants with the ability to act and make change to conserve nature.

(PMNH, 2019, p. 3)

The garden is therefore described as an investment in the future, in sharing resources for survival and in changing people's beliefs about what is possible. The museum director described the botanical gardens as a statement against the victimisation of Palestinians and an expression of self-respect and respect for others.

If we choose not to be victims but to take agency for our own change, then it does not matter how many obstacles or restrictions of freedom and movement, religion, culture and education we encounter. All these freedoms they have taken away from us but the most important one is in our minds.

(Interview, 30 October 2018)

Qumsiyeh's reference to the colonisation of the mind echoes Franz Fanon's (2004) observation that the first step towards decolonisation becomes possible through a process of epistemic emancipation undertaken by the colonised. For Fanon, mental colonisation is the loss of one's sense of self and cultural identity to the extent that the imagination itself is colonised. Like Fanon, Ngugi Wa Thiong'o (1998) points out that the mind is colonised through the disruption of ways of life rooted in lived experience. An important area in which cultural trauma occurs is language. Consequently, Wa Thiong'o emphasised the importance of language in nurturing ways of being that can heal trauma and alienation. From this perspective, decolonisation is primarily about imagining alternative futures that are predicated upon plural experiences, memories and relations to land (Tabar & Desai, 2017).

Tuck and Yang (2012) have emphasised that the decolonisation of the mind is the first, and not the only, step towards the abolition of colonial regimes. From this perspective, a purely epistemological focus undermines the actual decolonisation of stolen lands. The tension between theory and praxis in decolonial projects and the risk of 'domesticating' the radical imperative of decolonial theory also run through the question of what decolonising geographical knowledge should involve (Jazeel, 2017; Noxolo, 2017; Radcliffe, 2017). In considering the significance of knowledge production in relation to the future, it is therefore important to highlight some of the challenges that arise from purely epistemological framings of the decolonial project. While I do not attempt to resolve this tension, I understand the knowledge produced by the gardens as part of an iterative process in which theory and practice inform each other. Sium et al. (2012) caution against artificial distinctions between theory and practice, arguing that 'theory and action are intertwined - one does not exist without the other' (p. xii). The knowledge one chooses to produce informs how one chooses to act in the world.

## 6 | GARDENS IN CONTEXT: THE STRUGGLE BETWEEN BIODIVERSITY AND MONOCULTURE

The West Bank faces particular challenges due to the pressures of multiple planning regimes and resource exploitation that collectively damage and impoverish the land (Isaac & Hilal, 2011). These include land confiscation, control over water resources and exploitation of natural resources. In addition, the pressure on the environment is exacerbated by the resources used to support the needs of Israeli settlers living in the West Bank. The lack of sovereignty over natural resources and land use over a contiguous geographical area makes it difficult for Palestinians to monitor the state of the environment. The botanical gardens at the museum have the goal to reintroduce nutrients in the soil and nurture biodiversity. This task is more than just practical and is tied to the wider vision and values of the PMNH, holding that the strength of a society resides in its biodiversity and cultural diversity. Concerns for the reduction of plant, animal, genetic and cultural diversity (Maffi, 2018) are used to frame the Palestinian struggle for liberation as a struggle between biodiversity and monoculture. Monoculture here indicates a widespread tendency to homogenise difference, which echoes the JNF activities in the early 1900s but also identifies a general attitude towards regulating and homogenising difference throughout the history of Palestine.

The struggle against monoculture is refers to a struggle against the homogenising forces of ethnonationalism and the binding together of ethnicity, religion and territory under the nation-state. The story from the perspective of the activists and researchers at the PMNH runs as follows: biodiversity has always been the greatest resource of the area but decades of habitat destruction combined with longer-term changes due to industrialisation and large-scale deforestation in the nineteenth century have severely impacted local species. Palestine, as part of the Fertile Crescent, has always been home to diverse agricultural communities and Palestinians have inherited diversity as part of an ancient legacy tied to agricultural practices and domestication of wheat, barley, lentils, chickpeas and more. For the PMNH, diversity, both cultural and biological, is constitutive of the history of the region and part of its identity. Yet we are witnessing 'the project of transforming a multi-ethnic, multicultural, multireligious, and multilingual society into a "Jewish state of Israel"' lamented Qumsiyeh (email communication, 3 November 2022) while also stressing that not all Palestinians or Israelis buy into nationalist ideas: 'Both we and the Israelis are victims of this stupidity together, this is why for me the answer is respect, for one another and for nature' (interview, 30 October 2018).

During a meeting with the museum director and one volunteer from Beit Sahour, I asked whether the PMNH had an explicit political view and the director remarked that the priority was to have a 'sustainable human and natural community' that would be strengthened by enhancing diversity both in nature and in humans. The local volunteer joined in and noticed that creating a state for just one nation was 'the opposite to the ideas and history of this area, which used to go through different colonisations. It always hosted different people, nations, and even religious diversity' (personal

communication, 6 September 2019). The director suggested we could create an exhibition that could make parallels between the evolution of nature and the evolution of societies.

Qumsiyeh: In the evolution of society, you have hunters and gatherers, then you have agricultural communities, then you have city states, then kingdoms and empires, and now we have the nation-state. We could add a question mark after that, asking: what's the next model? This will help people think.

(Personal communication, 6 September 2019)

Then he stressed that the key idea he wanted to convey is that 'the future is in our hands to change' and, to do that, we need to ask ourselves: 'what is post-climate change, what is post-nation-states'? For Qumsiyeh asking these questions was more important than the answers, it was all about making people think.

What begins to emerge is a reading of political history that sees Zionism as one stage of a much longer history of colonialism. Although some of the articles published by the museum team mention the perspective of a 'Palestinian state in the making' (Qumsiyeh et al., 2022), statehood blurs in the background when seen through a longer time-frame, set against the prospect of ecological disasters and weakened by disillusionment with the outcomes of the Oslo accords. There are many threats faced by biodiversity in the Occupied Territories. Activities that are harmful to the environment include overgrazing, hunting, wastewater, dumping of solid waste, urban encroachment, and land speculation of Palestinian cities. Offering a very different take from traditional symbolic interpretations of the olive tree as a national signifier (Abufarha, 2008), the museum director explained that many Palestinian farmers in the West Bank have invested in monocultures of olive trees. Therefore, olive trees came to dominate the Palestinian landscape because, in contrast with other plants, such as figs, olive cultivations needed less care to survive in harsh conditions. Olive trees are more resilient and economically more viable as they do not need much water to grow. Jaber's (2019) study of al-Khader, a town located about 5 kilometres west of Bethlehem, suggests that the monoculture of olive trees cultivated by Palestinians in the West Bank is an indirect consequence of settler colonial policies, which have made cultivation inaccessible through dispossession and restrictions on mobility. Jaber describes how many Palestinians have resorted to cultivating olive trees, which require less water and maintenance, despite being aware that monoculture negatively affects the local ecology and leads to 'the loss of ecological diversity and the degradation of soil quality' (Jaber, 2019, p. 143). Several environmentalists I interviewed complained that the monoculture of olive trees grown by Palestinians was also damaging the land.

## 7 | SELF-SUSTAINABILITY: RETHINKING PROGRESS FROM THE STANDPOINT OF RUINATION

Through the gardens, the museum revisits narratives of improvement, progress and civilisation from the standpoint of those who have endured an 'Environmental Nakba' (Qumsiyeh & Abusarhan, 2020). Nakba in Arabic means catastrophe and is a term used by Palestinians to commemorate the displacement of over 750,000 people in 1948 and to denounce the ongoing erasure of Palestinian life. The environmental history of the Nakba seeks to include the progressive destruction of the environment, from the moving of Israeli polluting companies into the West Bank to the dispersion of toxic waste across the Green Line, to burning waste produced in the West Bank due to lack of appropriate services to dispose of garbage (Stamatopoulou-Robbins, 2019).

The botanic garden's primary function is to reintroduce nutrients into the impoverished soil and enhance biodiversity through experimentation. Researchers collect plants in wild areas throughout the West Bank and replant them in the botanical gardens, for example by introducing irises and orchids as well as trees such as carob, hawthorn, oaks, Pistacia and sumak trees in different sections of the gardens. Other operations involve translocation of rare and endangered species that are highly impacted by habitat destruction. The gardens can be explored by walking along a designated path that is composed of different stations. The stations include a Tortoise Sanctuary, with around 15 native tortoises walking around the gardens followed by a vegetable patch:

We live as an example of self-sustainability, feeding our volunteers with the crops we grow ourselves. The vegetable patch you see here is an example of traditional gardening, with sectioned and weeded areas for individual crops.

(PMNH, 2018, Section 3, Vegetable Patch)

Notions of self-sustainability and self-reliance are a form of emancipation and empowerment within the strangling political economy of the West Bank. Timothy Seidel (2019) examines self-reliance in Palestine as a practice that expands people's capabilities and decreases dependency on industrial food production. Self-sustainability is cultivated through practices that can be carried out by individuals—like permaculture and drip gardens. For example, the Biotopia/Food Forest section works as an area of experimental cultivation left to grow with minimal human intervention:

In front of you is an experiment with the practice of 'do-nothing gardening.' Fenced in and with drip irrigation, we're trying to recreate the natural landscape of the region, keeping the native 'weeds,' and throwing all kinds of seed types. The idea here is to let nature take its course.

(PMNH, 2018, Section 4, Biotopia/Food Forest)

The museum encourages vulnerable people to rely on community gardens to ease extreme poverty and water scarcity through workshops with women's groups, school environmental groups and other civic society and religious associations (Qumsiyeh, 2017). Not far from the aviary is a compost container, where natural waste is left decaying over time and turned into fertiliser:

At-home composting is a great way to reduce your waste while creating plentiful nutrition for your garden. Natural waste (i.e. food scraps, grass clippings, wood, cardboard, etc.) decays over time and makes amazing fertilizer.

(PMNH, 2018, Section 9, Compost)

Because the museum has very limited access to water per day, the gardens are used to experiment with techniques that require very little water for cultivation. Water scarcity is a constant challenge for Palestinians living in the Occupied Territories because Israel restricts Palestinians to a predetermined amount of water, while illegal Jewish settlements in the West Bank have unlimited access to water. This forces the Palestinian Authority to buy much more water from Israel's national water company, Mekorot, which extracts water from aquifers under the West Bank (B'Tselem, 2017). Therefore, the museum staff rely on hydroponic and aquaponic systems as methods of growing plants and fish together, without soil, by using mineral nutrient solutions in a water solvent.

The museum gardens focus on the potential of seed varieties to develop new medicines, promote agrobiodiversity, stem soil loss and build resilience to climate change. However, in contrast to the narrative of progress and improvement, the function of the gardens is primarily understood within a discourse of endangerment, scarcity and survival. Progress identifies a specific exploitative and predatory relationship with the environment that has caused large-scale destruction and cannot support future life on Earth. The focus is on enriching the soil and returning life to the natural rhythm of the land. It does not mean rejecting botany altogether, but it does require looking critically at purely utilitarian approaches to nature (Harding, 2018) and rejecting the idea, associated with Enlightenment thinker John Locke and incorporated in Zionist discourses (Fields, 2012), that nature exists to serve those who can most exploit it.

## 8 | CONCLUSION: FOR (BIO)DIVERSE FUTURES

This article has examined what I have called 'biodiverse futures' as a spatio-temporal alternative to the ecological domination of settler colonialism in Israel/Palestine. Through a discussion of the gardens at the PMNH, I have explored three interrelated processes that shape the relationship to time: future as knowledge, future as (bio)diversity, and future as survival. The paper started from an examination of the relationship between ecological practices and temporalities that constitute settler colonial environmental violence. While much scholarship has focused on the environmental imaginaries and epistemologies of nature that have informed colonial conquest in Palestine, this paper draws attention to the ways in which these relationships extend into constructions of the future. Futurity has become an increasingly important framework to interrogate decolonisation across different settler colonial contexts (Dekeyser, 2023; Gowland, 2021). Settler colonialism uses environmental and scientific knowledge to anticipate a future in which the indigenous population has been wiped out by natural and evolutionary causes. In this article I have argued that the entanglements of ecological practices and futurity are crucial in the formation of alternatives to settler futurity. These alternatives develop in response to an exclusionary and homogenising model that rules humans and non-humans based on hierarchies of difference.

This article developed an approach that explores the intersection of human–non-human political relations in Israel/Palestine through the concept of futurity. By stressing the importance of ecological temporalities in shaping alternatives to settler futurity, the article makes two main contributions to existing literature. First, it aims to fill the gap in the literature by discussing Palestinian ecological practices and their critiques of settler colonial relations with soil and land, offering insights into alternative conceptions of futurity. Second, the article contributes to the literature on environmental politics and environmental injustice in Israel/Palestine by examining the role of ecological temporalities in relation to settler colonial environmental violence. It stresses that environmental violence is manifested both spatially and temporally. This approach sheds light on the botanical garden as a site of decolonial politics and experimentation with alternative relationships to the land.

As the land and resources available for Palestinian life are progressively eroded, there is less and less space to nurture alternatives. Given the ways in which purely epistemological approaches to decolonisation have rightly been problematised, readers might ask how these processes advance the actual decolonisation of land. Developing non-exploitative relationships with the land through theory and practice is essential and coexists with demands for land restitution because, to paraphrase the words of the museum staff, ‘when the time comes for liberation, there will not be any place left to inhabit’. These are calls to disengage the political imagination from violent epistemologies of nature and essentialist views of difference. Crucially, decolonising the idea of the nation-state requires re-imagining cohabitation and ecological relations with the earth altogether. How to nurture and cultivate alternative political possibilities rooted in indigenous experiences, epistemologies and land relations is a central question for decolonisation (Daigle & Ramírez, 2019). This urgent task requires moving away from exclusionary governance structures and making space for alternatives. Biodiverse futures begin where stories of inert deserts and technological improvement are disrupted (Koch, 2021). Biodiverse futures are already present in the practices being experimented with in the gardens, laying the groundwork for hopeful alternatives to the temporalities of settler colonialism.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available upon reasonable request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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