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Milpa-Melipona-Maya: Mayan Interspecies Alliances Facing Agribiotechnology in Yucatan

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Abstract

This paper examines an environmental conflict between Mayan communities and governmental authorities in Mexico's Yucatan region. Mayan beekeepers attributed severe economic losses in honey production to the expansion of genetically engineered (GE) soy plantations. Beekeeping of *Apis mellifera* or "European" honey bees for the purposes of honey export is a key source of livelihood for Mayan communities. Mayan beekeepers mobilized to bring about a moratorium on GE-soy planting, but GE-seed corporations and farmers persuaded the government to lift the moratorium. We show that there is much more to the Mayan beekeepers' resistance than their livelihood stakes in "European" bees. Focusing on historically shaped

relationships between Mayan communities, *milpa* crops and indigenous *Melipona* bees, we develop the idea of *interspecies alliance* to explain the resistance of Mayan communities to the spread of GE-soy. Through ethnographically oriented fieldwork and archival research, our study sheds light on conjoined *milpa-Melipona*-Maya worlds struggling together to resist and survive in the face of interpenetrating climates of globalized capital and localized socio-ecological degradation. We also examine how the interspecies assemblage of *milpa-Melipona*-Maya has been transformed in the process through alliances with international foundations, religious groups, scientists, activists and alternative technologies.

Keywords

Bees; biotechnology; Yucatan; multispecies; Mayan

Introduction

In 2011, a series of conflicts erupted between Mayan communities of Yucatan and the Mexican Government, triggered by European authorities' rejection of honey due to unacceptable levels of genetically engineered (GE) pollen in the honey that was produced mainly by Mayan beekeepers. This data-triggered event – caused in part by a shift in the European Union's standards for evaluating levels of transgenic substances in honey – led to serious economic losses in Mayan beekeepers' communities (Carrillo, 2017; Villanueva-Gutiérrez, 2014).[1] Mayan beekeepers rose to struggle against the GE plantations, heightened declines of their *Apis* bees, but also the accompanying deforestation, toxic pollution of ground water, and land loss to big agriculture and mega tourism. They came to realize that unless they mobilized their cultural knowledge to think through and react to these threats, not only their economy but also essential parts of their memory and culture, would all together become collateral damage. Mayan beekeepers attributed their losses in honey trade to the pesticides brought by the GE-soy, in Yucatan grown mainly by Mennonite farmers.[2] They appealed to the Mexican state authorities that GE-soy be forbidden.

1 Honey production from "European" honey bees (*Apis mellifera*) is the main source of income for various Mayan communities in Yucatan and accounts for close to 40% of Mexico's total honey production (Güemes-Ricalde et al., 2003).

2 Mennonites came to Campeche from northern Mexico. In the 1980s, Old Colony Mennonites in Durango began to perceive land shortages and started searching for new colonies. In 1983, the State of Campeche offered several hundred hectares under favorable conditions so they purchased the land and began to move there (Ens, 2018). In the 1990s, Campeche's colonies grew as large numbers of Mennonites left the northern states in fear of growing persecutions from drug cartels that targeted their communities. Mennonites had arrived in northern Mexico from Canada in the 1920s, leaving in protest against secularization and Canadianization to which they were subjected by the establishment of the Canadian state school system. They were looking for a place that would

Due to the long-standing relationship of Mayans with bees (Mayan god Ah Musen Kaab is a *Melipona* bee), Mayan communities, and in a particularly active way, beekeepers' collectives from Hopelchén and Bacalar, appealed to the regional courts alleging that GE-soy infringes on their "right to culture", which is guaranteed by the Mexican Constitution. After many years of struggle, thanks to the support of activists, lawyers and international organizations, such as Ma'OGM and Indignación, in December 2017, Yucatec beekeepers succeeded in de-legalizing GE-soy planting in all the states of the Yucatan peninsula.[3] GE-soy growers appealed this decision, and pesticide and GE-seed corporations lobbied the government until this prohibition was ultimately reverted in August 2019. Yet, again in the first week of November 2019, the newly nominated director of a powerful state agency CONACYT (Consejo Nacional de Ciencia y Tecnología), Elena Álvarez Buylla, herself a world-renowned plant geneticist, announced her support for Yucatan bees and blamed GE-soy (Miranda, 2019). The struggle continues.

This essay attempts to show that if Mayan mobilizations have been considerably successful, this was precisely thanks to their affective attachment to indigenous stingless *Melipona* bees, *milpa* plants and forests, not just their relationship with the *Apis* bees that produced honey for export. In other words, we aim to show what are the deep drivers of this Mayan mobilization and how Mayan

grant them freedom from military service, from oaths of allegiance, as well as freedom to establish their own schools and teach in their language the subjects of their choice. President Obregón granted them these privileges hoping that they would in turn help to reconstruct the agriculture that had been destroyed by the Mexican Revolution. The Mennonites who moved to northern Mexico were the most conservative group among those who had arrived in Manitoba and Saskatchewan in the 1870s from Germany and East Prussia (Fretz, 1945). Indeed, Mennonites have been moving from place to place for several centuries since they followed Menno Simons, who had left the Catholic Church during the times of Reformation in 1536. For the next hundred fifty years the community was severely persecuted, and its leaders killed because their beliefs and practices upset state authorities and state-affiliated churches. In particular, they refused to use or condone the use of violence under any circumstances, including self-defense. Their efforts to adhere to non-violence and other community values led to their alienation from the societies surrounding them, but they were granted an entry to the American colonies because they were known as a hard-working and industrious community. For this same reason, they were given the privileges that they had requested in Mexico. It is believed that the difference between highly industrialized north Mexican agriculture, and the traditional central and southern agrarian structure is largely due to the influence of Mennonites (Hinojosa, 2014). There are around one hundred thousand Mennonites in Mexico today and they are among the fastest growing ethnic groups (https://themennonite.org/opinion/amish-growth-enriches-us/). In Campeche and Quintana Roo, Mennonites' relationships with Mayans are limited to employment and commerce. Mennonites employ Mayans in their fields for manual labor, and they also distribute pesticides, seeds and cheese, from their own productions, to Mayan communities. Intermarriage is extremely rare and punishable with expulsion in Mennonite communities, and the social lives of both communities occur separately.

[3] SENASICA (Servicio Nacional de Sanidad, Calidad e Inocuidad Agroalimenaria) — the Mexican governmental agency responsible for regulating agricultural commodities — revoked the 2011 permission to plant and commercialize GE-soy in seven states of Mexico: Campeche, Chiapas, Quintana Roo, San Luis Potosí, Tamaulipas, Veracruz and Yucatan.

beekeepers managed to build a wide alliance to support their struggle. With the aim of shedding new light on resistance to the advent of bioeconomy (Pavone, 2012), intimately connected to the latest stage of neoliberal capitalism, we adopt a framework of inquiry that considers human cultures as "interspecies" (Livingston and Puar, 2011). Interspecies cultures are co-constituted by relationships, with plants, animals, and other-than-human entities, which we call interspecies alliances. By focusing on interspecies alliances, we believe that we are telling a different story from those that have already been told about rising resistance to industrial agriculture in Latin America (Beilin and Suryanarayanan, 2017). We also examine how these interspecies alliances and resistances generate *sui generis* transformations in rural cultures, as people re-learn and reinforce their histories and remember their forgotten strategies of coexisting with plants and animals, a process that, evoking Walter Mignolo's term, we call interspecies re-existence. Walter Mignolo (2016), defines re-existence as a set of discourses and practices, historically shaped and aimed at decolonizing the Hispanic World. While embracing Mignolo's concept of re-existence, we open it to consider the role of other-than-human participants in decolonizing processes. We focus on the context in which re-existence occurs, as a nexus of cooperation between different human groups and ecosystems connected by networks of globalization and alter-globalization. We often come to reflect upon Tuck and Yang's (2012) proposition that decolonization is all about land, and that it will not happen without Indigenous people taking the land back from the colonizers. In our analysis, and as expressed by Indigenous activist Aldo González (2016), this land does not only belong to the Indigenous people, however, but "it also belongs to maize," forests and bees.

Methodology

Our research for this essay is based on primary and secondary sources, but most importantly ethnographic fieldwork and more than 40 interviews[4] that we led in Hopelchén, Itchek, Maní, Mérida, Tulúm, Tzakamulkay, San Juan de Dios, Peto, Xoy, Noh-bek, Tepich, Tzucabab, Dziuché, Tihosuco, Bacalar, Salamanca, Hay-Pix, Chetumal, Belize city, and San Cristobál, Chiapas, during two months of the summer 2017, two months in the summer of 2018 and an additional 6 weeks in the summer

[4] Our interviews were preceded with research and questions in each conversation were carefully thought out beforehand. Oftentimes however, the conversation took its own course, and we adopted new questions based on what our interviewees said. Some of the interviews were longer than two hours, and the shortest lasted around 40 minutes. Some of the interviews were written down in notes, but most were videotaped and constitute an educational material that has already been used in a graduate seminar at the University of Wisconsin, Madison and that will also be used in a documentary film, currently in post-production. The authors are experienced interviewers; one author has published a book of interviews with contemporary writers (Beilin, 2004), as well as a monograph (Beilin, 2015) and various articles partially based on interviews (Beilin 2016; Beilin and Suryanarayanan, 2016); the other author has published a book and multiple peer-reviewed articles based on data gathered from interviews and ethnographic fieldwork (Suryanarayanan and Kleinman, 2013, 2017).

of 2019. We interviewed politicians, such as Eduardo Batllori, the secretary of the environment of Yucatan, activists such as Luis Arturo Carrillo, member of the informal organization MAOGM (in Mayan, No to GMOs), Carlos Meade from the Tree of Life, Jorge Fernández from Indignación, Mayan leaders, beekeepers and *milpa* activists, such as Bernardo Camaal, Jorge Pech, Leydi Pech, Angelica Ek, Feliciano Ucán, Bernardino Camul, Egilio Dzib Canul, Father Tilo from the School of Agroecology in Maní, collective Kabi Habin de Bacalar; scientists and academic researchers such as Remy Vandame, José Javier Quezada-Euán and Ramón Mariaca Mendez; producers of honey, such as Federico Berrón, Mennonite farmers such as Franz Martins of Santa Elena, Johan Berge of Salamanca, and Marc from the Hopelchén area, just to mention some. We also talked to historians, artists, educators, guides and random people that we met in the fields, in the parks and on the road. As another point on methodology, in our research we attempt to avoid the dynamics of objectivization of people and their knowledges. To this extent, we follow Chim Bacab's (2018) postulate that research be done in dialogue with Mayan people and their philosophy rather than objectifying them and their knowledge.

Our interspecies framework builds on what we learned in our numerous conversations, but it also establishes a dialogue with the corpus of scholarship in environmental humanities including critical geography, anthropology, philosophy and political science, and science and technology studies (STS). A central insight common to all these, is that nature and culture, biological and social, human and other-than-human are not binary opposites but are co-constituted and co-produced as *naturecultures* (Haraway, 2008) or socio-natures (Castree, 2001),[5] through thousands of ongoing *intra-actions* (Barad, 2007) where humans and nonhumans become "companion species" (Haraway, 2008; Tsing, 2012). In other words, neither is culture/society exclusively the realm of humans, nor is "nature" exclusively the realm of nonhuman beings. Assembling humans into the relations with nonhumans has been undertaken by various geographers including Castree (2001), Collard, Dempsey and Sundberg (2015), LeHeron et al. (2016), Whatmore (2002), anthropologists such as De la Cadena (2016), Hetherington (2013), Kohn (2013), Myers (2015), philosophers such as Bryant (2010) and Marder (2013), political scientists such as Bennett (2010), and many others. Once assembled, these relations rely on reciprocal engagement and thus some kind of agency or even thinking is posited to nonhumans (e.g., Kohn, 2013).

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5 Noel Castree (2001), criticizes Marxists for "the questionable assumption that nature and humanity are two separate realms needing to be brought together or held apart in particular ways." Castree's vision of capitalism as unavoidably profit driven production of nature leading to its destruction, considered by him similarly in the context of GMOs, is close to ours, except, perhaps his belief that capitalist production of nature has gone so far that there is no way back. Our story, focused on revitalization of Mayan engagement with non-human beings, points in the opposite direction.

Indeed, the exteriorization of nature from culture may be seen as an historically situated phenomenon of a capitalist modernity that has arguably enabled massive technological dominance and exploitation (Latour, 1993), as well as crises in an epoch that has been called Anthropocene, Capitalocene (Moore, 2015), Chthulucene, and Plantationocene (Haraway, 2015). It is by taking into consideration the historical agencies and vitalities of other-than-human entities in partnerships with humans, which have been called agentivities (Müller, 2014), vibrancies (Bennett, 2010), and gravitational forces (Bryant, 2011), that a multidimensional analysis of conflicts like the one that involves Mayans, Mennonites and the Mexican Government can be constructed. Because this conflict is in fact not just between groups of people, but rather between interspecies alliances and biocultural assemblages featuring the *milpa-Melipona*-Maya-activists, and the GE-soy-pesticides- Mennonites-corporations-bulldozers-governmental agencies.

Our research follows the paths opened by social scientific accounts of the marginalization and struggles of Mexican rural cultures against GE-crops by various researchers (Fitting, 2011; Gómez González, 2016; Kinchy, 2012; Otero, 2012). Gómez González (2016) and Starobin (2018) examine Yucatec Mayan beekeepers' resistance to the spread of GE-soy through political economy approaches that are focused on the contemporary state of affairs.[6,7] We complement these emerging analyses by foregrounding an interspecies angle, one that elaborates the significance of historically grounded relationships between Yucatec Mayan people, stingless *Melipona* bees, *milpa* plants and forests.

The Conflict

During the meeting of the Mayan Beekeepers' Collective in Hopelchén, Leydi Pech,[8] Jorge Pech and others talk about the Mennonites with mixed feelings. Jorge, more temperamental than his sister, gets excited as he reproaches them for "ploughing through ancient Mayan ruins" and destroying five times more forest that they need for planting (Jorge Pech, 2017). In a later conversation, similarly Feliciano Ucán (2018) accuses Mennonites of knowing that they do damage and of suppressing this awareness because they are excessively interested in profits. Leydi, however, calmly states that they (the Mennonites in Campeche) are Mexican citizens like the Mayans, and have all the rights to live and work where they want. She adds that they

6 Gómez González (2016) focuses on contradictions entailed in the neoliberalized model of chemically intensive GE-agriculture, whose productivist logics of capital accumulation and innovation are undercut by deforestation- and agrochemical-induced damages that threaten Yucatec Mayan's main source of livelihood — *A. mellifera* honey.

7 Starobin (2018) undertakes a global-commodity-chains approach to analyze the success of the Yucatec Mayan beekeepers' movement against GE-soy planting, by focusing on the materiality of honey as a commodity connecting and confounding relationships between local ecosystems and global markets.

8 Leydi Pech is the president of the association and one of the best-known leaders of the movement.

are good people, but do not understand things and need a bit more education (Leydi Pech, 2018). Our interviews with Mennonite farmers point in various directions. Mark, whom we interview in the fields of soy near Hoplechén, claims that soy does not do any harm to bees, and that Mayan people are manipulated and confused (2018). Similarly, Johan Berge to whom we talk for several hours in Salamanca, near Bacalar, himself a beekeeper, does not connect his own bee losses to the agricultural use of pesticides or monocultures. Only Franz Martins of Santa Elena is aware that there are problems with his way of farming, but he had already listened to the lectures on agroecology brought to his village by Merida activists. Perhaps, Leydi was right.

Representatives of Mennonites and Yucatec Mayans met several times during the process of community consultations that were mandated by a court order concerning the planting of GE-soy. Mennonites and Mayans were mostly silent during these meetings in which governmental representatives talked the most. It was only during the last consultation meeting that Mayans from a community called Iturbide, who rented their lands to Mennonites under GE-soy, erupted with violent words and gestures during the meeting. We are told by Mayan beekeepers that the Iturbide were recruited by the GE-soy growers to break the unity of the Mayans. But, Mennonite farmer, Mark, believes that it is the beekeepers against GE-soy who are manipulated and "subsidized" by the enemies of the Mennonites.

Even if some of these stories were correct, and they may not be, we come to believe that the conflict is deeply rooted in a historical struggle between two radically different visions of life, where the main difference lies not so much in human relations and superficial power struggles, but in the relations with other-than-human life, that could be called divergent "cultures of nature" (Ares López, 2017). One of these cultures treats nature as resource for profit, and the other, inherent in Mayan spirituality, engages the world as a respectable, loved and feared partner to coexist with it. One of the most important contributions of our paper to geography, cultural studies, and political ecology, is pointing out the significance of this latter vision in political struggles about environmental regulations, and ultimately in stopping ecological degradation. In doing so, we advance lively scholarship that seeks to nurture "relationships across vast differences, best described as solidarity or collective movement in support of conditions that enable differently situated people and other-than-humans to realize abundance, to build a world of many worlds" through decolonizing frameworks (Collard, Dempsey and Sundberg, 2015: 328).

A symbiotic coexistence between Yucatec Mayans, *milpa*, *Melipona* bees and forests has survived—and transformed—in the face of many upheavals: colonization by Europeans, expanding networks of capitalism, and the recent growth of circuits of global tourism and industrial agriculture, in particular GE-soy. In the recent struggles, Mayan ways of life have found supporters among national and international activists, multiple NGOs connected with international foundations, catholic church groups who cherish theology of liberation ideals, various university scientists, lawyers, *Apis* honey producers and exporters and, we want to say, in some ways, also bees, maize and forests themselves. On the other side of the spectrum, the

GE-soy-pesticide-Mennonite alliance receives strong support from the Mexican state, agribiotechnology corporations, as well as various scientists who work with them, and globalized commodity chains of the livestock industry that rely on GE-soy as animal feed (Weis, 2013). Various Mayans, tempted by promises of higher yield, have also adopted some industrial agriculture ways, in particular pesticides that are often sold to them and used by them without proper precaution.[9]

Bees: Mayan Meliponas, Milpa and Apis

The contamination of *Apis mellifera* honey with the GE-pollen is only one example of the effects of a progressing industrial and chemically intensive bioeconomy on the sacred subsistence aspects of Yucatec Mayans' lives, which always were intrinsically connected to other-than-human entities around them. As we kept talking to diverse groups of beekeepers struggling against the GE-soy bioeconomy between 2017 and 2019, we realized that while their mobilizations seemed to be a direct answer to the 2011 rejection of *Apis* honey by the EU port authorities, the deeper fear and anger was related to the prospect of losing their *Melipona* bees, their forests, their *milpa*s, their clean water, in sum, their land. We aim to understand the concealed dynamics of these interspecies relations in the context of the past centuries of oppression of Indigenous Maya communities, destruction of Yucatan's ecosystems and concomitant patterns of resistance, shaping a complex present. It is our thesis that these interspecies relations have a very important role in mobilizing political agencies in today's struggles about the sustainable use of land by agriculture, tourism and forestry. Let's understand them in a historical context.

Mayans have lived in Yucatan for more than four thousand years (Adams, 2005). Eight million Mayans lived in Central America and southern Mexico before the arrival of Spaniards (Blanton et al., 1993). During the first centuries of the colonization, their population decreased dramatically to re-establish itself today at seven million distributed between Guatemala, Belize, Honduras, and in Mexico, Yucatan and Chiapas. Although similar to Mennonites in being mainly an agricultural community, Yucatec Maya have developed a very different culture of agriculture, known as *milpa*, which is a system of swidden cultivation and continuous rotation with forest fallow (Ewell and Merrill-Sands, 1987). *Milpa* has been for thousands of years a mode of sacred subsistence agriculture that originated in pre-Hispanic times and which continues to be an integral part of Indigenous Mesoamerican communities today. *Milpa* is particularly adapted to the difficult and

9 When we talk about Mayan struggle, we do not only refer to this ethnic group, but rather to the hybrid alliances that formed around Mayan philosophies of nature, Mayan interspecies bonds with bees, *milpa*, and forests. We do not refer to the whole Mayan population either. As in every human group, among Mayans, there exists a wide spectrum of attitudes towards their own culture and towards the culture of globalization that promises profits even if it deprives them of the land.

patchy ecology of Yucatan, characterized by the almost-complete absence of surface water (the region has a subterranean network of lakes and rivers), irregular rainfalls, and limestone-rich soil of relatively marginal quality for continuous cultivation of crops (Ewell and Merrill-Sands, 1987). At its core, each cycle of the Yucatec Mayan *milpa* involves a series of successional stages, lasting up to 35 years, that requires intergenerational collaborations and long-term planning (Diemont et al., 2011; Toledo et al., 2008). Thus, besides being a technology of growing food crops, *milpa* has been a foundation of a plant-based vision of human life immersed in vegetal biorhythms and is hardly compatible with the industrial system of monocrop plantation agriculture that creates "accelerating biophysical contradictions" driven by a growing desire for fast profit (Weis, 2010).[10] *Milpa* is also the center of the community life; it is the material map of the village, it organizes society, work, food production and structures family roles and communal administration of the land (Camaal, 2018).

Interspecies alliances between humans, *milpa*, forests and bees have created their own worlds of meaning in Mayan cultures for thousands of years. The god of the bees, *Ah Musen Kab* (Figures 1 and 2) is the creator of earth and universe in the fourth (and final) cycle of the Yucatec Maya cosmos. *Ah Musen Kab* is the guardian of stingless *Melipona beechei* bees, an endemic variety of social bee with which Yucatec Maya communities have co-evolved over thousands of years. The bee god is represented upside down, as coming down rather than flying up. In the *Popol Vuh* and *Chilam Balam*, *Ah-Muzen-Kab* climbs down *axis mundi*—the sacred green tree representing the center of the world holding up the great sky— to the underworld, where he releases the trapped forces of life. The deity of *Melipona* bees brings life to the Yucatec Mayan world and unifies the deities *Ah Uuk Cheknal* (the seventh corn pollinator) and *Uuk Taz Kab* (the seven layers of the beehive) (Lopez-Maldonado, 2005).

In unifying the deities of corn and beehives, *Ah Musen Kab* was also bringing to Mesoamerican peoples something even more important, namely a wisdom of understanding things in connection and symbiosis. Sets of symbiotic connections were established by Mayans not only with their *Melipona* bees, but more in general with their surrounding world, best represented in their *milpa*, where maize, beans, *chiles* and some other plants are grown together and are "helping each other". An awarded Mayan poet, Pablo Pedro Chim Bacab, explains that while in the cultures of European origin, there are only two subjects, man and God, and all the other life forms are objects, in Mesoamerican cultures, there are no objects, and everything is a subject: animals, plants, and even stones. In this framework, it does not make sense

10 Weis (2010) argues that capitalist industrial agriculture's reliance on highly mechanized and chemically intensive inputs to establish large-scale monocrop systems of production at the same time create interlinked treadmills of biophysical problems – such as soil erosion, water contamination, depletion of animal and plant species – whose synergies set up accelerating contradictions that undercut the sustainability of this industrial agricultural system.

to talk about protecting nature, but rather, the goal is a symbiotic coexistence with the nature that surrounds us

(Chim Bacab, 2018)

Figures 1 and 2: Ah Muzen-Kab patronizing stingless *Melipona beechei* bees in the Mayan village of Tzakamulkay (photo on left, Katarzyna Beilin, 2018). Ah-Muzen-Kab Temple in Tulúm (photo on right, Reynaldo Morales, 2019).

Yucatec Mayans' historical alliance with *Melipona* bee populations is a part of the same sacred economy of subsistence that the *milpa* constitutes. Archaeological and historical records such as the *Madrid Codex*, which contains manuals concerning meliponiculture with detailed observations of *Melipona* social behavior and biology, provide evidence that Yucatec Maya communities had developed sophisticated practices of nurturing and manipulating colonies of *Melipona* bees predating Hispanic times by 3500 years (Villanueva-Guttiérez et al., 2013). Pre-Hispanic modes of *Melipona* beekeeping are practiced to this day in the Yucatan region, and involve cutting or finding logs of hardwood containing the wild *Melipona* colony, transporting the colony to a home, where the colony is transferred to a hollowed-out log hive called *jobón* (Figure 3).

Figure 3: A. Meliponario in the township of Itchek with several *jobónes*. Sainath Suryanarayanan, 2017.

Melipona honey is used as a medicine, as a sweetener, and it is also an important part of ritual ceremonies, for example to make *balché*, a hallucinogenic honey mixture used in enema rituals (Lopez-Maldonado, 2005). Called "Xunan Kab", *Melipona* bees have played a central role in Yucatec Mayan epistemology, cosmology and social organization (Figure 4).

Figure 4: *Melipona beechei*. Marcos Colón, 2018.

Melipona bees are believed to be harbingers of messages from gods and a symbol of fertility and of life itself. According to Lorenzo Chim, a Meliponiculturist who took care of *Melipona* bees belonging to the Melipona Maya Foundation in Tulúm—if you have these bees at home, you will have a Maya person at home as well, because "*Melioponas* are Mayans" (Chim, 2017). The Yucatec Maya word Kab

(like in Xunan Kab and Ah-Muzen-Kab) does not only mean "bee" but also "world" -- the social world of Yucatec Mayans and the social world of *Melipona* bees are interconnected and draw from each other.

Neither *milpa* agriculture nor meliponiculture have remained static through history. In the wake of the Spanish conquest of the Yucatan region in the late 1500s, Yucatec Maya relationships with *milpa* plants and *Melipona* bees have shifted in dynamic tension with colonizing and neo-colonizing forces as well as with countervailing forces of Indigenous empowerment. Intensively cultivated monocultures of sugar cane, agave, and sisal plantations that came with the Spaniards led to widespread deforestation and the decline and displacement of *milpa*, Mayan people and *Melipona* bees across the Yucatan (Villanueva-Gutiérrez et al., 2005). The accumulating tensions culminated in the Caste War of Yucatan (1847-1901) in which Indigenous Mayan communities took up weapons to defend their lands and ways of life against the colonizers (Figure 5).

Bernardo Camaal, a Mayan activist, agronomist, writer and radio journalist, compared the processes that are transforming Mayan lands today and those that led to the War of Castes, the longest-lasting rebellion (1848-1901) of Mayan people, which had nearly succeeded in freeing Mayan lands from Mexican domination. While nowadays it is the spread of monocrops such as GE-soy that pushes Mayan people off their territories, in the first half of the nineteenth century it was the monocrops of henequen and sugarcane that took away the land from Mayas. He says, "*milpa* made Mayas fight the War of Castes" (Camaal, 2018), suggesting an activating character of relationships between the people and their *milpa* crops. Pedro Pablo Chim Bacab, Mayan awarded poet, similarly compares forms of colonial domination to today's development where Mayan people are objectified. Indeed, buried deep in the forest, in the town of Tixcacal Guardia, near Felipe Carrillo Puerto, Mayan Generals still guard the talking cross (*la cruz parlante*) that guided them during the nineteenth century war. Mayan elders tell us that "The War of Castes has not finished yet." The echo of Zapatista rebellion in Chiapas sounded strong in Yucatan Mayan areas.

Figure 5: Ruins of the Church destroyed by the War of Castes in Tihosuco that is also the location of the Museum of the War of Castes. Katarzyna Beilin, 2019.

In the carnage of the War of Castes, various Mayan communities from Campeche were forced to flee to Quintana Roo, leaving behind their *milpa* plots and *Melipona* log-hives. As a result, the intergenerational transmission of knowledges and practices of meliponiculture may have suffered and some of these knowledges and practices concerning *Melipona* bees may have been forgotten. Meliponiculture has declined also as a result of progressive deforestation and agrochemical contamination (Höstettler, 1996; Muñoz, 2016; Quezada-Euán et al., 2001). Meanwhile, Mayan peasants incorporated metal tools and pack animals into their *milpa*, and later on, some of them started to use chemical pesticides and fertilizers and newer varieties of maize. At the same time, the decreasing space for *milpa* cultivation due to progressive deforestation has meant that the same soils got re-used for multiple years of planting, leading to drainage of soil nutrient quality and decreased *milpa* yields over time (Ewell and Merrill-Sands, 1987).

Since the entry of Mexico into the North American Free Trade Agreement, Yucatan's *ejido* system of forests has been reconfigured by the Mexican State, allowing individuals to sell *ejido* parcels to private interests (Barnes, 2009). This has facilitated the purchase of Mayan lands by Mennonites, which was already fueled by the massive sale of federally owned forested lands by the Mexican State to Mennonites at highly subsidized prices (Gómez Gónzalez, 2016). The same period has seen a huge acceleration in the conversion of Yucatan forests into industrial agriculture fields, often GE-soy fields, mainly by the growing Mennonite population (Ellis et al., 2017). Johan Berge from Salamanca told us that when Mennonites purchased land from the ejido Bacalar, they were only given permission to cut 1600 hectares of forest, but that they cut more anyway little by little and ended up doubling this amount (Berge, 2019).

While deforestation and chemically-intensive agriculture intensified by neoliberalization have marginalized Mayan *milpa* and *Melipona* relationships, yet another important actor needs to be seriously considered. *Apis mellifera* honey bees have played a complicated role--- first as displacers, and later, as enablers of Yucatec meliponiculture (Figure 6).

Figure 6: *Apis mellifera* or European Bees beekeepers. Marcos Colón, 2018.

The first *Apis mellifera* honey bees were brought from Florida to Yucatan by "men of means" in the late nineteenth century (Calkins, 1974: 94). Following the early decades of the twentieth century, Yucatec Maya people were encountering *Apis mellifera* swarms that had escaped from their boxed-enclosures into Yucatan's forests (Höstettler, 1996). Allegedly, Mayans sometimes stole *Apis* bee-boxes with honey bees from their honey bee owners for whom they worked (Calkins, 1974). During the 1950s, the Mexican government took advantage of these increasing contacts between Yucatec Mayans and *Apis* honey bees by beginning rural development initiatives that provided aid to Mayan communities in return for their adopting a commodity-oriented model of producing industrial-grade *Apis* honey in order to export it to already established international markets of honey (Calkins, 1974; Höstettler, 1996). In the aftermath of international sugar shortages prompted by the second World War, Yucatan emerged onto the world stage as a major exporter of industrial honey to the United States, Germany, the United Kingdom and the Netherlands, with 90% of *Apis mellifera* beekeepers being of Yucatec Maya ethnicity (Calkins, 1974). As apiculture became the prime source of income for Yucatec Mayans, it slowly replaced meliponiculture (Höstettler, 1996; Muñoz, 2016). At the same time, meliponiculture was never fully displaced and it persisted at relatively low levels in Yucatec Maya communities, who used the cash generated from selling *Apis* honey to continue keeping *Melipona* bees in traditional ways (Weaver and Weaver, 1981). While apiculture was a market-oriented activity and source of

income, meliponiculture was a non-profit sacred activity that was a source of meaning.

Yucatec Maya's cash-oriented relationships with *Apis* honey bees have co-evolved in a complementary dynamic with their subsistence modes of *milpa* planting and *Melipona* beekeeping. For example, the labor schedule and resources required for keeping *Apis* bees do not clash or compete with the *milpa* planting cycle (Hösttetler, 1996). The most intensive months of *Apis* beekeeping tend to be from February to April for honey harvesting, during which the labor requirements of tending to *milpa* plots are minimal. Similarly, stingless *Melipona* hives tend to be kept in close proximity to Maya homes whereas *Apis* bees, in part due to their collective stinging capacities, are generally not kept in villages but at farther distances, sometimes in association with the *milpa* (Calkins, 1974; Diemont et al., 2011). This micro-geographical separation between *Apis* and *Melipona* bees fuels a gender-based division of labor within contemporary Mayan households in which men tend to manage *Apis* honey bees, and more and more often women care for *Melipona* bees.

The evolving dynamic between *Apis* and *Melipona* bees in Yucatec Maya communities took another twist in the late 1980s with the entry of "africanized" *Apis mellifera* bees into the Yucatan region (Quezada-Euán et al., 1996). Africanized bees had originated from an experiment gone awry in Brazil in the late 1950s. Scientists had brought *Apis* bees of African origin (*A. mellifera scutellata*) to an experimental station in Brazil for the purposes of producing an improved strain of honey bee by crossbreeding them with *A. mellifera* bees of European origin. Hybrid varieties of "africanized" honey bees escaped the experimental station, thus eluding the intertwined machinations of science and capital. As they migrated northward, breeding with immigrant European varieties of *Apis mellifera*, Africanized bees posed new challenges to apiculturists because of their increased propensity to defend their colonies by stinging[11] and to find new nesting sites by frequently swarming. These challenges posed by the "Africanized" bees in the late 1980s led to modifying beekeeping practices by keeping beehives far away from the livestock and homes. Ironically, the "Africanization" of *Apis mellifera* colonies in Yucatan, which led to Mayan beekeepers relocating *Apis* beehives further away from their homes, may have shaped a physical and cultural opening for the revival of keeping stingless *Melipona* bees near Maya homes (Höstettler, 1996; Quezada-Euán et al., 1996) along more gendered lines, with women often becoming meliponiculturists (Muñoz, 2016).

The Yucatec Mayas' commercial culture of *Apis* beekeeping and the subsistence culture based on stingless *Melipona* bees and *milpa* plants ran complementary to each other in an uneasy dynamic until the "discovery" of GE-soy pollen in *Apis mellifera* honey in 2011. It became apparent to Mayan beekeeping communities that the globalized market forces that had brought apiculture to Yucatan

11 See Tsing (1995) for a compelling reflection on the racialized discourses around Africanized bees.

had also brought networks of bee pathogens and parasites, big agribusiness operations, deforestation, and agrochemical toxification, which in turn had begun to destroy apiculture, and threaten their subsistence economy based on *milpa* plants and *Melipona* bees that lived in forests cut under GE-soy. The seeming co-existence between the subsistence economy and a chemically-intensive and industrial agricultural bioeconomy appeared as clearly untenable (Gómez Gónzalez, 2016). The rejection of shipments of *Apis* honey for export to Europe opened a new chapter in the storied struggle of Mayan communities against colonizers and neo-colonizers. This chapter is characterized by strengthening of the alliances working towards the decolonization of Mayan cultures based on the still-surviving memories of past technologies of Mayan coexistence with other-than-human beings, that we call here interspecies memory.

Interspecies Memory

While Toledo and Barrera-Bassols' (2008) concept of biocultural memory is anthropocentric, since it describes human memories of how to adapt to the environment gathered through centuries, we see the process of memory as distributed between humans and nonhumans. As Polanco and Beilin argue (2019a, 2019b), both human and nonhuman interests are interconnected through deep and long-lasting alliances. For example, various peoples of Mexico say that maize is their mother who protects them, but also demands protection from them. The same can be stated about Mayan peoples' relationships with *Melipona* bees. In this case, the agenda of *Melipona* bees is realized through an alliance with Mayans with whom they coevolved over millenia. On the other hand, when Mayan people were in trouble, their relation with *Melipona*s proved crucial when the courts forbade GE-soy to respect Mayans right to culture.

Interspecies memory flashes only when certain forms of life come together and interact; a seed remembers soil and a bee remembers forest plants whose flowers developed to attract the bees. Human memory also displays consciousness sparked by sensual contact with places, tastes, images or sounds of environmental forms of life or matter that carry fractions of meanings from the past, like in Marcel Proust's *Remembrance of the Things Past,* the smell of muffins famously evokes memories of childhood. In other words, interspecies memory comes in what feminist scholar Karen Barad (2007) described as an intra-action, when an encounter between two or more earthlings affects and ignites their very identities. A moment like that is expressed by Mayan poetry.

Memory, maize and *Melipona*s are connected in *Lool K'ajlay* (Flower of Memory), an award-winning book of poems in Yucatec Maya and Spanish by Pedro Pablo Chim Bacab. The poet reimagines the meaning of 2012 as a Year not of the Mayan end of the world, but rather the year when Mayan people regain their memory and retake their lands. He writes:

Cha'abil Tún u ka'aj u jook'ol u k'ajlay tu yiit metnal

Jóok'ol u ka'aj tu jool táan áak'ab

...

Le ken k'uchuk le k'iin je'elo' chacal u jéekankil nal.

Le ken k'uchuk le k'iin je'elo' sacal u jéekankil nal.

Le ken k'uchuk le k'iin je'elo' éekel u jéekankil nal.

Le ken k'uchuk le k'iin je'elo' k'anal u jéekankil nal.

(It will happen then that the flower of memory will be revived

...

That day, the maize will flower red

That day, the maize will flower white

That day, the maize will flower black

That day, the maize will flower yellow)

The day of the regaining of memory occurs as Chim Bacab's Mayans eat their maize tortilla and drink their *atole* made of maize and of the honey of *Melipona* bees as if for the first time again. Like in Proust where childhood is regained with the smell and taste of madeleine cakes, for Chim Bacab, the Mayan culture can be regained to re-exist through interspecies interaction between maize, *Melipona* and Mayas that occurs when humans eat and drink their products that later constitute their bodies. We are what we eat, according to Popol Vuh; the Gods tried to make people several times and they failed till they made their bodies out of maize mass.

Mayans preserved their interspecies memories and technologies in and with their *milpa*s and *Meliponas*, which connected them to their historically shaped forest-ecology, epistemology and cosmology. But, the interspecies memory formed between Mayas and *Melipona* sometimes also outlived their togetherness. In Tzacamulcay, near Cobá, where some Mayans fleeing the Caste Wars settled, for the time of the last two generations there were no *Meliponas*. But Mayan activist, Egilio Dzib Canul, tells us that he learned from the stories of his father and grandfather about which areas of the forest *Meliponas* liked and on which forest plants and flowers they foraged, and also how to use these plants for medicinal and other purposes. When *Meliponas* were brought here by the Melipona Maya Foundation, his memory got reignited and he arranged a little museum of Mayan knowledge, that he called "centro de rescate de usos y costumbres Mayas" (center of regaining of Mayan ways and customs), such as Mayan milpa calendar, Mayan cleaning ceremonies and other rituals.

The interspecies memory of the intimate cultural entanglement between Mayans and *Meliponas* did not only stimulate this attempt of recovery of Mayan ways of life by don Egilio, or the resistance of Mayan beekeepers against GE-soy as their "right to culture," but even earlier, in 1995, it had a role in the mobilization of Mayan communities to stop deforestation. The same collective of Hopelchén, called Koolel-Kab/Muuchkambal established a 5,000-hectare community forest with the goals of promoting Indigenous Mayan identity and land rights, environmental education, public policies that stop cutting forests and provide alternatives to input-intensive commercial agriculture. At the heart of that initiative, which won the International Equator Prize for its achievements in 2014 (received personally for the association by Leydi Pech), was a sharing of organic beekeeping practices across other communities, to provide an economic alternative to illegal logging, and to defend and activate the power of the bees.

New Hybrid Alliances and Technologies

Both interspecies constellations: *Milpa-Melipona*-Maya and the industrial *agri*culture encompassing GE-soy, pesticides, Mennonites (and some others including Mayans) have formed around themselves networks of technologies whose powers are both productive and destructive, and whose very manifestations are however, radically dissimilar. A GE-soy plant looks like a plant but it is in part technology, in fact, until few years ago,[12] a cutting-edge biotechnology that, according to Paraguayan peasants, has transformed soy into "evil beans" (Hetherington, 2013). Together with it come bulldozers that in a few hours flatten trees that took a hundred years to grow. On the side of the *Milpa-Melipona*-Maya constellation, there are also technologies whose certain aspects remain partially concealed: wooden boxes with innovative shapes enabling supposedly "more efficient" expansion of colonies of stingless *Melipona* bees, alter-globalized social networks on the Internet, and bokashi[13]-making machines, just to give a few examples.

In the struggle to preserve *milpa, Melipona* and Mayan vision of life, some of the past colonizers---European people and *Apis mellifera* bees--- have become allies. An accumulating array of research studies by entomologists and ecologists over the past 40 years have noted the accelerating decline of *Melipona* populations in the Yucatan region (e.g., Quezada-Euán et al., 2001; Villanueva-Gutiérrez et al., 2013; Weaver and Weaver, 1981). A few of these have observed the storied history of relationships between Mayans and *Meliponas*, and suggest, as a *Melipona* conservation strategy, re-instituting meliponiculture in Mayan communities. In parallel, social scientists and NGO activists such as Carlos Meade (see Daltabuit and Meade, 2012), who are concerned with the marginalized status of Yucatec Maya

12 Today new technologies of genetic manipulation are being implemented, such as CRISPR-Cas gene editing, and yet new ones are being researched.

13 Organic fertilizer used in agroecology

communities, are experimenting with re-introduction of meliponiculture—along with chicken and hog farming-- as a source of economic livelihood toward improving the lives of these communities. Academics and scientists in universities, such as ECOSUR in San Cristobal, Chiapas, and nongovernmental organizations, who are motivated by the desire to conserve stingless *Melipona* bees on the one hand and to help struggling Yucatec Maya communities on the other, are re-animating memories of the historically grounded interspecies alliance between Maya and *Melipona* as an essential element of Yucatec Maya culture. They are attempting to help restore meliponiculture among Mayan communities that stopped keeping *Melipona* bees for several generations after being displaced in the wake of the Caste Wars of the late 19th-century or later for other reasons.

The resurgence, or re-existence (to use Mignolo's term), of interspecies *Melipona*-Maya relationships does not necessarily occur along the traditional lines practiced even today in much of Hopelchén, and often entails the introduction of more "modern" meliponiculture practices. For example, Fundación Melipona Maya, a nongovernmental organization that had initially started as a group focused on the conservation biology of *Melipona* bees, has begun to work closely with Mayan communities (Figure 7).[14]

Figure 7: Entrance to the Hotel Don Diego de la Selva in Tulúm with the headquarters of Fundación Melipona Maya. Sainath Suryanarayanan, 2018.

14 http://www.meliponamaya.org/

The Melipona Maya Foundation's efforts illustrate the ambiguous dynamics of re-existence of the *milpa*-Maya-*Melipona* interspecies alliance, in which the worsening plight of *Melipona* bees triggered the enrollment of outside conservation groups, whose interests in turn shifted toward entangled Mayan communities. Initiated by apiculturist and educator Stephane Palmieri, the Foundation has been re-introducing meliponiculture to impoverished Maya communities near Cobá and Tulúm to help them produce, package and sell *Melipona* honey to international markets. Melipona Maya Foundation employees have been introducing new techniques of meliponiculture for scaling up the production of *Melipona* honey and providing logistical resources to market and distribute the honey. The Foundation propagates *Melipona* colonies in boxes (*cajas*) instead of logs (*jobones*) because the box-design allows for easier splitting[15] of colonies, and allows them to grow bigger (Figure 8).

Figure 8: Meliponario in San Juan de Dios with boxes. Marcos Colón, 2018.

These boxes had been invented as a part of doctoral work of Javier Quezada-Euán (2018), today the head of the Department of Tropical Apiculture - Universidad Autonoma de Yucatan. Euán explains that the larger space that the boxes provide, as opposed to the logs, also allows *Meliponas* to better adapt to changes in temperature.

Boxed *Melipona* hives further allow beekeepers an easier access to the entirety of a *Melipona* colony, enabling a greater degree of intervention and control. For example, a beekeeper can monitor the health of immature bee brood in areas that would previously have been inaccessible in log hives, and afford more choices regarding where to take honey and pollen from. At the same time, box hives enable

15 Splitting is a widespread beekeeping technique to propagate new colonies from a pre-existing colony of social bees.

a significant ramp-up in the scale of *Melipona* hive management, control and economy of honey production. Here, an overt focus on increasing the "efficiency" of *Melipona* honey production for the purposes of export risks transforming an interspecies alliance historically grounded in the incalculable realms of subsistence and sacred (Hösttetler, 1996) into a commodity-oriented framework based on calculation, production and profit. This phase of re-existence of meliponiculture sets the stage for it to become like commercial apiculture--- a high economy of scale with a productivist logics, involving intensive exploitation, control and capital. Palmieri believes that in a globalized world moved by market dynamics, the only way to salvage meliponiculture is by making it marketable (2018). His friend, Remy Vandame, a renowned professor of entomology at ECOSUR, in San Cristobal, Chiapas, disagrees. Vandame warns that if we commercialize *Meliponas,* they may suffer the same series of diseases and collapses that a capitalist economy brought to *Apis* honey bees (2018). Multiple factors are at play here because the Europeans who introduce apparently more productive technologies, are themselves in a quest for Indigenous wisdoms of sustainability that are arguably maintained through sacred traditional modes of life. They want to rescue dying Indigenous cultures of nature for the sake of saving themselves from climate collapse. "We need the Indigenous people to relearn our relation with nature," says Palmieri who also believes in learning from the bees through biomimesis. The degree of flexibility in the tension between the sacred and the productive is debatable.[16]

Among the debates arising during the struggle to save the environment among the members of the alliance that emerged around *Meliponas*, another one has had to do with the antagonism towards Mennonites. Since approximately the beginning of the 21st century, immigrant Mennonite communities in the state of Campeche had been planting GE-soy with the active support of the Mexican state authorities. They have been recently blamed for destruction of Yucatan forests to allow access to large agricultural machines that fumigate crops (Ellis et al., 2017). GE-soy, which relies heavily on ground and aerial fumigations of herbicides, insecticides, and fungicides, is believed to be responsible for the rejection of Yucatan honey in European markets (Vides and Vandame, 2012; Villanueva-Gutiérrez et al., 2014), but also, more in general, for declining bee health (Gómez González, 2016; Pech, 2017; Vandame, 2018), and toxic pollution of Yucatan's underground waters (Polanco et al., 2014). Mayan activists (as we discussed in the beginning of this article), the national and international activists and NGOs differ in their appreciation

16 These tensions recently exploded when Fundación Melipona Maya was accused by a Mayan Assembly Múuch'Xíinbal of biopiracy, that is, of attempting to appropriate ancestral wisdom of Mayan communities, including its medicinal knowledge and the genetics of *Meliponas*, for the benefit of a private French laboratory, Expanscience, as well as a French cosmetic firm Ballot-Flurin, and by "stealing" traditional Melipona hives in *jobones*, and changing them into rectangular boxes (Cortés, 2018; Múuch'Xíinbal, 2018). Various other accusations of Múuch'Xíinbal turned out to be unsustainable, and most people believe Palmieri has merits in both regenerating meliponiculture and helping Mayan communities, but the question of whether the sacred economy of Melipona bees should become a part of the market remains unresolved.

of Mennonite presence in Yucatan. While some like Feliciano Ucán, Robin Canúl or even Stephane Palmieri himself would like to see the Mennonites gone, Luis Arturo Carrillo from MAOGM together with the producer of honey, Federico Berrón, decided to introduce Mennonites to agroecology.

Figure 9: Mennonite carriage in Salamanca. Katarzyna Beilin, 2019.

Mennonites are committed to non-violence and for this reason, they are very careful with technology. Franz Martins, in Salamanca, explains that they do not use cars because if someone drives too fast, it is easy to harm a passerby. Instead, they use horse carriages (Figure 9). For the same reason, Mennonite tractors have metal wheels to slow them down and reduce the likelihood of an accident. Although they do not let children use cell phones and computers, Mennonites use them for business purposes. Profit is the strongest argument for Mennonites to consider a change in their routines, and disagreements about technology have been a reason of various divisions in the community. We find it surprising that precisely this peace- and family-oriented religious group has been one of the first to adopt an aggressive bioeconomy of the GE-soy in Yucatan. Our exchanges with Franz, however, suggest that he did not consider the imperceptible aspects of the technological modification that the green leaves of GE-soy plants embody. Biotechnology as such is invisible in its fleshly manifestation as a plant, and its effects on the health of the community remain too distant from the cause to be related back to it, and as a result remains hard to track and stop.

Luis Arturo Carrillo from MAOGM, began to give talks about agroecology in different Mennonite villages and after one such lecture, Franz and some of his friends approached Luis and said that they wanted to give up the use of pesticides

and chemical fertilizers, but that they did not know how to do this.[17] This was the beginning of a long venture to re-organize Franz's farm so that it would not have to rely on toxic chemicals. There were pure challenges. First, how to fertilize? Bokashi is an agroecological fertilizer that requires intensive manual labor for its mixing and it is hard to produce by hand in quantities more than that required for a house garden. Activists found on the internet a machine for mixing bokashi in quantities that could cover the large acreages of the Mennonites' fields. This machine, designed in Germany, cost an exorbitant sum of money that they did not have the capacity to pay. Unwilling to give up, however, they decided to make the machine themselves from bits, scraps and pieces of various old farm equipment (Figure 10). When we visited Franz's farm in 2017, the machine was almost ready; in 2018, it was working (Figure 11). We find this bokashi machine fascinating as a symbol of the desire to build an alternative agriculture that would not destroy the conditions of its own

17 Luis Arturo Carrillo (2018) tells the story of this initiative in the following way: "The way I began to work with Mennonites is by going to each community, approaching their governors, to see if they would allow us to hold a lecture about organic agriculture and agroecology and to invite all the Mennonites of the community. We did it already in Temporal and in other communities, and I came one day to talk to the governor Franz Klasner that is still there, well he stepped down, but now he is back. I went to look for him at his house. I was talking to the governor who was sitting in his carriage and next to the carriage Franz was standing. So, I told him, this is a talk about organic agriculture and agroecology, can we give it? He says, 'yes, no problem' and Franz was there and he asked: 'Can anybody come? I say, 'of course, all can come.' And he says, 'I will come'. We gave the talk near the silos, here in the cooperative about organic agriculture and why it was better. There was Franz, his brothers and various other Mennonites, and at the end of the talk we were asking them if they would let us work with them in one, two or three hectares. And Franz was one of those who said: 'I want to work organic agriculture. You can come to my house, we can work there we can make experiments there.'"

existence and for which new alliances between humans, technologies and nonhumans are established.

Figure 10: A Bokashi producing machine in the Mennonite village of Santa Clara not finished yet in 2017. Katarzyna Beilin, 2017.

Figure 11: The same Bokashi machine painted and working in 2018. Marcos Colón, 2018.

The efforts of different associations, NGOs and Foundations reacting to the range of threats presented by the GE-soy agribioeconomy and other forms of industrial agriculture synergized. Agroecology and revitalization of *milpa* seemed to be the right answers and these were undertaken especially in Yucatan under the leadership of the secretary of environment of this state, Eduardo Batllori, and Carlos Bojorquez Urzáiz, directing an interdisciplinary program of research and innovation of *milpa* and agroecological systems (Programa Interdisciplinario de Investigación e Innovación de la Milpa Maya y Sistemas Agroecológicos), in Mérida. Agroecology was long taught by Mayan experts in the renowned School of Agroecology, U Yits Ka'an in Maní, led by Padre Tilo, a catholic priest who, in the vision that he shared with us connected Christianity, Theology of Liberation, Mayan Religion and Agroecology itself (Tilo, 2017). Thousands of students passed through the school and carried its wisdom to their communities in Yucatan and beyond. Bernardo Camaal, Mayan agronomist from Peto has popularized *milpa* in his radio programs, teaching also about the Mayan agricultural calendar and Mayan history (Camaal, 2018). The Mayan associations of Guardians of the Seeds (Guardianes de Semillas) also struggled to preserve native seeds, planting and conserving technologies without pesticides (Don Bernardino from Xoy, 2018). The human rights organization, Indignación, located in the vicinity of Mérida provided legal help to the Mayan beekeepers' struggle. In 2018, these struggles connected also to the protests against constructing an intensive porcine factory in the vicinity of the town of Homún, famous for its *cenotes*, sinkholes with crystal clear water, visited every year by thousands of tourists, and that were threatened with severe contamination by the planned facility. Various manifestations protesting against the plans of building the porcine factory passed through the streets of Mérida, and scientists activists struggling against toxic contamination of water, such as Angel Polanco, were featured in the local news.[18] The plans to construct the factory were withdrawn.

Conclusion

This paper shows that the rejection of Yucatec honey by EU authorities in the port town of Progreso in 2011 due to high levels of GE pollen catalyzed the formation of hybrid alliances focused on preventing further degradation not just of honey trade, but of various aspects of environment and Mayan culture. We argued that a deeper driver of this struggle was the millennia-long Mayan relationship with *Melipona* stingless bees, which, in the legal struggle, allowed GE-soy to be presented as a threat to Mayan culture (Mayan beekeepers appealed for their "right to culture"), and not only to the Mayan local economy. The Mexican judicial system had to take such an allegation seriously because of the Mexican Constitution, and in particular the new articles added in the *Reforma indígena* in 2001 (Comisión Nacional, 2015). On the other hand, concerns that *Melipona* bees were threatened with extinction (e.g., Villanueva-Gutiérrez et al., 2005) appealed to international scientists and

[18] To read more about this struggle, see Polanco and Beilin (2019a and b), as well as Polanco et al., 2014.

environmentalists' sensibilities, and the beekeepers showed that the deforestation progressing with the GE-soy was threatening *Meliponas* as much, if not more, than the *Apis* bees. Finally, the Mayan *Apis* honey economy initially started as a result of the Mayan beekeeping knowledge that was acquired during their thousands of years of co-evolution with *Meliponas*. In a way then, *Meliponas* were a *sine qua non* condition of everything that happened later in the honey economy, and losing them would mean a loss of origins. Inverting Bruno Latour's (2004) model of democracy, wherein scientists are the spokespersons for nonhumans, in this case, *Melipona* bees, by enrolling Europeans and mestizos into new alliances and collaborations with Yucatec Maya communities, have turned into spokespersons for the Yucatec Mayans.

In the process of mobilization, it became also clear that not only the bees, but also Mayan agricultural practices of *milpa*, Mayan cenotes and Mayan forests were threatened by the intensive agriculture that was now even more so with the spread of GE-soy. All these threatened elements of the contemporary Yucatan ecosystem: beekeepers, *milpa* growers, forests, cenotes, but also activists, producers, lawyers, scientists, and even *Apis* bees were enrolled to defend historical interspecies alliances of Yucatec Mayans. Mayans, *milpa* and *Meliponas* were seen as so deeply connected that their conjoined worlds may fall apart if they are separated for good by the expanding neoliberal bioeconomy in Yucatan. In this essay, we sought to shed light on these deeply entangled plant-human-insect worlds in Mexico's Yucatan struggling together to resist and survive in the face of an expanding bioeconomy of GE-soy.

We developed the concept of *interspecies alliance* to denote these inextricably intertwined and historically grounded relationships between *milpa* ecosystems, Indigenous Mayan communities and stingless *Melipona* bees. We argued that these alliances are extremely relevant to understanding today's confrontations between operators of industrial-scale agriculture and Mayan beekeepers, whose subsistence-oriented meliponiculture has come to rely primarily on the cash-oriented bioeconomy of producing and exporting industrial-grade honey from *Apis* bees. As the expansion of chemically intensive agriculture leads to deforestation and toxic contamination in the Yucatan, it progressively dismantles the very conditions upon which neoliberal market production depends. In this system of "accelerating contradictions" (Weis, 2010), Mayan beekeepers began noting the heightened declines of their *Apis* and *Melipona* bees and came to realize that unless they mobilized their cultures of *milpa* and *Melipona* to think through and react to the threat, not only their economy but also essential parts of their memory and culture, would all together become collateral damage.

We showed how the *milpa*-*Melipona*-Maya alliances have been transformed in the process of resurgence/re-existence, through the incorporation of various new actors such as international foundations, scientists, lawyers, activists and new technologies. As our brief case study of the Melipona Maya Foundation illustrated, the dynamics of interspecies re-existence are complicated with emancipatory

(decolonizing) possibilities but they also carry the *re*colonizing trappings of market innovation. Most importantly, however, our analysis shows the significance of alliances with other-than-human beings, for the consequent adoption of, or rejection of, particular technologies, which all together promote distinct and often incompatible visions of justice, sustainability and well-being. Mayan communities know through their bees and their forests – an interspecies way of knowing indeed - when harm is being produced. Consequently, the culturally conscious Yucatec Mayans are unable to go all the way in adopting profitable yet destructive modes of agriculture because, as some of them realize, if their conjoined world of *milpa*, *Melipona* and forests get destroyed, they will be destroyed as well.

We are sure that economy, land tenure and politics constitute principal factors of transformation in Hispanic agricultures, but we believe that the stories told from these perspectives can be enriched if we appreciate what Birgit Müller (2015) calls *agentivity* of nonhumans, such as the *milpa* plants and *Melipona* bees in the case of Yucatec Mayans. *Milpa* and *Melipona* are carriers of interspecies memory and guardians of hopes for a better future, when like in the poem of Chim Bacab, Mayans regain their worlds made of maize-based *milpa* and *Melipona* honey and take back their land. Retaining this hopeful vision as an antidote for the fear that toxic monocrops may become a uniform reality for the planet, is important for all of us.

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