Published as _*Perspective* in *On_Culture: The Open Journal for the Study of Culture*
(ISSN 2366-4142)

After Trash: Temperament of Penicillium Societies

Siyu Li

Siyu.Li@gcsc.uni-giessen.de

Siyu Li is a PhD candidate at the International Graduate Centre for the Study of Culture (GCSC) and the Department of Consumer Research, Communication, and Food Sociology at Justus Liebig University in Giessen. She completed her master's degree in cultural anthropology at Eötvös Loránd University, and she studied global art and curatorial practice at the Tokyo University of the Arts as a research student. Her doctoral research is about shelf life and microbiopolitics. This research will analyze regulation policy and conduct fieldwork ranging from food operators to public organizations, to individual kitchen practices. Her research interests also include ecology/biology in contemporary art and multispecies relationships.

Keywords

ethnography, life, environment, microbiopolitics, Penicillium, storytelling

Publication Date

Issue 17, October 31, 2024

How to Cite

Siyu Li. "After Trash: Temperament of Penicillium Societies." *On_Culture: The Open Journal for the Study of Culture* 17 (2024). <https://doi.org/10.22029/oc.2024.1448>.

DOI: https://doi.org/10.22029/oc.2024.1448

On_Culture: The Open Journal for the Study of Culture
Issue 17 (2024): Trash
www.on-culture.org
https://doi.org/10.22029/oc.2024.1448

After Trash: Temperament of Penicillium Societies

_Abstract

This *_Perspective* uses the Penicillium family as a case study to explore the interaction between life and the environment. It employs ethnography as a form of qualitative inquiry to track the migration, kinship, and living habits of Penicillium community residents. Sensory ethnography and go-along interviews serve as a method that allows delving into intimate social and personal aspects of the Penicillium family. Examining the process of bread becoming moldy to being discarded from a microscopic and microbial perspective is a potential way to dissipate dualistic thinking regarding life/matter, the human/non-human, and consciousness/action. Additionally, it prompts reflection on the ontology of language and reminds us that language does not belong solely to human beings. It enables us to rethink the boundaries of life as a form and its definition.

1_Introduction

This *_Perspective* examines the Penicillium family as a case study to explore the interaction between life and the environment. As one of the oldest ethnic communities, the Penicillium family has existed for 3.5 billion years. The study used ethnography as a form of qualitative inquiry to track the migration, kinship, and living habits of Penicillium community residents. Here, sensory ethnography and go-along interviews provide the method that allows delving into intimate social and personal aspects of the Penicillium family. Ethnography serves as an effective approach to creating a productive connection between biology, the human material body, social practices, and the social sciences.[1] According to Foucault, the biopolitics concerned with the human species or human populations means managing reproduction, births and deaths, behavior, and health and sanitation.[2] Haraway extends this scope to hybrid entities that involve multiple species' boundaries. She emphasizes interspecies relationships, where humans become human through interactions with environmental materials and companion species.[3] Along with the burgeoning of technoscience, more beings (are able to) become embroiled in this entanglement. The concept of trans-biopolitics highlights the power dynamics involving both human and nonhuman populations, as well as their flesh, organs, tissues, and cells.[4] One of the ways to respond to those power relationships is to add those actors into the social analysis. Therefore, the shifting of the right to interpret, the knowledge production in different situations, and the method of non-human translation by crossing disciplines are important. This piece of writing is an experiment in translating the microbes' language. The stories I collected

https://doi.org/10.22029/oc.2024.1448

from Garbageland and Continent B reveal the territorial occupation, survival strategies, and emotional entanglements of the Penicillium family history. Analyzing the fieldwork enables rethinking the boundaries of life as a form and its definition.

2_Methods

In past decades, the debate about the binary opposition of human and nature has become increasingly nuanced and complex, interweaving various perspectives on their interdependence. The term 'Anthropocene' identifies the significant impact of human behavior on the planet. To investigate other living beings, I conducted fieldwork on the planet Garbageland, which is one of the most biodiverse places in the universe. The vast expanse of ground is home to billions of species (of creatures), many of which have yet to be discovered and documented by science. It is a complicated environment for me; I am surrounded by birth and death as the creatures living in this land have very short life cycles, and the rate of renewal is particularly fast. Even though species are decreasing, at the same time I discover new species every day. I chose to visit one of the continents on this planet. It is a square island, with many species living on it. Penicillium grow here. Their lifestyle is semi-nomadic and semi-sedentary. Penicillium start to travel after they become adult; they need to float among various places until they find a land where they wish to live. I landed on the island and found a handful of interviewees who allowed me to live with them. This writing provides an ethnographic case study of the Penicillium community in a small town in the southern Continent B, exploring and illuminating the life model of the Penicillium group and their transitions to and rebirth from the environment.

3_Childhood and Education

In this town, new residents arrive every second. The way Penicillium reproduce is not like ours, as they do not require one female and one male. Penicillium are born from the house where they live; the house serves as the maternal body. Penicillium told me that finding a location is normally very quick for them. After childhood, they split from their dwelling, and search for a place with abundant water and food resources. They reminisced about how they settled on the land and recounted encountering a barren and inhospitable landscape, where terrestrial organisms had begun to die off due to the lack of water resources and severe drought. They led me to it once; the

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cracked earth seemed incapable of sustaining any life. It was a place where life seemed to have been forgotten, and survival appeared impossible.

Drifting with the wind, they discovered a continent with similar ground. This location is surrounded by a loose, transparent film contributing to the year-round humidity of the climate. The Penicillium decided to settle in the territory along the edge of this continent. One Penicillium said: "After I split from my dwelling, I started to travel to many planets. I had many fantastic trips, and finally, I found a place suitable for me to live."

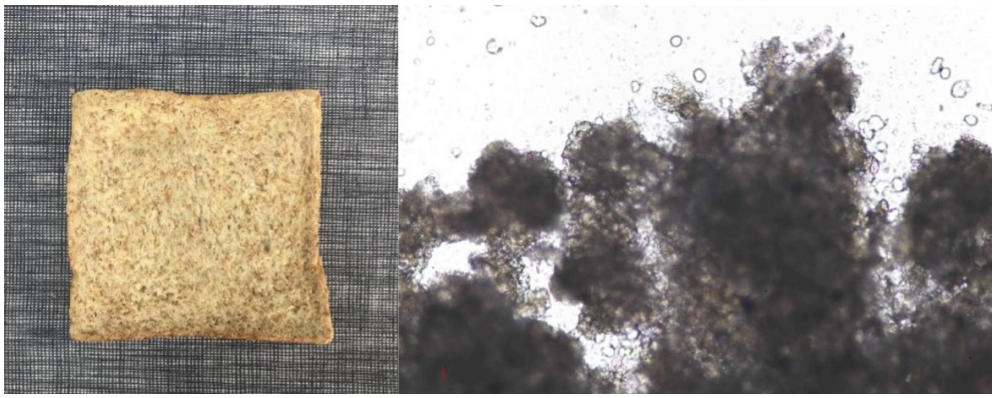

Fig. 1: The barren continent

I walk with Penicillium to their dwelling in a densely populated village. The entire community is abuzz with preparations for the next generation's training. It is an education style they call 'penam,' which embodies the principles of exploration, capture, and attack. It seems like it also defined what they are. After all, inhabiting such a biodiverse space can involve mutual benefit alongside competition for resources that may lead to conflict. Penicillium is the latter.

The 'penam' training consists of several sections. Initially, they draw foundational energy from their dwellings, which transmits directly from the house to their bodies. They describe it as courage inherited from ancestors, providing them with sufficient strength to acquire skills. As they advance, their senses are finely tuned to repel any encroaching outsiders. Should adversaries breach their perimeter, Penicillium strike swiftly, releasing a potent gas into the air that is able to melt the enemy's skin—a formidable defense born of ancient wisdom and instinct. What is more, this gas can also cause developmental disorders in others so that no adversaries can build on the territory around them. Therefore, as they excel in penam training, they become more ag-

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gressive, empowering the residents of this village to defend against members of other ethnic groups.

On one occasion, I joined them on a trip to gather food. We visited a trade market under the land. Many residents from different communities come to this market to trade as well. The diversity of the communities brings a wide variety of goods to the market. However, it is not always a harmonious place of equal exchange. There is no altruism—sometimes bargaining, but also begging, borrowing, stealing, and cheating. They captured some sugar and fats, and we returned to the foundation of the building. Through the roots, the food was transported into the house, and the house distributed the nutrients to each resident.

Although protective against intruders, the aggressive temperament does not provide Penicillium with a mutually beneficial living strategy but rather leads to competition and antagonism with other communities. For instance, the mature and elder Penicillium building strictly prohibits outsiders from entering their territory. To enter those dwellings, one must pass through the miasma surrounding their area, a skill they are trained in from a young age. This barrier prevents any outsiders from approaching them. If any creature dares to advance, the gas will dissolve the inner layers of their skin from within, causing the skin to thin until the body's internal moisture bursts through the fragile outer layer, resulting in the body exploding entirely. This living strategy appears to be a skill that is taught and highly valued in this community. Therefore, aggression is intrinsic to the Penicillium ethnic spirit.

4_Adulthood Rites

During the fieldwork period, I resided with a younger Penicillium group due to safety concerns that prevented me from accessing the territory of the older generation. Here, various other ethnicities coexist, including Aspergillus, Alternaria, Cladosporium, and Mucor, among others. They all build their dwellings above the trade market.

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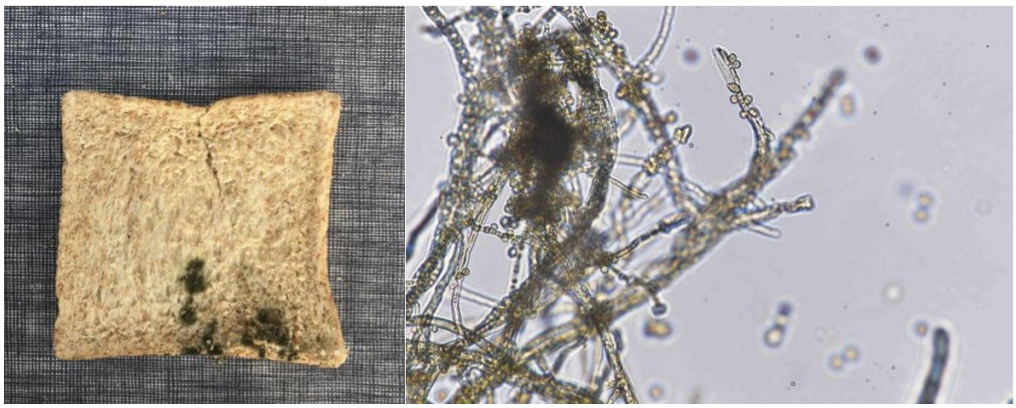

Fig. 2: The humid continent

The village features a crisscross layout, with Penicillium's buildings standing tall and slender. All residents live on the top floors, while the lower levels are designated for collecting and storing food and water. The age of the inhabitants determines the location of their dwelling. Those nearing the end of their childhood reside at the very top, preparing for their departure as part of their coming-of-age ceremony. The ritual is held only at midnight when the moon appears. Penicillium will gather at the top and sing a song. This melody has been passed down through generations, deeply engraved in the memory of each. As their voices fill the air, the sound releases a distinctive smell. This happened every day, so I participated regularly. The rhythm resonates in my mind, making me feel as if I were trapped in a damp and cold basement. Accompanied by the singing, they jump from the top of the roof. They meet the air, embrace the moisture, achieving complete harmony, ferally. Whether sharp, predatory, or subtle, it is their journey of destiny.

Being an adult signifies reaching sexual maturity. After the ceremony, every Penicillium must leave their original home and find a new place to build a dwelling. Sexuality for them is a rooting capacity. Reproduction is a way of building. Building as the vital organ of society is not only a place to live but also the basis of survival and an extension of each individual's body.

5_After Trash: Becoming Building, Becoming Society

> To dwell, to be set at peace, means to remain at peace within the free sphere that safeguards each thing in its nature […] Mortals dwell in that they save the earth —taking the word in the old sense still known to Lessing. Saving does not only snatch something from a danger. To save really means to set something free into its own presencing.[5]

https://doi.org/10.22029/oc.2024.1448

The Penicillium community shows a strategy of living where the body and the dwelling are one. Metabolism occurs not only within the individual but also in the environment. Their existence illustrates that symbiosis extends beyond mere coexistence with other individuals or communities. Life and its form are fluid, and life and the environment are interdependent. In other words, they share a complex body that does not have a clear beginning or end but is always in a state of continuity.[6] This intricate relationship highlights the interconnectedness of all living things and their habitats, emphasizing that survival and thriving are dependent on this dynamic interplay.

Sustainable development requires rethinking and reorganizing the basic conditions of human life and finding a way to live within the carrying capacity of supporting ecosystems, balancing the relationship between natural and man-made environments.[7] Examining the process of bread becoming moldy to being discarded from a microscopic and microbial perspective is one of the (possible) ways to dissipate epistemological anthropocentric thinking by emphasizing the mind and body of mold and the language of non-humans. Tim Ingold points out that language embodies a shared knowledge of the world, shaped by our mutual engagement in the tasks of inhabiting.[8] Thus, it is not the language itself that ensures the continuity of tradition, but rather the tradition of living on the land that ensures the continuity of language.[9] This prompts reflection on the ontology of language and serves as a reminder that language does not exclusively belong to human beings. The loss of non-human language signifies the loss of non-human habitats and reflects a complete shift in the right to interpret these languages toward scientific knowledge production. Microbes emerge as a semiotic biological code, representing a distinct language employed to implement a range of safety systems and knowledge practices. Translating the language of different species involves more than merely 'carrying across' an idea encoded in one expressive medium into another in that it also requires empathy.[10]

Microbes are primarily defined as infectious pathogens that need to be controlled,[11] and the logic of their regulation is activated by biopolitics, which controls them through public health measures to produce healthy populations.[12] Pasteurization stands as a crucial symbol of modern technoscientific power in exerting control over nature for human benefit, which is based on the idea of perceiving the natural world as potentially hazardous and requiring human intervention for regulation.[13] Microbiopolitics focuses on the political result of living with microbes as allies and threats,

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and draws attention to the regulatory and market forces that govern the interaction between humans and microbes.[14]

We, as humans, in the long timeline of human evolution, have been trying to co-habit with our environment in order for our species to spread our genes. However, if we view bacteria as a species, according to metagenomic sequencing, we can demonstrate that each human gut has a long-term partnership with over 150 species of bacteria. We can only perceive that part of nature that our technology allows, so our theories about nature are also highly constrained by what our technology enables us to observe. As Scott Gilbert proposed, the notion of the "biological individual" needs to be rethought, because, we have never been individuals.[15]

Fig. 3: The Garbageland planet

After settling in a location, the Penicillium construct the environment using their own body. As they take root in the ground and grow, the bodies transform into their dwelling, achieving a fusion of the landscape and the corporeality. The regenerative

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body emerges from the structure, ready to travel and climb. Time and again, dwellings and their residents are in symbiosis, the society is becoming.

7_Postscript

Fig. 4: Preparation of testing

This *_Perspective* is an experiment in semi-fictional writing, aiming to shift the perspective toward non-human characters and alternate between micro and macro views. The images were collected in a laboratory, and I received assistance from biologist Li Wang from Guizhou Academy of Forestry in making a series of microscopic observations. I have rewritten some of the stories about microbes that she shared with me, incorporating biological knowledge and scientific articles. I replaced them by substituting the relations between microorganisms, bread, and trash bins with those between residents, continents, and planets. The use of the images has been authorized by Wang. Thanks to her for translating for me and the microbes, which made these conversations possible.

_Endnotes

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