



Mapping Plants and Their Movements in and across Contemporary Francophone Narratives

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In April 2021, the interactive digital platform *Cartographie littéraire des plantes à travers quelques récits/Literary Cartography of Plants in and across Narratives* went live after four years of research conducted jointly by researchers from UQÀM and McGill University, funded by the Social Sciences and Humanities Research Council of Canada (L'imaginaire botanique 2024). Building on various interactive functionalities, the platform presents multiple mappings and cross-readings of ten plants and fifteen contemporary Francophone narratives (1985–2020). Intended for botany and literary enthusiasts, professionals, and amateurs alike, it seeks to stimulate curiosity about literary plants, deepen knowledge about plants and their habitats, and encourage exchanges between digital and environmental humanists. The present article presents a moment of reflection and critique about this project, from which have emerged more questions than answers. At the intersection of the digital humanities, plant studies, and literary cartography, our article outlines the shifts in perspective that the development of this interactive digital platform required of us and our relationships to plants. Instead of offering a chronological account, we prefer to draw inspiration from the pitfalls encountered along the way and so do justice to the intellectual trials and tribulations that have brought us closer to the plant world. Moreover, it is in large part due to a collective approach of literary scholars, graphic designers, and a software developer that we have been able to discover plants and their movements from so many different angles. Our multi-authored article aims to illustrate the importance of such interdisciplinary work when it comes to understanding plants and their movements.

En avril 2021, la plateforme numérique interactive *Cartographie littéraire des plantes à travers quelques récits/Literary Cartography of Plants in and across Narratives* a été mise en ligne après quatre années de recherche menées conjointement par des chercheurs de l'UQÀM et de l'Université McGill, financées par le Conseil de recherches en sciences humaines du Canada (L'imaginaire botanique 2024). S'appuyant sur diverses fonctionnalités interactives, la plateforme présente de multiples cartographies et lectures croisées de dix plantes et de quinze récits



francophones contemporains (1985–2020). Destinée aux passionnés de botanique et de littérature, aux professionnels et aux amateurs, elle vise à stimuler la curiosité pour les plantes littéraires, à approfondir les connaissances sur les plantes et leurs habitats, et à favoriser les échanges entre humanistes numériques et humanistes environnementaux. Le présent article propose un moment de réflexion et de critique autour de ce projet, d'où émergent plus de questions que de réponses. À l'intersection des humanités numériques, de l'étude des plantes et de la cartographie littéraire, notre article décrit les changements de perspective que le développement de cette plateforme numérique interactive a exigés de nous et de nos relations avec les plantes. Plutôt que de proposer un récit chronologique, nous préférons nous inspirer des embûches rencontrées en chemin et rendre ainsi justice aux tribulations intellectuelles qui nous ont rapprochés du monde végétal. D'ailleurs, c'est en grande partie grâce à une approche collective de littéraires, de graphistes et d'un développeur de logiciels que nous avons pu découvrir les plantes et leurs mouvements sous tant d'angles différents. Notre article à plusieurs auteurs vise à illustrer l'importance d'un tel travail interdisciplinaire lorsqu'il s'agit de comprendre les plantes et leurs mouvements.

First exploration: From literary cartography to mapping plants in narratives

The research group *L'imaginaire botanique* was first created in 2017 by Rachel Bouvet (UQÀM) and Stéphanie Posthumus (McGill University), who were joined by several assistants and collaborators over the years. The team includes researchers from the University of Angers: Isabelle Trivisani-Moreau, Cristiana Oghina-Pavie, Aude-Nuscia Taïbi, Anne-Rachel Hermetet, Bertrand Guest; a post-doctoral researcher: Amélie-Anne Mailhot; and several research assistants: Joseph Dorion, Marine Bochaton, Mégan Bédard, Talia Wise, Jean-Pascal Bilodeau, Noémie Dubé. Additionally, Mehdi Moussaoui and Anouk Verviers were responsible for web development and programming of the platform's interactive functionalities. Our research into the botanical imaginary in narrative is structured around four thematic axes—herbariums and the scientific; gardens and the aesthetic; fields and the political-economic; forests and the symbolic—and it has one transversal axis—plant movement. Our main challenge was to develop a botanical approach to literary texts, in other words, to foreground a plant-centred way of reading texts. Driven by two fundamental intuitions, namely that literature and botany can cross-pollinate and that plants are less passive than generally thought, we quickly saw in literary cartography a useful tool to explore the transversal axis of plant movement, to grasp its dynamics and complexities, to observe the ways in which plants colonize literary space, and to reflect on the emergence (or the necessity) of a new paradigm in “plant-thinking” (Coccia 2016; Hallé 1999; Hustak and Myers 2012; Marder 2013). In our edited collection *Mouvantes et émouvantes: les plantes à travers le récit* (Bouvet and Posthumus 2024), we address the many ways in which plants are active movers and mobilizers: from the growth of stems, leaves, and roots to movement across large distances alongside botanists and explorers, or as seeds carried by the wind; from the power to attract insects, birds, other animals, and humans to the power to transform into flower from seed, into soil from decomposing leaf. In the wake of Michael Pollan's book *The Botany of Desire* (Pollan 2001), there has been an increasing number of books about the influence of plants on human history. Conversely, more and more research has been dedicated to the ways in which humans have carried plants with them following colonial routes of empire. (See, for example, Londa Schiebinger's *Plants and Empire: Colonial Bioprospecting in the Atlantic World* [Schiebinger 2011] and Judith Carney's *In the Shadow of Slavery: Africa's Botanical Legacy in the Atlantic World* [Carney 2011]). Literature is a laboratory where different worldviews are constantly constructed and confronted, even when the stories take place in largely imaginary places. After a preliminary phase of our research, dedicated to finding contemporary Francophone narratives in which plants play a key role, we made a first attempt at developing a methodology for mapping plant movement. By focusing on a single text,

J.M.G. Le Clézio's *Raga* (Le Clézio 2006), we knew we could play and experiment, that is, we could follow various pathways, get stuck at dead ends, and completely change visualization and mapping tools if needed.

Several issues emerged as we began working on this text. First, mapping a story means translating narrative description into lines and symbols, using toponyms and spatial indicators, and adopting a base layer map to represent the world or fictional universe. In most cases, points are marked on the map to illustrate the plot's spatial evolution, to obtain a geographical overview, to establish correspondences between real places and fictional ones, or to situate a group of authors or texts in a given place. One can therefore characterize literary cartography according to its different uses. First, there are maps, imaginary or real world, that are part of the narrative and added by the author or the editor (Jourde 1991; Bouvet 2003). These serve as "spatial devices," an expression created by geographers Thierry Joliveau and Sébastien Caquard to refer to "dispositifs intégrés dans les œuvres dont le rôle est de créer/représenter l'espace de la fiction à l'intérieur même de l'œuvre [...] et qui peuvent avoir des formes variées: descriptions, récits, cartes, plans, schémas, systèmes informatiques, interfaces magiques ou techniques [devices integrated into works whose role is to create/represent the space of fiction within the work itself [...] and which can have various forms: descriptions, narratives, maps, plans, schematics, computer systems, magical or technical interfaces]" (Joliveau and Caquard 2012, 45) (all translations are our own unless stated otherwise). Then there are metatextual maps created after publication that can be categorized according to their different aims: 1) to identify the places where works were produced and then create a geography of writers (Moretti 1997); 2) to identify the places where works were published, read, and circulated, as part of the theoretical framework of reception theories (Moretti 1997); 3) to identify the geographical areas covered by the works of a single writer or writers of a specific region, which corresponds to the geocritical approach (Piatti 2016); and 4) to map the places named in a single narrative, which is undoubtedly the most widespread practice. A large number of these latter analyses are topographical, simply writing about places, rather than cartographic. As Bertrand Lévy points out, "le terme de cartographie ou de *mapping* en anglais est devenu très fourre-tout. On veut par exemple recueillir un état des lieux dans un domaine quelconque, alors on réclame une 'cartographie complète' ou un 'mapping' du domaine. Le terme de cartographie devient alors métonymique [the term cartography or mapping in English has become a catch-all. For example, when one wants to offer an overview of a given field, one calls for a 'complete cartography' or 'mapping' of the field. The term cartography then becomes metonymic]" (Lévy 2018, 178). While our project aimed to literally create a map of *Raga* and not just write about

places, it did not fit with any of the above aims. We were interested first and foremost in mapping plants and their movement, not in the places that authors or readers or texts circulated and not in grouping texts together by geographical region.

Another issue became evident as we tried to move from reading about plants and their movement to mapping them. Much like the act of reading, analysis is accompanied by the creation of a mental map from the moment places are described, even if this activity is most often done unconsciously. It is only when we try to make this activity explicit in one way or another (through speech or drawing) that we really become aware of the process of mental mapping. But as this operation takes place after and not during the act of reading, it is very likely that this subsequent spatial representation does not correspond exactly to the one that emerges during the first encounter with a text. This primordial map is, however, important, as Marie-Laure Ryan points out in her work on spatial narratology (Ryan 2009, 420–433). The spatial references disseminated in the text and the movements of the characters allow the reader to create a mental cartography that facilitates their orientation within the fictional space. Their prior knowledge and imagination—particularly useful in the case of indeterminate, imaginary or unknown places—complements the information provided by the text. According to Ryan, the five levels and forms that make up this fictional spatial representation are the spatial frames (in which the events of the diegesis take place), the setting (global levels of country, time, city, social class, etc.), the story place (places evoked), the narrative universe (totality of the parallel worlds in the text), and the story world, which includes the reader's real knowledge or experiences (Ryan 2003, 333–364). As Rachel Sparks notes, “[t]hese five levels and forms capture the complexity of fictional spatial representation [...] and in some ways define the role that the reader plays in the production of that representation and the relationship between the reader and the textual components” (Sparks 2017, 63). For each of the key plants in the narratives in our research corpus, we created careful reading notes that included information about these five levels and forms.

While we were building our plant database, we began exploring the digital tools that were already available for mapping places, which meant moving into the world of online geographic information systems. A quick survey of tools such as *Maptiler*, *Mapme*, *Maptive*, and *Mymaps* revealed a set of functionalities designed for geographers concerned with geo-referencing items, adding information tags, and doing data analytics and visualization. While we had initially hoped to map all the plants mentioned in our corpus of texts (possibly cross-referencing them so users could move easily between texts), we quickly realized that such distant reading did not capture the movement of specific plants that required closer attention. We needed mapping tools that allowed for the combination of text and image. Without developing a systematic

analysis of digital mapping tools, we concluded that *Neatline* and *StoryMaps* were two viable options capable of showing stories on or through maps alongside explanatory text material.

For a variety of reasons, we chose *StoryMaps*, rather than *Neatline*, for mapping key plants and their movement in Le Clézio's *Raga*. First, *Neatline* seemed to have a much higher learning curve than *StoryMaps*. Given that we wanted to experiment with the tool to see what worked and didn't, we didn't want to invest too much time into learning all the functionalities. Second, we weren't particularly interested in geospatial information. As Caquard and Dimitrovass explain, *Neatline* allows for analyzing "stories [...] to better understand places and their intimate and personal geographies" (Caquard and Dimitrovass 2017). We wanted to focus on plants and not places. Third, we liked the scrolling function of *StoryMaps*, as we could then represent the narrative's three different time periods without having to choose just one map: the first arrival of Indigenous people carrying taro and yam to Vanuatu Island (for which no geographical map was available), the moment of colonial ships taking sandalwood from the island back home (for which an historical map was found), and the contemporary moment of the narrator's explorations of the island and its vegetation (for which a geo-referenced Google map was used). It was on this third geo-referenced map that we indicated where key plants such as, palms, taros, yams, coconut trees, bamboo, and sandalwood grew on Vanuatu island according to the contemporary narrator's account. In the end, *StoryMaps* made it possible to create a user-friendly, easy to navigate, visually appealing, multi-mapping of plants and their movement in the novel ("*Raga: Approche du continent invisible*" 2018).

The challenges encountered during this first experiment were of both a digital and literary nature. We were faced with the difficulties of navigating tabs, creating moving objects on the map, establishing exact placement of plants, and dealing with the absence of specific place names and directions in the novel, amongst many others. Despite these challenges, our first *StoryMap* proved to be a success because of what it taught us about our own biases when it came to plant mapping and movement—our tendency to adopt a bird's eye view (which hides the life of underground roots), our need to follow the novel's timeline (which does not account for plants that live a day or two or many hundreds of years through vegetative reproduction or hibernating seeds), our focus on images to illustrate plants (which do not capture so much of what constitutes the slow movement of plants). We began to ask ourselves: What were we looking for in doing this cartographic exercise? What were we aiming to map: *the text* or *the plants*? What was our actual object, our ultimate goal? How could we depict plant movement *across* different texts and not only within one story?

We went back to the drawing board to look for digital mapping tools that centred on plants and that experimented with geo-referencing to allow for side profiles and blurry edges. In short, we wanted to move away from GIS and towards a hybrid tool combining botany, narrative text, layers of maps (both imaginary and real) and interactive features. Thus, we did not follow literary cartography's trends in the digital era as named by Cooper and colleagues, namely 1) the use of already available tools like Google Maps or Google Earth to visualize spatio-temporal data; and 2) the focus on toponyms and the use of automatized tools such as *Frontiers* to identify places in literary texts (Cooper, Donaldson, and Murrieta-Flores 2016, 9–14). As so often happens in the field of digital humanities, we concluded that we needed help from software programmers and designers to create our own interactive digital platform specific to the needs and focus of our research project.

But how to recentre plants on a map? We were not trying to outline fictional universes, nor to identify the places where literary works were produced or received. Neither did we wish to come up with a global map of narrative places in which plants can be found. We wanted to represent a specific spatio-literary dynamic, that of plants. To do so, we needed to foreground, in our readings and maps alike, elements generally perceived as secondary. Indeed, as Franco Moretti explains in *Graphs, Maps, Trees*:

What do literary maps do ... First, they are a good way to prepare a text for analysis ... You choose a unit—walks, lawsuits, luxury goods, whatever—find its occurrences, place them in space ... or in other words: you *reduce* the text to a few elements, and *abstract* them from the narrative flow, and construct a new, *artificial* object like the maps that I have been discussing. And with a little luck, these maps will be *more than the sum of their parts*: they will possess “emerging” qualities, which were not visible at the lower level. (Moretti 2005, 53; ellipses and italics in the original)

We, too, were trying to reveal the presence of elements often invisible when first reading a text. What is now commonly called “plant blindness” is so ubiquitous that we often walk by plants without even noticing them, in the real world and in books. It's easy to favour, unwittingly, the human characters, their travels, emotions, etc. on which the intrigue centres. In isolating plants in the texts we had chosen, we wanted to bring out their “invisible qualities,” to presence them, to render them observable. Starting with a corpus of around thirty texts, from various fiction and nonfiction genres, we began to intersect and compare plants and their worlds. (We did not consider differences in literary genre and form when developing the principles and components of our plant cartography. For readers who would like more in-depth literary analysis of the texts in our corpus, please see our forthcoming book, *Entre les feuilles: explorations de l'imaginaire botanique contemporain*, [Bouvet et al. 2024].) We first chose to compile

every single plant occurrence, with no initial criteria for determining their importance. The instructions for data collection were to transcribe in a table all the excerpts in which plant species were mentioned, specifying their roles and uses, as well as the five levels of fictional spatial representation. We feared that, if we read selectively, we would fall prey to our personal biases and miss important plants. These tables were then used as databases for our analyses and maps. However, we were quickly faced with a major problem: either plants abounded, and the tables extended over pages and pages, rendering the information almost illegible (some of our first tables were over fifteen pages)—or they were entirely absent.

While these tables included citations drawn from a close reading of the texts, they were also the result of a distant reading that tallied occurrences of various plant species in a given text. Both too close and too distant, this approach did not allow us to identify the most significant plant elements. Consequently, we opted for an attentive reading, one attuned to vegetal matter, which led us to question our reading habits influenced by the kinds of anthropocentric biases critiqued by plant studies philosophers (Coccia 2016) and biologists (Mancuso and Viola [2013] 2015). Thus, we progressively narrowed our research in three ways: 1) by selecting plants that had roles other than strictly decorative in the texts; 2) by giving more space to interpretation and analysis; 3) by recentring our corpus on a limited number of plants and text, facilitating, at the same time, cross-readings and comparisons. While the tables identified a wide variety of plants, we chose, for our cartography, the plant species that were most often listed. We used additional criteria such as the plants' repartition in different biomes and their movement between regions of the globe. In so doing, we wished to bring to light the multiplicity of climates and ecosystems in which plants thrive, while also highlighting the vast transportation networks developed by humans trading plants. Two ideal candidates were identified: 1) ferns, found in six of our fifteen selected texts, and spreading over an area from North America and Europe's temperate forests to (sub-) tropical forests found in South America and the Pacific islands; and 2) coffee, at the heart of various texts about the international mercantile activity to which this plant was historically subjected. Other species, such as nettle, were selected because of their importance in a particular narrative. While less central to the cartographic dimension of our project, these plants opened up other facets of the vegetal world, that of intimate human-plant relationships and their many functions (alimentary, economic, aesthetic, entertainment, medicinal, practical, symbolic). While some plants, such as sugar cane, are cultivated in vast plantations, others, like rosebushes or orchids, mobilize one or two characters who travel long distances to enjoy the beauty of their flowering (*Je vois des jardins partout* [Decoin 2012]) or to further botanical knowledge

(*Humboldt l'explorateur* [Gaspar 1985]). Moreover, the four thematic axes central to our research—that is, herbariums, gardens, fields, and forests—were all represented in our final selection of plants and texts. Finally, we made sure our selection offered the best possible representation of genders and geographies with respect to our corpus of authors from the French-speaking diaspora. (For a list of the fifteen texts chosen for the digital interactive platform, see the “Corpus” section at the end of the article.)

Second exploration: From single-mapping to a proliferation of maps and modes

We encountered a second pitfall when we tried to depict, on a single world map, all the plants in the texts from our corpus. As Isabelle Ost astutely remarks in her introduction to the essay collection *Cartographier*:

Dessiner une carte, représenter l'espace et en tracer les frontières est le premier geste d'invention du territoire, mais aussi celui du fantasme de complétude et de maîtrise du monde. [...] Cartographier est une opération de schématisation dont la portée épistémique ne peut que poser question à la philosophie, comme théorie de la connaissance; de même, cartographier est une opération de symbolisation du monde, de réécriture de celui-ci par les signes, qui convoque le geste mimétique dont fait œuvre la littérature. [Drawing a map, representing space, tracing its borders, is the first act of inventing territory, but also the one that sustains the fantasy of wholeness and mastery over the world. [...] Mapping is a schematizing process with epistemic implications that must necessarily be questioned by philosophy, as a theory of knowledge; in the same way, mapping is a process of symbolization of the world, re-writing it with signs, that appeals to the same mimetic act as the one at the heart of literature.] (Ost 2018, 11)

We gave in, for a moment, to the panoptic tentation, the desire to embrace the entirety of space from a single perspective, or what Michel de Certeau calls “knowledge’s own fiction” (De Certeau 1990, 40). Our desire was, moreover, fuelled by the new possibilities opened up by digital tools, especially geolocalization. But unlike cities, rivers, mountains, and islands, which can be located on a map with accuracy, plants dwell in blurrier territories and their localization, just like their movement, is not as easily pinpointed. Indeed, how is it possible to precisely map what is taking place underground, through root systems, or happening infinitely slowly? When the movements through space don’t follow human means, but vegetal ones? How can movement that is more proliferation than journey be represented, when it involves an area rather than a trajectory? Where should the line be drawn between a plant as a specimen and plants as a species? Concepts used to characterize animals or humans, like that of the individual, cannot be applied so easily to vegetal matter.

We turned to other disciplines to see how plants were being mapped. In plant biology, maps are created using accounts of a plant species found here and there on the territory, thus delimiting a plant's area of distribution according to the biome in which it grows (see, for example, *Canadensys 2024*). Similarly, some artists spend time mapping very small spaces, a neighbourhood or a wasteland, for example, in order to come up with a comprehensive map of the species they encountered there (see, for example, the works of Simon Boudvin, artist [Boudvin 2024]). While each plant takes root in a specific territory, it can then spread further, depending on the climatic conditions, the nature of the soil, etc. But what about when a plant's territory is not real, but fictional? When the descriptions of its habitat are only partial? How can a map represent known species that live and flourish in places that have no equivalent in the real world? Should such works simply be dismissed in the name of cartographic realism? How could we allow the real and the imaginary to cohabit, visually and textually, while also facilitating movement between them?

To answer these questions, we began to consider alternative epistemologies that moved away from the panoptic, the certainty of fixed lines and delimited borders, the need for precise localization, the hard distinction between the real and the imaginary. We asked how we might adopt the ideas of deep mapping that “allow[s] multiple versions of events, of texts, of phenomena (both primary and secondary) to be written over each other—with each version still visible under the layers” (Fishkin 2011). The digital provides a perfect environment for creating layers for plants, their movements, and their real and fictional places. We were, however, surprised to find that most digital mapping projects retain an anthropocentric focus, looking at human places and movement, and rarely considering the more-than-human world, such as animals and plants. (A notable exception is Hannah Cole's “Botanical Imaginaries,” which foregrounds plants in three postcolonial novels [Cole 2024]. One important difference between Cole's project and our digital platform is that we opted for interactive functions so that users can choose which plants, functions, and texts they are most interested in as they navigate the site. While Cole's project is the only one we found that combines a similar interest in literature, plants, and cartography, there are many digital projects working at the intersection of plant studies and the environmental humanities, such as Herbarium 3.0 [users upload their stories about plants], Centre for Plants and Culture [highlights lesser known botanical histories], and Plant Humanities Lab [open source tool linked to JSTOR for annotating and augmenting historical texts about plants], to name a few.) Once again, we concluded that we would need to create our own interactive platform if we were going to maximize the capacities of the digital environment to create a deep map of plant movement in and across our corpus.

Moreover, our questions spoke to a larger goal, that of allowing plants to move about more freely than in enclosed, individual texts. We wanted our digital interactive platform to become a crossroads where different literary works and species intersected. If we had limited ourselves to locating plants on a single global map, we risked losing the specificity of each work because only a few texts represented a global scale. In the end we came up with a three-pronged approach: first, we abandoned geolocalization that was, in the end, not appropriate for our goals; rather, we decided to allow different types of maps to cohabit on the platform. Second, the general biome map on which the chosen plants were placed using references from the texts was not the only map we chose. We added text- and reader-specific maps that appear in additional overlaid windows when users choose a text from the interactive menu. Third, single note cards for each plant and each text were added to these layers with information that included internal hyperlinks, allowing users to circulate from one text to another or from plant species to their textual occurrences. Using these various scales of representation, we were able to cover, however imperfectly, three types of plant movement: 1) inside a single text; 2) across one text to another; 3) from the text to the real world and back again. Such layering implemented the possibility of deep mapping that we had initially discussed only conceptually. While there are numerous additional layers on the biome map (plant icons, text specific maps, note cards for the text and the plant), each one can be closed so that the user is not overwhelmed by information.

Text- and reader-specific maps: A question of perspective

In their observations about literary cartography, Joliveau and Caquard raise the problem of reducing complex geographical phenomenon to mere dots on a map:

Le risque principal des ontologies est de réduire des phénomènes géographiques complexes à des objets individualisables et définissables, dont la compilation ne permet pas nécessairement de capturer l'essence. Ce risque est particulièrement marqué dans le cas des espaces fictionnels car le sens donné au lieu naît non seulement du lieu lui-même, mais aussi de sa mise en scène, de son traitement esthétique, de son rôle dans la narration, voire de l'aura qui lui est donnée par d'autres œuvres. Il faudrait pouvoir associer aux objets géographiques conventionnels des caractéristiques esthétiques, émotionnelles ou narratives. [The major ontological risk is the reduction of complex geographic phenomenon to individualizable and definable objects, the compilation of which does not necessarily allow for capturing their essence. This risk is particularly present in the case of fictional spaces because the meaning given to a place stems not only from the place itself, but also from its staging, aesthetic

treatment, narrative role, even from the aura it is given by other works. We should be able to associate aesthetic, emotional or narrative characteristics to conventional geographical objects.] (Joliveau and Caquard 2012, 44)

But how to retain the aesthetic, emotional, and narrative aspects of the original fictional representation of a place (and the plants that grow and move there, in our case)? We opted to give free rein to our individual, creative cartographic responses instead of adopting a single, predefined template. Our corpus was made up of a wide variety of texts whose stories often took place in imaginary worlds for which no referential places existed, so such a choice made most sense. Moreover, this more inductive approach revealed some of the mapping processes that are inherent to the act of reading. To counter the risk of reproducing biases in highly impressionistic maps, our team research members confronted and discussed different mental maps. In fact, these text- and reader-specific maps proved to be extremely rich symbolically and visually: the practice of research-creation gave life to a new relationship with vegetal matter. Rather than convert spatial data into cartographic symbols, the process became one of translation of a subjective experience into an aesthetic object.

Essentially, this activity is one of externalizing a mental map, using the same neural networks as the ones used during reading. Interestingly, the French word *carte* comes from the Latin *charta*, which means a support. As Marion Picker explains, “les cartes opèrent par transfert, dans la mesure où elles servent de médiatrices entre une perception de l’espace, une carte mentale, et un système de signes [Maps operate by way of transfers, that is, they serve as mediators between a perception of space, a mental map, and a system of signs]” (Picker 2012, 101). In general, any map that is created during the reading process is necessarily embodied somewhere because it is the result of a subjective and real experience of the text. These maps are necessarily partial in both senses of the word, incomplete and favouring certain elements. However, because they are grounded in a specific, individual understanding of the fictional literary space, they enrich and complicate the overly schematic dimension of world maps. Jeanne-Marie Roux offers the following reflection:

[L]a carte sensible est-elle l’indice, comme toute carte, du fait que la pensée, pour être telle, n’exige pas une parfaite et totale transparence à elle-même? En ce sens, la pensée pourrait et devrait opérer sur un fond toujours impensé. Une pensée, pour jouer son rôle, pour opérer, n’aurait pas besoin d’être intégrale, totale, absolue. De ce point de vue, la sensibilité de la carte ne serait pas contradictoire avec sa conceptualité, mais en serait, tout au contraire, le moyen. [Does a *carte sensible* not illustrate that maps, like thought itself, do not require perfect and complete transparency? In

other words, thinking could and should operate against a background of unthinking. To play its role, to operate, a thought does not need to be integral, total, absolute. In this sense, a map's specificity does not contradict its conceptuality, but is instead its means of being.] (Roux 2018, 17)

While remaining faithful to the locations and characteristics of fictional spaces, these individualized maps offer a subjective representation of story places that reflect the aesthetic and literary experiences of each research group member.

In keeping with these reflections, we decided to increase the number of perspectives rather than harmonize the individual maps using a single point of view (such as the common bird's eye view). Isabelle Ost makes a similar point about maps and their representation:

Aussi la cartographie nous oblige-t-elle à problématiser la notion même de représentation, nous incitant à ne plus penser celle-ci sur le mode de la fixité, de l'unicité et du figural, mais bien du mobile, du multiple et de la défiguration ou de la reconfiguration permanente. [Cartography thus requires us to problematize the concept of representation, leaving behind the mode of fixity, unity, and the figural to adopt the mode of mobility, multiplicity, constant defiguration and refiguration.] (Ost 2018, 13)

As shown in **Figure 1** below, the text- and reader-specific maps adopt one of the following viewpoints: 1) an overview or bird's eye view in the case of plants that travel from one continent to another (for example, the coffee trade in Bleys's *Le maître de café* [Bleys 2013])—or in the case of travel by boat or air, etc.; 2) a cross-sectional or frontal view in the case of tree canopies that play a key role as the place of plot intrigue (for example, the gathering of deadly plant species' samples in Nottret's *Mort sur la forêt* [Nottret 2007]); 3) a three-dimensional view to visualize tree and plant profiles (for example, in the garden of Thomas's *Comment faire une danseuse avec un coquelicot* [Thomas 2004]); and 4) a composite view to represent multiple perspectives at once (for example, the use of paths, arrows and magnification to translate plant areas and movements in Clément's *Thomas et le voyageur* [Clément 1997]). Prioritizing local scales, often more apt at revealing movement, some of these maps situate plants in the places they grow and so highlight the relationship to territory and cohabitation with other living organisms. Never isolated from their environment, plant species are an integral part of a large network of interrelationships that allow for the survival and flourishing of entire ecosystems. We drew much inspiration from these dynamic and non-hierarchical relationships when designing the layers and structures of our interactive digital platform.

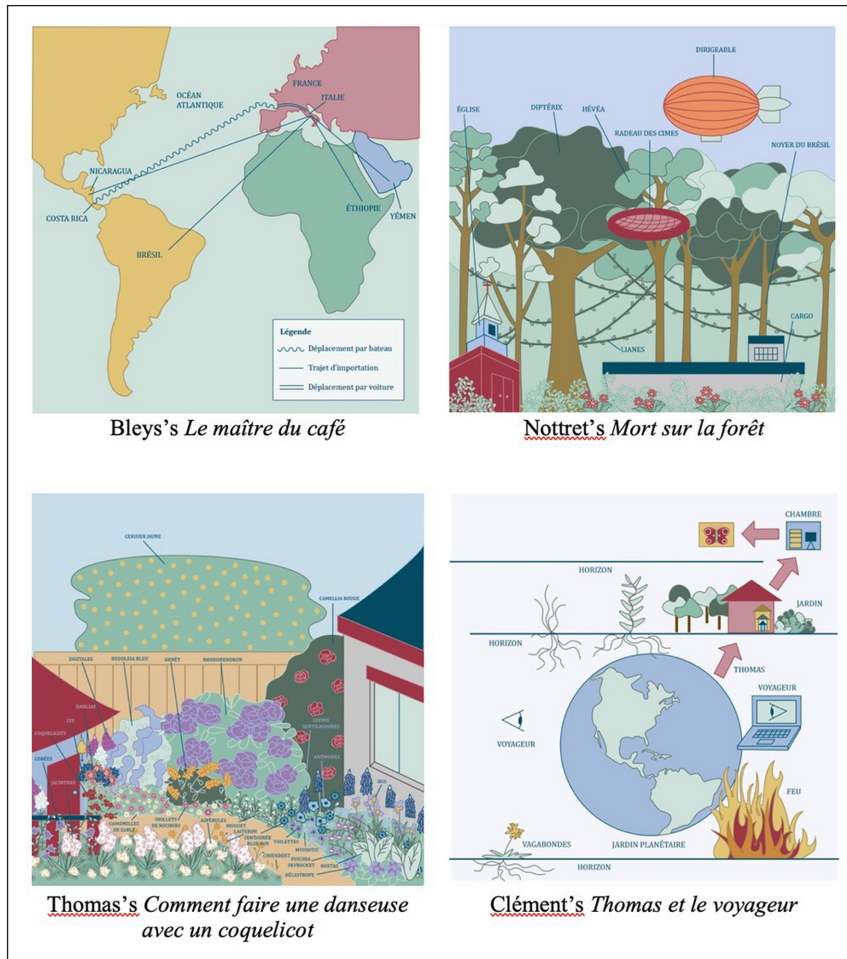


Figure 1: Text- and reader-specific maps.

Experimenting with rhizomatic design

Once the selection of plants and texts was completed, we began reflecting on the type of design that would allow us to organize many different types of information (cartographic, literary, botanical, geographic, etc.) and display as clearly as possible the connections between them. What type of interactive digital platform would illustrate a kind of dialogue between plants, narratives, uses, and maps? How could the convergences between literature, botany, and cartography be best highlighted? From the beginning, we wanted the platform to be a space of discovery and exploration. We wanted to give users the freedom to follow their own interests when navigating the information and maps. To do this, we decided on a design with three entry points: narratives, plants, and functions.

Our design immediately brought to mind the figure of the rhizome, a concept developed by Gilles Deleuze and Félix Guattari, who speak of its “multiple entryways” as a key characteristic (Deleuze and Guattari [1980] 1987, 12). More precisely, the rhizome privileges lines over points, creating connections between diverse, unrelated elements; as such, it served as the perfect figure for the multi-directional movements of our own project. Even though our platform is a closed network (that is, users cannot add their own texts or maps), the possible trajectories are numerous. Each plant, each function, and each narrative provide additional bifurcations that spark curiosity, leading to the creation of new pathways and alternative assemblages. Having decided upon this rhizomatic design, we began reflecting on the visual organization of our plant cartography interface, one that would allow for a simple and effective materialization of all these combinations.

Given that the central node of our research project was plant movement, we chose a map of biomes around the world as the base layer for the platform. First, plants care little about human borders, so a geopolitical map made no sense. Second, biomes offer essential information about the different factors that influence where and how specific plant species seed and flourish in some places and not others. Viewing the biomes map first, users have direct access to the plants by choosing a species from the main menu on the left. Icons representative of that species appear on the biomes map, each icon corresponding to a place in which that particular species is named in a text (see **Figure 2**). In this way, users can explore the second mode of plant movement, that is, across texts, while also seeing the distribution range of each of these plant species and the spatial convergences of plants and texts, etc. Similarly, selecting one of the plant functions from the main menu gives rise to a constellation of icons on the biomes map.

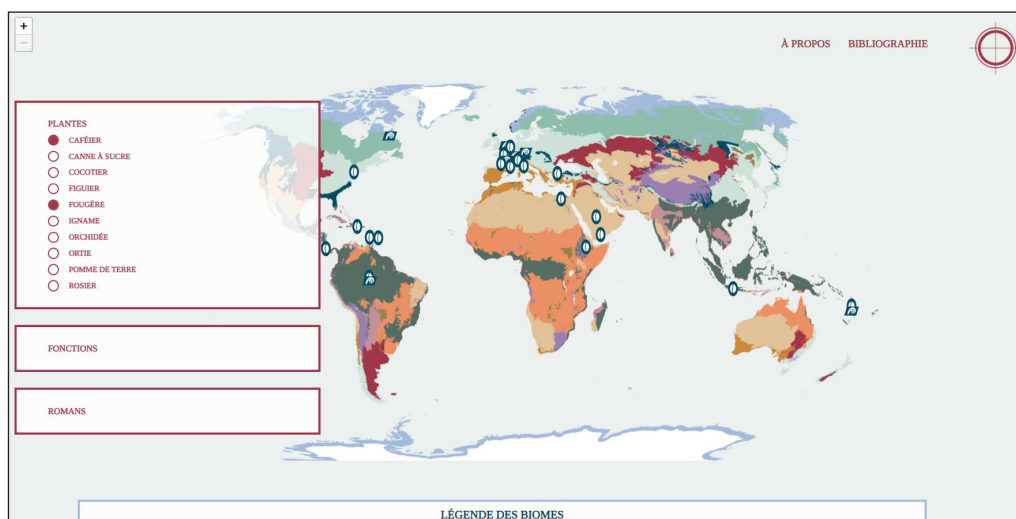


Figure 2: Map of biomes and clickable plant icons.

Any of the three entry points can be used to click on an icon of the user's choice to see the note card designed for that plant species. The card includes various information such as common and scientific names, a general description of the plant, literary quotes from the texts about that plant's functions, additional relevant references, and a list of the texts in which the plant appears. The titles are hyperlinked so that users can easily access a text's note card and its text- and reader-specific map. While these latter maps illustrate the first mode of plant movement, that is, within a single narrative, the co-presence of the plant note card and the text note card create the third mode of plant movement: between the real and fictional worlds. In addition to offering various details such as a brief author biography, a short plot summary, additional references, and a selection of quotes, the text's note card contains a list of hyperlinks to the plants included in the interface. Users experience a restricted version of a rhizomatic system that encourages heuristic movement and exploratory wandering from plant to text, from botany to literature, from the real to the imaginary, all the while forging their own trajectories and cartographic combinations. To encourage the greatest number of openings and facilitate multi-directional movement across different components of the site, the windows of the note cards and text-specific maps are superimposed on the biomes map (see **Figure 3**). Users can return to this base layer map by closing windows or clicking on the compass rose in the top right-hand corner of the site. They can then choose a new entry point to begin their next rhizomatic exploration of modes of plant movement.



Figure 3: Plant and narrative note cards, along with a text- and reader-specific map.

Navigating narrative: Grounding the digital in the real world

No matter the trajectory chosen, users begin to experiment with a certain vegetal dynamic. Moving from plant to plant, from narrative to narrative, from map to map means users immerse themselves in a universe based not on the linearity of the story, but instead on a proliferation of different types of signs (visual, linguistic, cartographic). The maps on the interactive digital platform serve in this way more as openings than as signposts.

Can a new subject position emerge from this experience of navigating digitally mapped spaces? Christiana Ljungberg argues that we are entering a new cartographic paradigm as the reader of the map becomes a user of the map and so “relinquish[es] the subject-object framework for that of implicated agent and expansive field” (Ljungberg 2010, 39). Much like our rhizomatic model for experiencing plants and their movement in and across real and fictional places, Lundberg’s model results in “meshworks” as “diagrammatic thought of illimitable scope rather than closed systems of finite objects” (Ljungberg 2010, 40). We hope that such experiences will lead users away from a place of plant blindness to a place of plant spatialization and orientation.

If our digital interactive platform points back to the real world, it’s because we designed our multi-layered maps to be “oriented toward an experimentation in contact with the real [...] open and connectable in all of [their] dimensions” (Deleuze and Guattari [1980] 1987, 12). Users are invited to follow their own paths of interpretation, to do their own field work and plant walks, in other words, to revisit in an embodied, situated way the universe of plants that is accessible to all who are willing to step outside, to enter a forest of tall trees or a garden, to follow a trail of hedges.

To conclude, the creation of an interactive digital platform led us to repeatedly adjust our research-creation perspective and our relationship to plants. Our first experiment working with a text-image tool like *StoryMaps* was both a failure and a success. It revealed the need to recentre our cartography on plants and not on a single text’s story world. It also led us to the multi-layered design of our platform: individual plant and text note cards, text- and reader-specific maps, a base layer of biomes, three interactive entry points, and clickable plant icons. The next step of our project will be to further consider the agency and intentionality of plants to avoid projecting human characteristics onto them. This is easier said than done. One way to address this thorny problem is to pay careful attention to the language used when speaking of plants, language that often reveals our cognitive biases and modes of thinking. Such attention does not emerge overnight; much like plant growth, it develops slowly and adopts its own modes of movement. In some sense, we hope to get as close as possible to “plant

thinking,” even if this means simply coming to terms with our own limitations. In this regard, our digital platform was so successful because it revealed exactly these human assumptions, limitations, and biases. At the same time, it allowed us to see the world from many different, new perspectives, possibly the richest experience we can have in our encounters with plant and literary worlds.

Competing interests

The authors have no competing interests to declare.

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Authorship in the byline is by magnitude of contribution. Author contributions, described using the NISO (National Information Standards Organization) CrediT taxonomy, are as follows:

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