

ECOLOGIZING, DECOLONIZING: AN ARTEFACTUAL PERSPECTIVE

RELATIONS; ARTICULATIONS

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ABSTRACT

In this paper I present a design project developed in Córdoba, Argentina, entitled ‘Spices-Species’. Through this case study, I discuss the possibility of designing using two decolonial strategies — "objectivity (or truth) in parenthesis" and "being where one does and thinks"— that can lead to delinking, on a micropolitical scale, from colonial social patterns as well as reconnecting humans with natural processes and beings to which they are detached by means of devices. The paper suggests that these decolonial strategies, combined with the performance of designed artefacts may help to acknowledge not only human diversity, but also the multiple and diverse nonhuman beings that conform and participate in different localities.

SPICES-SPECIES

‘Spices-Species’ was the working title of one of three projects developed in Argentina in the context of my postdoctoral research entitled *Symbiotic tactics*.¹ All

¹ Developed between 2014-2016 and financed by the Swedish Research Council. The design proposals of this paper resulted from a collaboration with designer Leonardo Lopez, while consulting scientists at the Multidisciplinary Institute of Vegetal Biology in Córdoba. Crucial to these studies was Mariano Lucia’s advice, being a researcher specialist in carpenter bees at the Entomology Museum in La Plata. It is worth noting that the project was originally conceived through a ‘ecologizing’ framing rather than a ‘decolonizing’ one.

three projects addressed everyday life, and in the case of ‘Spices-Species’, it addressed it at an ‘intimate’ scale; based on the relations we humans establish with nonhuman beings, in this case plants, by ingesting them, either because they are edible or because they can be used for medicinal purposes, thus inter and intra acting through their chemistry and materiality with our bodies.

To lead a human life in any part of the world implies the use of *devices*, that is, artefacts, services, rituals, and/or systems that in one way or another *divide*, organize our everyday while including some and excluding others, both human and nonhuman.² Design practices enact prescriptions and thus materialize and orchestrate forms of power-knowledge. From a biodiversity perspective, it becomes explicit that the ones that are included in the devising are, for the most part, humans (particular human groups enacting the fluid and overlapping categories of gender, race, class, ethnicity). Design as a practice has been anthropocentric (something I will briefly elaborate upon later on the paper), reason why one of the aspects that framed the studies was species’ correlations to human preferences. In this case, the general human predilection of floral plants, with the resulting presence or absence of certain plant species in the city of Córdoba.

Together with researchers from the Multidisciplinary Institute of Vegetal Biology, we identified four floral native species of this region that could be either edible and/or medicinal. These were: *Tagetes minuta*, *Caesalpinia gilliesii*, *Nicotiana glauca* and *Passiflora caerulea*. After a first-year period of studying, growing, and experimenting with the four of them, we decided to develop our proposal based on *Passiflora caerulea*, a

The reflections on decoloniality and power presented here result from my effort to contribute to this event and my maturing of the understanding of ecologizing and decolonizing as complementary processes.

² See Avila 2012. For a more explicitly political description of the devising process see Avila and Ernstson “Realms of Exposure: On Design, Material Agency and Political Ecology.” In Ernstson & Sörlin, forthcoming 2017.

variety of ‘passionflower’³, for being both medicinal and edible, and for specific interactions they have with carpenter bees that make them vulnerable in the built environment of the city of Córdoba.

Varieties of passionflower grow in different locations. In the central regions of Argentina, the variety known as *Passiflora caerulea* is mostly used for ornamental purposes, while its fruits are eaten and its parts (leaves, flowers, stems and fruits) used to make infusions, decoctions and tinctures that alleviate humans for its sedative and anti-stress effects; reason why it is, perhaps, the most cherished of the native medicinal plants in the region.⁴ Several other species have preference for this plant; *Agraulis vanillae maculosa*, the most common Argentinean butterfly lays eggs and feeds on it, several carpenter bees of the genus *Xylocopa* prefer it for its abundant nectar (Fig. 2), a variety of birds feed on its fruits and ant species cohabit peacefully with some of its visitors to draw mutually beneficial relations that maximize the availability of nectar. These are a few of the most common interactions that are visible to the human eye, which give a sense of their co-evolutionary symbiogenesis.⁵

Throughout ‘Spices-Species’, we have attempted to acknowledge some of these inter and intra actions, and incorporate them onto the final design proposal, with the intention to make explicit the possibility not only of growing the plants as (useful and beautiful) companions to humans, but also of hosting and/or nurturing several nonhumans that relate to the plant.

³ “Their common names ‘passion flower’, ‘flower of Christ’ refer to different plant structures that resemble different aspects of the life of Jesus Christ.” See Sérsic & Cocucci 2010: 264. The edible fruit worldwide and commercially known as “passion fruit” derives from *Passiflora edulis* and *Passiflora edulis flavicarpa*, the one we presently discuss, *Passiflora caerulea*’s fruits are edible but not as sweet to the human palate as the *edulis* varieties.

⁴ The fruits can be edible if ripe or raw but cooked. Syrups from them can be obtained to produce a refreshing drink traditionally used against jaundice and scurvy. The most known property of this species is the sedative or tranquilizer, for which leaves, flowers, stems and fruits are used. The roots are attributed anthelmintic, antispasmodic, contraceptive and emmenagogic properties. Root syrup is used against pneumonia; however, this is narcotic and in high doses can cause death. The infusion of flowers, leaves and stems has been used as a diuretic, emmenagogic and contraceptive. It is also credited with antifungal, antimicrobial, vermifuge and antituberculous properties. See Barboza et al. 2009; Martínez 2015.

⁵ See Ajmat de Toledo 1991; Amela Garcia et al. 1997; Amela Garcia and Hoc, 2000; Lucia 2011; Lucia et al. 2014.

By referring to ‘humans’ I do not mean to emphasize the homogeneity of our ‘species’⁶, on the contrary, I am interested here in the specific ways in which a variety of human legacies of knowledge and relation to biomes affect the potential to establish affective bonds that might benefit the cohabitation of humans and nonhumans. The category ‘human’ is predominantly used to distinguish human animals from nonhuman animals and nonhuman things in general.

In the particular case of the human population of the province of Córdoba, a region formed by the historical influx of (mostly) European immigrants, the cultural hybridity repeats colonial patterns found in many other parts of the world: ‘colour’ as the deviation from the (‘white’) norm; indigenous knowledge as naïve and archaic in relation to scientific knowledge. Questioning these, what this proposal engages with are the mixtures in their potential for sustainable development, and the multiple onto-epistemological approaches that enrich and diversify, rather than silence, how sustainable development might be enacted. Emphasising the mixture, this approach builds upon the existing continuum that can be described through several categories such as: naturecultures, urban ecologies, agroecosystems, bioregions, places, locality, among others. In my use, these categories attempt to pay attention to the (physical and material) dynamic aspects in and of their enaction, but also, and beyond their geographical location, to the geopolitical “in the sense of how imperially made regions, beyond ‘natural environment’ shape and conform people dwelling in that region” (Mignolo 2008: 117). Being where one does and thinks matters, and in this very sense, we must acknowledge the myriad nonhumans that matter, shape and conform these naturecultures (Haraway 2016).

The knowledge derived from indigenous and mestizo or ‘criollo’ cultures and their hybrid cosmologies are predominantly based on the ecological knowledge of the hilly landscapes (*las sierras*) in the region. My work focuses on the urban context of the city of Córdoba, also surrounded by the sierras, and influenced by the knowledge and worldviews of those that practice ‘alternative medicine’.

In spite of recent legal measures to combat deforestation, there is only 5% to 3% left of the native forests of the region of Córdoba⁷. The knowledge of plants that has been collected by experimentation over centuries by people living in intimate association with their environment is disappearing, with the consequence

⁶ Although I cannot develop this here, at stake are the recognition of the complex inter and intra actions of the multiple *umwelts* in their own *multiplicity*. See Hendlin 2016; also, Kull 2016.

⁷ See for example: http://www.vidasilvestre.org.ar/sala_redaccion/?16260/Crdoba-peligran-los-ltimos-bosques-nativos-de-la-provincia

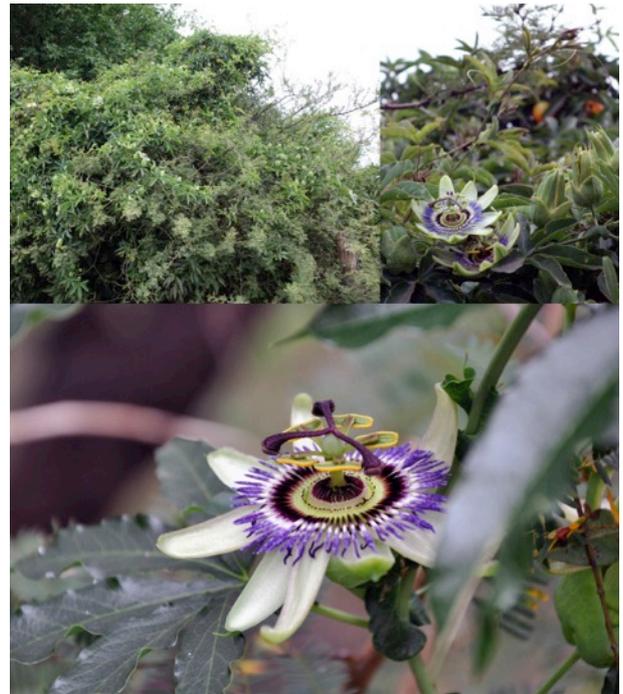
of silencing these cosmologies, leaving scientific knowledge, not only as dominant but also as the only epistemological register. About 80% of the world's population “still relies upon plants for primary health care; even today in Western medicine, and despite progress in synthetic chemistry, some 25% of prescription medicines are still derived either directly or indirectly from plants.” (Barboza et al 2009).⁸ This is important since it implies the presence and the liveliness of human heterogenic ways of knowing and relating to the world as well as different approaches to validating the knowledge enacted. It is also important because it indicates that the majority of the human population practices and lives by compound belief systems that vary in degrees. However, “accelerated acculturation is disintegrating ethnopharmacological information often faster in many areas than the extinction of plant species, which rampant deforestation invariably entails.” (Barboza, G. et al. 2009).

CYCLE INITIATOR

The design proposal of ‘Spices-Species’ was prototyped through several experiments.⁹ The following description attempts to contextualize the plant, some of its visitors and their habitats while giving an account for the main considerations that shaped the proposal.

⁸ See also Martínez 2015. More specifically Barboza, G. et al 2009 mention “There is a worldwide trend of increasing demand for many popular, effective species in Europe, North America and Asia, growing between 8 and 15% per year (Grünwald & Büttel 1996). In Japan, 60-70% of allopathic doctors prescribe TM [Traditional Medicine] for their patients, and in China, TM accounts for about 40% of all health care. Forty-eight percent of the populations in Australia, 70% in Canada, 42% in the US, 38% in Belgium and 75% in France, have used TM at least once. In the United Kingdom, almost 40% of all general allopathic practitioners offer some form of TM referral or access (Bussmann & Sharon, 2006). A similar situation exists in Latin America, where large volumes of medicinal plants are sold in urban markets (Shanley & Luz, 2003). Regional Office for the Americas (AMRO/PAHO) reports that 71% of the populations in Chile and 40% of the population in Colombia use TM.”

⁹ Some of which can be found on <http://www.martinavila.com/projects/spices-species/>



1 - *Passiflora caerulea*. The images show the plant in its native context, its flowers and its fruits in the background, and the flower in more detail.

In figure 1, we see a variety of the passionflower native of these areas. Being a climbing plant they climb on other trees or stronger plants that can support them without obstructing all the sun from the supporting plant. Although, as noted before, the plant interacts with myriad of beings, the design of the proposal and this paper focus on the plant's main pollinators: carpenter bees of the genus *Xylocopa* (fig. 2).

There are eighteen species of *Xylocopa* in Argentina (Lucia 2011). These nest in dry woods by excavating holes to oviposit and protect their young. Of those found in Córdoba we decided to work with two species, *Xylocopa artifex* and *Xylocopa ciliata*. The peculiarity of these two is that they do not excavate on solid wood (like the majority of its genus) but on hollow woods such as Cane or stems of *Eryngium* (Fig. 3). Since cane and *Eryngium* are more threatened by human preferences for other plants, we decided to work with these two species in particular because both are increasingly rare in the built environment of Córdoba.

As can be seen in figure 4, these varieties of *Xylocopa* use the sawdust from the scraping of the walls to build partitions where they oviposit inside the cane/*Eryngium*. Their larvae grow inside these partitions that are also provided with food (a mixture of nectar and pollen), and even when they have grown up so as to look like fully mature carpenter bees, the mother keeps bringing them food to the nest until they are fully grown to be able to procure their own food. (Lucia 2011).



2 – Carpenter bee collecting nectar from the nectary with pollen on its back. We also see on top of the stamens a Leaf-footed bug of the *Coreidae* family (these are phytophagous, they feed on the sap of the plant).



3 - Hollow woods: Cane (left) and *Eryngium* (right).



4 - Longitudinal section of the nest of *Xylocopa* in a cane of *Arundo donax* (Photo: Mariano Lucia).

We sketched, modelled and prototyped several versions to create what we call a ‘cycle initiator’. The intention was to create a device that could help to initiate the life cycles of the plant and also, provide the housing that enables the nesting of these species of *Xylocopa artifex/ciliata*. As such, the ‘cycle initiator’ should

provide the means by which one can initiate two ‘cycles’: that of the plant and that of its main pollinator, while remaining instrumental in its performativity in relation to the human caring for it (benefiting from its medicinal properties). As observed, *Xylocopa artifex* and *Xylocopa ciliata* build nests on soft (hollow) woods, and in order to be able to provide with a soft material that these species could excavate without repelling them (because of their chemistry and/or structural properties), we experimented with local varieties of wood and resins that could be used to create compound materials (fig. 5, to the left). Due to difficulties in producing our own material that could be mechanized and would prove to be long-lasting enough, we decided to experiment with commercially available compound materials such as MDF. On the right side in figure 5 we see that the carpenter bee has gnawed and accepted the MDF (they need sawdust for the partitions), we can also see traces of pollen left behind.



5 – Sample of material experimentation with wood from ‘Palo borracho’ (genus *Chorisia*). On the bottom left it is possible to see part of hardened resin from a native *Acacia* used as binder to make the soft compound material. On the right (photo: Mariano Lucia), it is possible to see the sawdust from the scraping of the inner walls of the MDF cylinder, as well as pollen disseminated while entering and leaving the cylinders.



6 – Both species, *Xylocopa artifex* and *Xylocopa ciliata* circumnavigate cane or *Eryngium* stems assessing the suitability of the plant for nesting, landing occasionally on its stalk and ‘tapping’ onto it before they decide on a place to perforate its wall.



7 - 'Cycle initiator'

In figure 7 we see an image of the set we call 'cycle initiator'. It has three cylindrical compartments and a solid peg, as well as a flask that contains two plant germinators. These compartments were mechanized to cylindrical shapes following the observation that one of the main procedures of *Xylocopa artifex* and *Xylocopa ciliata* when identifying potential nests, is to circumnavigate the cylindrical stalks of their plants of preference (cane and *Eryngium* —see diagram fig. 6). The diametrical size of the cylindrical compartments (22 mm) is based on the average diametrical size of the canes of the region.¹⁰



8 - Details 'cycle initiator'

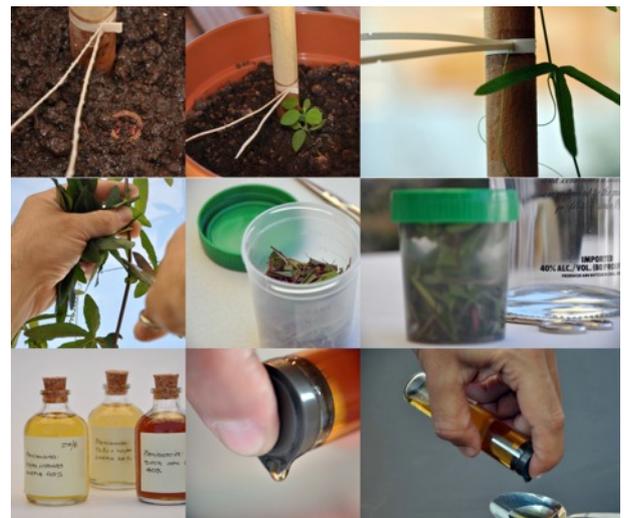
The image of the right side of figure 8 shows a peg that can be buried and three modular compartments. On the left image of figure 8, it is possible to see inside the flask two germinators made of substrate and seeds. All contained by three precincts that, once the package has been disassembled, function as fasteners for the modules and structures on which passionflower grows (Fig. 10, image at the top right).

¹⁰ Although I cannot develop this point here, this is a crucial aspect of what is at stake through a bio-geo-centric practice of design, since it implies ecosemiatic/biosemiatic recognition and the addressing, explicitly, of the concept of *semethic interaction*. See Hoffmeyer 2008; Maran & Kull 2014.



9 – Disassembling, mounting and planting procedures

On figure 9 we can see a sequence of steps to use the set for starting germination: preparing a pot, disassembling and mounting the set, the planting of the germinators. Once the germinators are planted, it takes on average 30-50 days for the plant to germinate. As it grows, the plant searches with its tendrils for supporting structures on which it can tangle up and climb.



10 - Growing process as well as pruning and tincture procedures

The precincts that were first used to pack the parts are now turned into fasteners and a structure for the plant to tangle up. When the plant has matured and exceeded the height of the initiator it can be pruned. Pruned parts are placed in a container to make tinctures. This is done by adding edible alcohol of at least 40%, and stored in a cool, dark place between 4 to 8 weeks. After those 4-8 weeks, leaves and stems are filtered and the tincture is removed and put into the dosing tube (flask) that comes with the set. Taking a dose of tincture has a sedating, relaxing effect. The dosage will vary depending on the physical condition of the person ingesting them, as well as on the quality of the tinctures produced. Although similar (sedating) effects can be obtained by directly

boiling the parts of the plant on water to create infusions/decoctions, we designed the set to encourage the production of tinctures, being a process less wasteful of the plant and better at concentrating the chemicals of the plant than infusions are.¹¹



11 – Female *Xylocopa* peeking from its nest.

Ideally this is what we would see after a while (fig. 11), if the vital cycles of the plant and the bees coincide with the installation of the set¹². This, however, is becoming more difficult to happen naturally in the built environment of the city of Córdoba since there is scarcity of the plants that these pollinators inhabit (cane, *Eryngium*); hence the need to relate to these native plants in a way that also includes their pollinators and other visitors.

DELINKING, RELINKING OTHERWISE

Taking ‘Spices-Species’ as a case study and departing point, how can we speak of an ecologizing process in relation to a decolonizing process? The cycle initiator proposes an engagement with the preparation of tinctures, a technology that was developed later than the understanding of the medicinal properties of these plants. In this way, the set may seem to combine pre-Hispanic with scientific knowledge and Eurocentric

¹¹ Tinctures, like other forms of medication, must be used with care. A general reference for their production, advantages and disadvantages can be found in Wikipedia: en.wikipedia.org/wiki/Tincture.

¹² The experiments realized so far are few and have not led to conclusions regarding the viability of the life of these species of *Xylocopa* in these conditions. Studies in Canada on “bee hotels” (from a survey of almost 600 bee hotels during a 3-year period) showed for example, that native bees were parasitized more than introduced bees and females of introduced bee species provisioned nests with significantly more female larva each year. See MacIvor & Packer 2015. It is important to note however, that this proposal differs from such generic “hotels” since it has been specially designed for these and not any other species, as well as for relating to the plant that these species prefer.

traditions daily present in the region studied, not introducing something epistemologically ‘new’, while participating, as a device, in extending the existing power-knowledge relations of this region’s naturecultures. In my view however, its ‘newness’ lies in its attempt at de-linking from anthropocentrism to extend our sense of *self* so that ecological belonging acknowledges other scales of being, a becoming-*with*, a becoming-*through*, a becoming-*for and...*¹³ It exposes us to the short sightedness of not caring for the companion species that cohabit with us (whether we like them or not), and on which we are dependent upon. Decolonizing implies epistemological disobedience, “de-linking”. In the case of ‘Spices-Species’, the project does not propose an expansionist model, but the responsible use and understanding of local materials and species and a reestablishment of affective bonds; a de-linking from ‘growth’ and a re-linking to the processes of living and dying.

In this context ‘sustainable development’ is not a contradictory expression (since development does not imply expansion), but an expression that emphasises the dynamic aspects and the interrelation between the two words: sustaining (create, test and maintain adaptive capability) development (create, test and maintain opportunity).¹⁴ More specifically, the micropolitical and decolonial frame of this project implies that both words, sustainment and development, should also be anchored on multiple *anthropos*, and acknowledge the plurality of human cosmologies and ways of knowing. Through the proposed medicinal use, the project suggests a de-linking from (not to replace but to complement) allopathic ways of knowing and the industry of synthetic chemistry that disconnect us from multiple scales of life of the biomes we inhabit.¹⁵ A serial production based on the potential of materials and processes of the biome. The project suggests, in short, an everyday material device that in its commonplace pushes for “a reworking of the geo- and bio-graphic politics of knowledge” (Mignolo 2008: 123).

I have mentioned that design as a practice has been anthropocentric, that is, designed by humans for

¹³ See my work on prepositions as well as the use of the conjunction *and* in (Avila 2012). See also Haraway’s use of “becoming-with” (2016: 12).

¹⁴ This definition of sustainable development comes from “systems ecology” (Holling & Gunderson 2002) and not from “economics”. For a critique of the implications of “development” in current “sustainable development” see Mignolo 2016. For a critique of development see Escobar 2012.

¹⁵ “Decolonizing Western epistemology means to strip it out of the pretence that it is the point of arrival and the guiding light of all kinds of knowledges... decolonizing knowledge is not rejecting Western epistemic contributions to the world. On the contrary, it implies appropriating its contributions in order to then de-chain from their imperial designs.” (Mignolo 2008: 82).

humans. This is partly because it has enacted a material culture organised around the perceptual capabilities of humans and human cognitive features, such as our own linguistic capacities.¹⁶ On the linguistic framing, we might refer to Derrida's word play when, thinking of his cat, he describes the difference in understanding it as *animaux* (animal), and not as the 'cat' that we normally and generally categorize in conversations and to which he refers as *animot*; the single figure of an animality (as opposed to humanity, while abstracting the singularity of *that* cat) by means of the category "animal" through the use of words (hence the pun "mot" —'word' in French— instead of "maux". Derrida 2008). In the words of Yogi Hendlin "In treating the other like a token of a type instead of a semiotically-capable being, we miss the relational aspect of the interactive event, as well as the opportunity to learn the nuances of meaning for the other more thoroughly" (2016: 96). If we as humans think about other humans, nonhumans and companion species as a representative of a type, we miss the diffractive and resonant inter and intra active aspects of communication.¹⁷

The (human) recognition of shared precarity, vulnerability and co-dependency¹⁸ becomes the precondition that might open up to living (and constructing) with uncertainty and make possible to enter into what Humberto Maturana calls a domain of "co-inspiration" by means of putting "objectivity in parenthesis".¹⁹

When one puts objectivity in parenthesis, all views, all verses in the multiverse are equally valid. Understanding this, you lose the passion for changing the other. One of the results is that you look apathetic to people. Now, those who do not live with objectivity in parentheses have a passion for changing the other. So they have this passion and you do not. For example, at the university where I work, people may say, 'Humberto is not really interested in anything,' because I don't have the passion in the same sense that the person that has objectivity without parentheses. And I think that this is the main difficulty. To other people you may seem

¹⁶ I choose to emphasize this, to point at the relevance of biosemiotic understanding, since design tends not only to be anthropocentric but also anthropomorphic in its way of framing communication. See Hoffmeyer 2008; Emmeche & Kull 2011; Maran & Kull 2014. Some of the philosophical implications can be found in Derrida 2008; Hendlin 2016; Haraway 2016.

¹⁷ See Hendlin 2016. Also, Barad 2007; Hoffmeyer 2008; Emmeche and Kull 2011; Haraway 2016.

¹⁸ See Butler 2011; Avila 2012; Haraway 2016.

¹⁹ Quoted in Mignolo 2011: 27. This quote can also be found in several online forums. For Maturana's development of this concept and the difference it creates on our perception of reality see: <https://www.univie.ac.at/constructivism/papers/maturana/88-reality.html> (accessed 30/9 2016)

too tolerant. However, if the others also put objectivity in parentheses, you discover that disagreements can only be solved by entering a domain of co-inspiration, in which things are done together because the participants want to do them. With objectivity in parentheses, it is easy to do things together because one is not denying the other in the process of doing them.

According to Walter Mignolo this is the equivalent of (in the discourse of science and coming from a scientist, Humberto Maturana) the Zapatistas' "dictum": A world in which many worlds would coexist. If, as Maturana claims, disagreements can only be 'solved' by entering a domain of co-inspiration, in which things are done together because the participants want to engage in them, so that we can "co-inspire" one another, why would those who benefit from the current socio-economic and material system change and do these things? From the perspective of the dominated, to get the other to co-inspire means to build your power to change the world. And if the differences among humans are so pronounced, what can be said of the human forms of exclusion and exploitation of most nonhumans? At this historical moment, the real threat of the ecological collapse of the natural systems that support human life has the potential to make possible an opening for "co-inspiration" towards the dominated; a process that must continuously and agonistically be reassessed; an unavoidably co-adaptive symbiogenesis.

Through this attempt to expand our response-ability (Haraway 2016) I have presented a design that is an account layered on multiple textual and material registers, in an effort to engage in alternative biographies. The very determination to produce the tinctures and understand the developmental processes of the plants has brought me and other non-plant specialists colleagues in contact with multiple aspects that demand an active appreciation of the organisms and the biomes studied, nurturing thus, a sense of care-for these and other species related to them, provoking a shift in our practices, which attempt to move from a (Eurocentric) anthropocentrism to a pluriversal biocentrism and develop devices that perform human responses as responses co-inspired by and for multispecies cohabitation. Being where one does and thinks matters, and matters *differently*.

REFERENCES

- Ajmat de Toledo, Z. D. (1991) Fauna del noroeste argentino. Contribución al conocimiento de los Lepidopteros argentinos. X. *Agraulis vanillae maculosa* (Stichel) (Lepidoptera, Rhopalocera, Heliconidae). Acta zoológica Lilloana 40. 2: 21-31.
- Amela García, M. T., Hoc, P.S. & others (1997) Floral biology and reproductive system of *Passiflora caerulea* (Passifloraceae). *Beiträge zur Biologie der Pflanzen*, 70(1), pp.1–20.

- Amela Garcia, M.T. & Hoc, P.S. (2000) Pollination of Passiflora: do different pollinators serve species belonging to different subgenera? En *VIII International Symposium on Pollination-Pollination: Integrator of Crops and Native Plant Systems 561*. pp. 71–74. Available at: http://www.actahort.org/books/561/561_10.htm [Accessed 22/5/2015].
- Avila, M. (2012) *Devices. On Hospitality, Hostility and Design*. ArtMonitor: Gothenburg.
- Barad, K. (2007) *Meeting the Universe Halfway. Quantum Physics and the Entanglement of Matter and Meaning*. Duke University Press. Durham and London.
- Barboza, G. E., Cantero, J. J., Núñez, C., Pacciaroni, A., and Ariza Espinar, L. (2009) “Medicinal plants: A general review and a phytochemical and ethnopharmacological screening of the native Argentine Flora.” *Kurtziana* v.34 n.1-2 Jan/Dec. Córdoba. Available online: http://www.scielo.org.ar/scielo.php?pid=S1852-59622009000100002&script=sci_arttext&tln_g=pt
- Butler, J. (2011) “Precarious Life and The Obligations of Cohabitation”. Available at: <http://www.nobelmuseum.se/en/nww-lecture> (Accessed June 2011)
- Derrida, J. (2008) *The Animal that therefore I am*. Fordham University Press. New York.
- Emmeche, C. and Kull, K. (Eds.) (2011) *Towards a Semiotic Biology. Life is the Action of Signs*. Imperial College Press. London.
- Ernstson, H. and Sörlin, S. (Eds.) - (forthcoming 2017) *Grounding Urban Natures: Histories and Futures of Urban Ecologies*.
- Escobar, A. (2012 [1995]) *Encountering Development. The Making and Unmaking of the Third World*. Princeton University Press. Princeton and Oxford.
- Haraway, D. J. (2016) *Staying with the Trouble. Making Kin in the Chthulucene*. Duke University Press. Durham and London.
- Hendlin, Y. H. (2016) “Multiplicity and *Welt*”. *Sign Systems Studies* 44(1/2) 94–110. University of Tartu Press. Tartu.
- Hoffmeyer, J. (2008) *Biosemiotics. An Examination into the Life of Signs and the Signs of Life*. University of Scranton Press. Scranton and London.
- Kull, K. (2016) “The Biosemiotic Concept of the Species”. *Biosemiotics* (2016) 9:61–71 DOI 10.1007/s12304-016-9259-2
- Lucia, M. (2011) *Estudio biosistemático de las abejas de la tribu Xylocopini (Hymenoptera: Apidae) de interés agronómico en Argentina*. Doctoral thesis. Facultad de Ciencias Naturales y Museo Universidad Nacional de La Plata Museo de La Plata.
- Lucia, M. et al. (2014) “Large carpenter bees in Argentina: systematics and notes on the biology of *Xylocopa* subgenus *Neoxylocopa* (Hymenoptera: Apidae)” <http://biotaxa.org/Zootaxa/article/view/zootaxa.3754.3.1>
- Maran, T. and Kull, K. (2014) “Ecosemiotics: Main principles and current developments”. *Geografiska Annaler: Series B*. Swedsh Society for Anthropology and Geography.
- Martínez, G. J. ([2010] 2015) *Las Plantas en la Medicina Tradicional de las Sierras de Córdoba. Un recorrido por la cultura campesina de Paravachasca y Calamuchita*. Detodoslosmares. Córdoba.
- MacIvor J.S., and Packer, L. (2015) “‘Bee Hotels’ as Tools for Native Pollinator Conservation: A Premature Verdict?” *PLoS ONE* 10(3): e0122126. doi:10.1371/journal.pone.0122126
- Mignolo, W. D. (2011) *The Darker Side of Western Modernity. Global Futures, Decolonial options*. Duke University Press. Durham and London.
- (2016). Sustainable Development or Sustainable Economies? Ideas Towards Living in Harmony and Plenitude. Available at: https://www.academia.edu/29415578/Sustainable_Development_or_Sustainable_Economies_Ideas_Towards_Living_in_Harmony_and_Plenitude_CLIC_K_ON_LINK_https_doc-research.org_en_report2_sustainable-development-or-sustainable-economies-ideas-towards-living-in-harmony-and-plenitude_
- Sérsic, A. and Cocucci, A. (Eds.) (2010) *Flores del Centro de Argentina*. Academia Nacional de Ciencias. Córdoba.

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