JULIA MENSCH

Aroma Colorado

This essay explores the intelligence and political agency of amaranth, based on my fieldwork in Argentina and my coexistence with, and close observation of, its vegetal behavior. Also known as *kiwicha*, *aroma*, and *colorado*, amaranth is an ancestral plant redefined by the transgenic model as a resistant weed. Through its development of mechanisms to resist the agrochemicals used in genetically modified crop production, it transforms the landscape of soybean monoculture and disrupts the homogeneity that capital purports to achieve.

Agrochemicals
Agroecology
Genetic Variability
Plant Intelligence
Monoculture
Resistance

"I am a monstrous plant.
My roots are thousands of miles from me and no stem connects us, two seas and an ocean separate us."[1]
Juan Gelman

1.

I uproot myself from a fertile, abused and powerful soil. I get on the plane, my body resting in a seat where I float in mid-air, moving to the other side of the ocean. This time is like many that have come before and many yet to come. The connection between my body and my roots expands, floating like some sort of monstrous plant, suspended until further notice. As a strategy to reduce my fragmentation somewhat, I carry a small cargo of amaranth seeds and plants with me; actually, they are in the large suitcase, and I will recover them once I reach that other country, which at this point might be said to be awaiting my arrival.

Like me, amaranth originates from the Americas. This exotic-looking and unclassifiable plant has been able to overcome a variety of adversities and expand to different lands. Amaranth—also named *kiwicha*, *coime* and *yuyo colorado* (red-colored weed)—may well be like many other plants in knowing much about migration and the adept transformation of the spaces to which it moves.

FIG. 1–2
Left: *Amaranthus hybridus*, Bolívar, Buenos Aires Province, 2023; right: *Amaranthus cruentus*, Volcán, Jujuy Province, 2023. Photographs taken during field research for the project *Amaranth as Political Agent*, 2022–2025

Although the Spanish conquistadors sought to banish it because it was sacred to indigenous armies and provided them with nourishment, this plant managed to survive in this immense, rich, abused and powerful territory that is the Americas. In Argentina, very few people cultivate amaranth, but she grows, irreverent and undisciplined, in millions of hectares of monoculture crops. Agents of transgenic agriculture rather unsuccessfully seek her extermination utilizing a variety of chemicals called phytosanitary products. However, she has ways of mutating to elude the poison's effects, transforming the soil where she chooses to grow. In the monotony of soy fields, where everything is a flat, homogenous green, the red colored weed (or *colorado*, as she is called in transgenic agriculture circles) intervenes in the landscape, transforming its color palette, giving heterogeneity to capital's purported homogeneity, creating polycultures of genetically modified (GM) soy and wild amaranth.

FIG. 3
Julia Mensch, *Amaranthus cica (Hornillos)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 4
Julia Mensch, *Amaranthus cica (Hornillos)*, 2023, drawing, ink on paper, 17 × 24 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 5
Julia Mensch, *Amaranthus hypocondriacus (Río Cuarto)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

2.

This plant has been able to modify how my surroundings are perceived. Since the beginning of this project,[2] I have sought the most diverse strategies for attaining a profound knowledge of *kiwicha*. I have gathered her seeds during every research trip, I have carried her from continent to continent, I have planted her on my balcony, in my urban garden and along the sidewalk in front of my house. I have conversed with people who cultivate her in family agriculture and agroecology settings, as well as with those who attempt to eliminate her as a weed resistant to the agrotoxins used in GM crop production. I have seen her grow, caressed her, eaten her and seen her dance in the currents of the wind, attempting to imitate her movements. By following her growth process in drawings, I have tried to slow myself down to observe her as thoroughly as possible, to develop a different perceptiveness of her plant being. Very gradually, and perhaps without being entirely aware of it myself, I have become this wise plant's apprentice and devotee. What I can say is that we have both constructed a reciprocal connection. Speculation on my part? Without a doubt. But over the course of recent years, amaranth has become my companion, accomplice and guide. And today, I feel the plant acting in some way within me, a germination that has grown slowly, progressively, as plant beings do in the earth.

FIG. 6
Julia Mensch, *Amaranthus caudatus* (*Tilcara*), 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 7
Julia Mensch, *Amaranthus caudatus* (*Tilcara*), 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 8
Julia Mensch, *Amaranthus palmeri (Carmen de Areco)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

I am a city being, I grew up seeing the wild plants called weeds emerge from urban crevices, gaining territory any way they could. My interest in these rebel plants, so skilled at intervening space, multiplying and living in the most adverse conditions, is what led me to begin this project. They are called weeds, resistant weeds, trash, wild plants, *buenezas*[3] (edible weeds) and spontaneous vegetation, and each term manifests a different worldview.

Agroecologist Santiago Sarandón explains that these plants' intelligence resides in their ability to adapt to their surroundings.[4] They have been continually adapting themselves for millions of years, co-evolving year after year, generation after generation.[5] While the transgenic model insists on eliminating them with more poisons, they insist on adapting to them even more insistently. Sarandón states that eradicating them from cultivated fields is biologically impossible, because of the high degree of genetic variability the populations have, which allows them to continually adapt to their external conditions. Said variability refers to the fact that the populations are diverse on a genetic level.[6] One same species can have many biotypes, or plants with different DNA, which therefore possess distinct capabilities for adapting to the environment.[7]

As opposed to transgenic agriculture, agroecology does not purport to eliminate spontaneous vegetation, but rather to make use of the biological and nutritional services it has to offer.[8] According to Sarandón, this increases agrodiversity and brings many advantages, such as better regulation of plagues and disease in crops, assuring better pollination, and even an increase in overall productivity.[9] In terms of nutritional value, the fact that spontaneous vegetation has not been domesticated means that wild species conserve more nutrients than the majority of cultivated ones. As biologiest Eduardo Rapoport confirms, the best way to control weeds is by eating them.[10]

According to the dictionary, wisdom is the "highest degree of knowledge."[11] Taking this definition as the point of departure, we could establish that the intelligence demonstrated by resistant weeds that succeed in adapting and growing in GM crop plantations is wisdom. This wisdom begins with the diversity wild plants possess as species, in other words, their genetic variability. This diversity is what enables them to resist and adapt to the most adverse of settings (whether resisting the action of poisons that seek to eliminate them or producing greater quantities of seeds, or knowing when to awaken from their dormant state to sprout). The learning that is acquired over time and passed from generation to generation is stored in their genetic code. As a result, the wisdom of these plant beings is collective and intergenerational, since it is not reduced to a single plant, but is shared by a group of them. Their extreme genetic diversity is, in turn, expressed in their phenotypical plasticity, that is to say aesthetically, in their varied appearance.


FIG. 9–10
Resistant weeds, Universidad del Litoral, Esperanza, Santa Fe Province, 2024. Photographs taken during field research for the project *Amaranth as Political Agent*, 2022–2025

3.

There is a family of amaranths sleeping on my sidewalk. I arrive in Berlin at the beginning of spring and I curiously observe the dry ground in the flowerbeds on the street where I live. I planted and harvested amaranth there last year, and there may well be thousands of seeds that remain there in the dirt, waiting to sprout. I know this because at the end of the plant's annual cycle, the seeds fall from the panicle to the ground, to await the conditions propitious for them to sprout and begin the cycle over again. I look at the soil to see if any have begun to do so on their own, as they do in GM soy monoculture fields. I closely watch the small urban plots where the plants remained frozen after the cold arrived in Germany, but none of them have sprouted. They are surely in the state that specialists refer to as 'dormancy,' a word thus far new to me that refers to plants' ability to know when to sprout, that is to say, when to wake up and begin to grow. In the current political context, I envy this plant population's ability to know when to collectively awaken.

The seeds I plant in this land—where like amaranth, I too am a migrant—come from my field research in Argentina. I return from every trip accompanied by seeds that I either gather myself or receive in the fields I visit. The seeds are very small, like the dot of a pen on paper. The white ones correspond to species that can be cultivated (*Amaranthus caudatus*, *A. cruentus*, *A. mantegazzianus*, *A. hypocondriacus*), entrusted to me by the people who reproduce them year after year with great determination and dedication for their conservation. Nutritionist and investigator Renate Rietz affirms that the selection of white seeds as cultivatable species was surely carried out by the original inhabitants of the Americas, hundreds of years ago.[12] Black seeds correspond to wild species; the one called *aroma*, which grows in the northernmost part of Argentina, is dark violet in color and used for religious processions in that region, and the ones called *yuyo colorado* (red-colored weed) or just *colorado* (*A. palmeri* and *A. hybridus*), which have learned to tolerate the agrochemicals utilized for transgenic crops, being rather green with some tones of magenta.

During my long months in Berlin, the growth of these plants accompanies me day by day. In them, I observe the things I have been told during my research trips, I am amazed by their daily performance and I make conjectures. As an urbanite, I verify that visiting a field and seeing amaranth plants one single day isn't the same as seeing the same plant every day during her complete cycle of growth. Thanks to having them close at hand, on my balcony or sidewalk, I have seen the gradual but constant movements made in the environments where she chooses to grow. I have observed how she closes her leaves at night when still small, how she knows to wait for spring's arrival to sprout and grow with strong sunlight and my daily watering when I return to Berlin. I plant new seeds or transplant seedlings in the ground where last year's plants were, and when I begin to water every day, the seeds that were dormant awaken, sometimes in the same plot and sometimes in odd places, like the space between cobblestones, there where no one could have planted them. When they start to grow, the cultivated and wild amaranth species are similar, sharing a wide palette of color ranging from magenta to green (with the exception of some species like *A. mantegazzianus*, with a palette lacking magenta, and panicles that are ocher and yellowish).

FIG. 11
Julia Mensch, *Aroma (Tilcara)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 12
Julia Mensch, *Amaranthus hypocondriacus (Río Cuarto)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 13
Julia Mensch, *Amaranthus mantegazzianus (Tilcara)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

First, it is a small green or red dot that appears in the deep black soil. The following day, the dot is a short line that peeks out of the surface, and days later a tiny leaf appears, and then two elongated ones that extend horizontally on either side of the little stem. A little later, the fine stem grows upward, and the color is so strong that it looks like a brushstroke, often deep magenta, at other times green. With time, that little seedling stem transforms into a strong, upright stalk. For most species, this starts out as a deep magenta line, where green begins to mix in as it grows, on occasion completely abandoning the first color, and sometimes with alternating lines of both colors growing up toward the light. The leaves perform their colors, too, the greens have fine magenta lines that delineate their structure and magenta occupies the leaf entirely at times, or appears in little splotches, as if spattered with ink similar to the one I use to draw the plant. As days go by, small panicles begin to grow. Accumulations of fuzzy little dots of color, they are either green or magenta depending on the species of amaranth. After the first panicle has developed on the upper portion of the plant, others will grow on the plant's new stalks, each one surrounded by leaves. In my view, the panicle is what makes this plant so particular. In some species it grows upward, and in others, downward.

Sometimes they are even and orderly, and others, they are monstrous, expanding in different directions. The panicle is also where the seeds are to be found. In some cases, two seeds from the same species and provenance grow into two completely different amaranth plants, even opposite colors. *Kiwicha* has extreme plasticity, an ample color palette and huge transformations in its appearance throughout its growth cycle. On my sidewalk, they grow to be enormous, reaching over two meters in height, and in months they become heavy and need stakes, which I cautiously provide for them. I go through the year surrounded by the infinite range of green, reddish, magenta, violet and ocher tones in the amaranth plants I have sown. The immense palette of color is evidence of their genetic variability, a variability that makes their capacity to adapt and develop resistance to the herbicides used in transgenic agriculture possible.

FIG. 14
Julia Mensch, *Amaranthus palmeri (Carmen de Areco)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 15
Julia Mensch, *Amaranthus hybridus (Esperanza)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 16
Julia Mensch, *Amaranthus hybridus (Esperanza)*, 2024, drawing, ink on paper, 24 × 17 cm, from the series *Field Drawings*, 2023–ongoing

My family of amaranths (that's how I refer to the species I plant every year) is made up of different wild and cultivatable species. I plant diverse seeds mixed together and observe that the cultivatable amaranths (*A. cruentus* and *A. caudatus*) grow to be enormous, while the wild ones, called red-colored weeds (*A. palmeri* and *A. hybridus*), whose seeds come from immense plants growing in monoculture GM soy fields, remain small. I observed the same thing in agroecological plantations of cultivated amaranths, among which some red-colored weeds also grow, but always small, accompanying the cultivatable amaranth species without overshadowing them. This same red-colored weed species, whether *A. hybridus* or *A. palmeri*, is notably able to grow to enormous dimensions in GM plantations. Wild amaranth (whether resistant red-colored weed or aroma, the violet colored species that grows in northern Argentina) is the ancestor of all of the species that human beings have domesticated through centuries of agriculture. This ancestor, which perseveringly grows, irreverent and undisciplined, in GM soy or corn fields, has the ability to become huge and threatening in the monocultures purported by capital, but remains small when it grows alongside its descendants.

FIG. 17–19
Julia Mensch, *Familia de Amarantos*, 2023–ongoing, cultivation of different amaranth species, Berlin

4.

When winter arrives, I leave European soil again, where my second family of amaranths has grown. This time, I do not leave all the plants to freeze in the sidewalk plots, but bring them into my studio, hanging them on the walls to dry. Before closing the door, I allow myself to be immersed in the particular, intense aroma that fills the space. I propose to do the same when I reach the polyculture of soy and amaranth that *kiwicha* has managed to construct.

5.

When Argentina approved the commercialization of glyphosate resistant *40-3-2 Roundup Ready* soy by Monsanto (now Bayer) in 1996, it was the first Latin American country to open its doors to transgenic agriculture. Glyphosate is a broad-spectrum systemic herbicide that sickens and kills every plant (and non-plant) it touches, except those that have been genetically modified to resist it. From that moment on, agriculture that depends on GM seeds and poisons would expand across territories, becoming one big, empty, homogeneous green stain. Environmental activist Carlos Alberto Manessi from Santa Fe, one of the creators of the Paren de Fumigar (Stop Fumigating) initiative, confirms that in Argentina, 600 million liters of agrotoxins are used for every campaign, 300 million of which are glyphosate.[13] The star among transgenic model herbicides, it was declared a possible carcinogen by the World Health Organization in 2015. The failed star herbicide that in 1996 promised to eliminate all weeds now has 48 biotypes of 28 resistant wild plant species that manage to withstand its effects and grow in GM crop plantations.

Agricultural engineer and researcher Ignacio Dellaferrera has studied *A. hybridus* and *A. palmeri*'s strategies for resisting herbicides for decades, and he explains that this weed species was already complex to manage even before the arrival of transgenic crops and the massive use of glyphosate in 1996.[14] It lost importance during the 2000s, until the first glyphosate-resistant biotypes appeared in 2010.[15] Today, red-colored weed is the most widespread resistant weed throughout Argentina's territory; it occupies 25 million hectares of transgenic crops, primarily soy, the country's most produced GM crop. It generates a large quantity of seeds: 4000 seeds are sown for every hectare of transgenic soy, and a single amaranth plant can have up to 3000. As a result, even when a plant dies, thousands are left to germinate.[16] However, the plant's position as the most extensive resistant plant is not due to this characteristic, given that there are other plants that produce large quantities of seeds, but are not as resistant. It is primarily its genetic variability that allows it to adapt to new external conditions, develop strategies for resisting herbicides and elude the actions of their chemical compounds. Dellaferrera states that its seeds possess a high degree of dormancy, attenuated by low temperatures and a lack of light. In other words, seeds know how to wait and to awaken when external conditions are propitious for growth. It also possesses great plasticity for phenotypical expression, which can be observed in the diversity of its appearance, in the broad palette of colors in the stalk, inflorescence and leaves.[17] The plant's phenotypical plasticity, or diverse appearance, is a demonstration of its genetic variability.[18] There are two resistant species in Argentina: *A. hybridus* and *A. palmeri* (the former is native to North America and the latter, to South America). Two species, but each one possesses an infinite number of biotypes, which is to say that there are many groups of plants with different characteristics within the same species. For example, there may be a biotype of *A. hybridus* that is resistant to a herbicide in one region, and another in a different zone that is not. Amaranth not only performs color, but also adaptability and resistance to the poisons that are applied to it. Dellaferrera explains that the red-colored weed's resistance to agrochemicals (like that of other resistant weeds) is not developed once the herbicides have been applied, but is already present in a small population, and the unrestricted use of poisons has managed to awaken that ability in the plant. Its resistance is present, but dormant in the DNA of a small group of plants. After fumigation with poison has taken place, the biotypes that manage to survive are the ones that manage to activate that, leave descendants and therefore multiply in subsequent generations.[19]

FIG. 20
Julia Mensch, *Amaranthus hybridus (Esperanza)*, 2024, drawing, ink on paper, 21 × 14.9 cm, from the series *Field Drawings*, 2023–ongoing

FIG. 21
Julia Mensch, *Amaranthus hybridus (Esperanza)*, 2024, drawing, ink on paper, 21 × 14.9 cm, from the series *Field Drawings*, 2023–ongoing

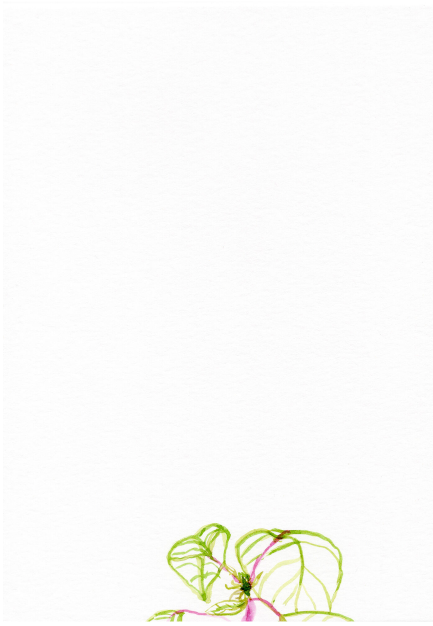

FIG. 22
Julia Mensch, *Amaranthus hybridus (Esperanza)*, 2024, drawing, ink on paper, 21 × 14.9 cm, from the series *Field Drawings*, 2023–ongoing

Resistant weeds possess two resistance mechanisms that are called upon either inside or outside the herbicide's site of action. Dellaferrera says that the resistance to glyphosate at the site of its action was the first one amaranth developed. Glyphosate acts upon a particular enzyme in the plant, codified in positions 102, 103 and 106 of the sucrose-phosphate synthase (EPSPS) enzyme. Through mutations in its genetic code, amaranth managed to resist chemical applications by impeding the poison's access. When the herbicide does reach the desired position, the DNA has been modified by the plant so that the agrochemical does not affect it. Where it was previously able to enter and kill the weed, the herbicide fails to attach with the enzyme, because the genetic code has been modified. Next, amaranth developed resistance mechanisms beyond the site of action, which are neither situated in a specific position of the plant's DNA, nor governed by a single gene, but rather multigene and harder to identify, because the specific location where the resistance is coded cannot be established. Dellaferrera explains that this no longer has to do with the plant's mutations at the site of herbicides' action, but rather with the weed's metabolic capacity to dodge agrochemicals' effects, reducing their entry and the effects of their action, storing them in places where they cause no disturbance and even managing to transform them into non-chemical compounds.[20]

FIG. 23–24
Amaranthus hybridus, Universidad del Litoral, Esperanza, Santa Fe Province, 2024. Photographs taken during field research for the project *Amaranth as Political Agent*, 2022–2025

6.

I return to the land where Amaranth comes from, where the sun is strong and cracks the earth. There, I begin to plant myself again. At first, in the midst of the strident sounds of the city that watched me grow up, then leaving Buenos Aires, to be surrounded by the silence of extensive fields tagged with corporate signs. I visit the same field of GM soy many times. It is immense, there are hectares of a flat, monotone green all around me. The sun comes up and a soft wind moves the even soy leaves, which seem to form a shining, infinite tide, offering at first glance a placid calm that may not be what it seems. In the middle of the GM soy monotony, red-colored weeds peek out here and there, rising taller than the lesser-size soy. For the first time, I see the two herbicide-resistant amaranth species that grow in Argentina together: *A. hybridus* and *A. palmeri*. The most widespread across the country is *A. hybridus*, and so it is in this field. It has a varied palette of bright, shiny green throughout the plant, with soft tones of magenta found in the stalk. *A. palmeri* is of a darker green color, and the panicle is composed of fine little branches of a sort that grow in different directions and prick the fingers when touched. Once grown, the panicle of *A. hybridus* will also be prickly to the touch, but it is still at a soft stage of development right now. Dellaferrera confirms that this species has changed in appearance over the past few decades. While its inflorescence or panicle used to be soft, like that of the domesticated species, it is now aggressive to the touch when it grows, and seems to be made up of thousands of short needles, with spinier edges than it used to have decades ago.[21] Some months back, I confirmed that very characteristic in one of the plants that grew on my balcony, which was prickly even while still a small plant.

FIG. 25–26
Left: Polyculture (*colorado* & GM soybeans); right: *Amaranthus hybridus* & *palmeri*, Bolivar, Buenos Aires Province, 2025. Photographs taken during field research for the project *Amaranth as Political Agent*, 2022–2025

In this field, I find myself accompanied by red-colored weeds that have achieved deactivating the poisons that seek their extermination. Their green is shiny, lighter and with more nuances that that of soy, which is darker, opaque and more homogeneous. Some red-colored weeds are small, others as tall or taller than I am. The *A. hybridus* that I find among the soy are tall, but thin and not very ramified; they have grown tall in search of light, making room for themselves amid the GM crops. On the other hand, the *A. hybridus* that grow on the edges of the soy plantation or outside it have branches of a sort that expand horizontally, every plant growing like a kind of shrub.

Hours go by in the soy monoculture that circles me. Although GM crops' extension grows, I know that the red-colored weeds will be able to multiply. As Dellaferrera explained, if 4000 seeds are planted for one hectare of soy, a single amaranth plant can have up to 3000 in its panicle. I walk among both plants, the commodity for export and the resistant weed, lost in this polyculture that *kiwicha* has been able to construct. I ask myself what it's like for the GM soy to have the red-colored weed for company. Transgenic agricultural agents talk about competition between the crops and the weeds. But in their midst, I cannot stop asking myself how they can know for sure what it is that this soy, created in corporate scientific laboratories, really wants? A plant designed to grow alone, resisting poisons while everything around it sickens and dies. What alliances are made between the two plants? Could it be that GM soy wants a destiny for itself that differs from the solitary one assigned to it by global capitalism? I smell them and only *kiwicha* has an aroma, similar—as far as I remember, though I cannot be sure—to that of the plants I left in my studio. Standing tall above the soy, the amaranth plants begin to shine even more as the first rays of morning sun begin to intensify. The wind continues to softly move both plants. Once more, I think that every *colorado* will be able to multiply by the thousands.

FIG. 27
Colorado, Bolivar, Buenos Aires Province, 2023. Photograph taken during field research for the project *Amaranth as Political Agent*, 2022–2025

Translation by Tamara Stuby

NOTES

1 Gelman 2013, p.17.
2 Julia Mensch: *Amaranth as Political Agent,* PhD project realized in the framework of the research project *Plants_Intelligence. Learning Like a Plant* (2022–2025). A research project by Yvonne Volkart, Felipe Castelblanco, Julia Mensch and Rasa Smite, funded by the Swiss National Science Foundation and hosted by the Institute Art Gender Nature, Basel Academy of Art and Design FHNW.
3 Translator's note: this term takes its cue from *maleza*, the word for weed, where *mal-* (bad) is replaced with *buen-* (good).
4 Santiago Sarandón is Principal Researcher of the Scientific Research Commission of the Province of Buenos Aires and director of the Laboratory for Research and Reflection in Agroecology (LIRA). He is also Chair of the Agroecology Department at the Faculty of Agronomy of the Universidad Nacional de La Plata (UNLP), president of the Argentine Society of Agroecology and honorary president of the Latin American Scientific Society of Agroecology.
5 Cf. Santiago Sarandón, zoom interview with the author, September 9, 2022.
6 Ibid.
7 Eugenia Niccia, manager of the Red de Control de Plagas (Pest Control Network or REM) for the Asociación Argentina de Productores en Siembra Directa (Argentine No-Till Farmers Association or AAPRESID), explains that a biotype is a particular form that a determined species has at one defined place, because it had to adapt to the characteristics of that setting. One same species possesses different biotypes that it has developed thanks to the adaptation that one weed population has undergone to the characteristics of a determined zone. Eugenia Niccia, online interview/conversation with the author, May 11, 2022.
8 Cf. Santiago Sarandón, zoom interview with the author, September 9, 2022.
9 Cf. Sarandón 2020, p. 9.
10 Cf. Rapoport/Marzocca/Drausal 2009, p. 3.
11 Diccionario de la lengua española, "sabiduría," URL: https://dle.rae.es/sabiduría (accessed: 02/15/2025), trans. by Tamara Stuby.
12 Cf. Kietz 1992, p. 39.
13 Cf. lecture by Carlos Alberto Manessi, presented as part of the PhD seminar *Infraestructuras, extractivismos y futuros posibles*, led by Dr. Malena Castilla and Dr. Alvaro Alvarez, Doctorate in Art and Technoaesthetics, Universidad Nacional de Tres de Febrero (UNTREF), October 8, 2024.
14 Dr. Ignacio Dellaferrera is the Director of the Laboratorio de Investigaciones en Fisiologia y Biologia Molecular Vegetal (Plant Physiology and Molecular Biology Research Laboratory) at the Universidad del Litoral. He is a researcher at the Consejo Nacional de Investigaciones Científicas y Técnicas (National Scientific and Technical Research Council or CONICET) and his research area is the mechanisms involved in weed resistance to herbicides, particularly *Amaranthus hybridus* and *A. palmeri*.
15 Cf. Ignacio Dellaferrera, zoom interview with the author, October 27, 2023.
16 Ibid.
17 Ibid.
18 During the project workshop *For Plant Intelligence*, held in October 2024 at the Basel Academy of Art and Design FHNW, I had an exchange with Monika Messmer (project partner) and Paco Calvo regarding my research. Both scientists affirmed that the phenotypic plasticity of amaranth is evidence of the plant's genetic variability.
19 In support of his hypothesis, Dellaferrera cites a study done with herbarium material gathered from 1788 to 1975, prior to the utilization of agrochemicals in agriculture, that is, before herbicide's commercial liberation. Of the 734 species investigated, one from the year 1888 was identified as having a mutation that granted it resistance to herbicide compounds. This result demonstrated that these weeds' resistance to herbicides predates their use in industrial agriculture. Therefore, wild plants' resistance would not be developed after coming in contact with agrochemicals, but found in the genetic code of a small population of plants of a determined species. The application of herbicides has merely facilitated the selection of biotypes that possess that mutation in their DNA, enabling them to tolerate the herbicides' effects. Essentially, herbicide application selects for resistant species and eliminates the sensitive ones. As a result, only the resistant biotypes reproduce. Délye/Deulvot/Chauvel 2013.
20 Cf. Ignacio Dellaferrera, interview/conversation with the author, Esperanza, Province of Santa Fe, October 27, 2024.
21 Cf. Ignacio Dellaferrera, zoom interview/conversation with the author, October 27, 2023.

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Fig. 27: © Julia Mensch, photo: Laura Santos

AUTHOR

Julia Mensch is a visual artist from Buenos Aires based in Berlin. She studied at Hito Steyerl's class at the UdK, Berlin, and at the National Art University in Buenos Aires. Currently, she is a PhD candidate on the research project *Plants_Intelligence. Learning Like a Plant*, funded by the Swiss National Science Foundation and hosted by the Institute Art Gender Nature, Basel Academy of Art and Design FHNW, and the Bauhaus-University Weimar. Her practice focuses on the history of socialism and communism, and on environmental sociopolitical conflicts in Latin America, confronting the exploitative conditions imposed on the land and its beings since colonization and continuing through the era of neo-extractivism. Julia Mensch has been granted and exhibited internationally, including at Savvy Contemporary (Berlin), Museo Nacional de Grabado (Buenos Aires), Shedhalle (Zurich), and the Sesc_Videobrasil art biennial (São Paulo).