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Eco-Immunology and Superweeds

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by Ohad Ben Shimon



Abstract

This article explores immunity outside the contours of a human body and biopolitical framework in the plant science material-discursive object of the superweed with its resistance and tolerance to herbicides. Instead of categorically assuming all forms of immunity and immune systems taking place within the abstract category of the (human) body, the article attends to how the figure of the superweed as an analytical and synthesizing focal point comes to populate and be populated by the concept of immunity. At large, the author claims that the material dimension of the superweed can be seen as an extension or supplement to notions of the individual, autonomous, and bounded human body, yet this material dimension can also come to undermine even its own subject position. By unshackling or unlocking the concept of immunity from its human body 'point of origin', new ontological grounds for human and non-human political ecologies can be imagined, with a different form of embodiment, which is neither negative, nor affirmative.

Keywords: Immunity, Superweed, New Materialism, Biopolitics, Embodiment, Roundup



About the Author

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Eco-Immunology and Superweeds

Ohad Ben Shimon

This article explores how a new evolution of the concept of immunity can be put to work outside the contours of a human body in the plant science material-discursive object of the superweed with its resistance and tolerance to herbicides. Instead of categorically assuming all forms of immunity and immune systems taking place within the abstract category of the (human) body, I claim that the material dimension of the superweed can be seen as an extension or supplement to notions of the individual, autonomous, atomized, and bounded human body as elaborated in early critical theories of immunity (Esposito 2008, 2010, 2011, 2015; Derrida 2002, 2003, 2005; Haraway 1991). In order to begin extending the critical stakes of immunity's operation within a human-centered conceptual ecosystem to non-human political ecologies, I go beyond canonical biopolitical accounts of immunity such as that of Roberto Esposito. In order to traverse the border between biology and politics, self and non-self (other), inside and outside, Esposito metaphorizes the concept of immunity in such a way that disembodies the concept of immunity from its actual material grounds (Ben Shimon 2020). Although Esposito's biopolitical analysis tries to attribute immunity with an essential and at the same time historical material dimension, it falls short of producing an affirmative and tangible imaginary that could also give a nuanced and suitable account of the concept of immunity for non-human life forms. By exploring immunity in the plant-science object of superweeds, I reclaim the often-dismissed dimension of immunity in biopolitical scholarship and develop a more nuanced concept of immunity which, following Alfred Tauber, situates immunology as an environmental rather than clinical science (2017). Exploring how immunology as a biological science can be read as an environmental science with a new, evolving, and mutating concept or grammar of immunity allows me to explore the many ways weeds and superweeds proliferate, evolve, change, and disrupt the environments they are entangled with. Lastly, I consider the critical stakes of reading immunity in superweeds as they embody a different scale

from the individual, autonomous, atomized, and bounded human body. As such, I explore how superweeds might also come to problematize and nuance the utilization of their non-human ontological status, in order to extrapolate from them a different ontological framework for new human and non-human political-ecological imaginaries. This opening up of biopolitical scholarship on immunity is particularly pertinent when new ontological grounds on a planetary human and non-human scale are needed to establish new political ecologies.

The most widely agreed upon definition of a weed is that of “a plant in the wrong place’, that is, a plant growing where you would prefer other plants to grow, or sometimes no plants at all” (Mabey 2010, 5). Clearly, that definition immediately “begs the question of what is the ‘right place’ for a plant” (6). In that sense, “how and why and where we classify plants as undesirable is part of the story of our ceaseless attempts to draw boundaries between nature and culture, wildness and domestication” (Mabey 2010, 5). A superweed, which will be the central focal point of analysis of this article, is defined as a weed that has developed “resistance to the herbicide glyphosate” (Bain et al. 2017). Glyphosate, marketed, patented, and owned by the agricultural biotechnology company Monsanto/Bayer as Roundup since 1973, aims to control by starving to death unwanted weeds from competing with crops grown by millions of farmers worldwide. According to Amalia Leguizamon (2020, 8), “[a]s early as 2002, farmers in Argentina and the United States began reporting the emergence of glyphosate-resistant ‘superweeds’ in fields planted with herbicide-resistant soy and corn.” As I will further elaborate in this article, this resistance to herbicide is what constitutes its undesirability from the point of view of the agricultural industry which develops the herbicide, yet that is not the whole story. In exploring the basic definition of the word “weed,” it becomes readily evident how its specificity ambivalently hosts, and paradoxically gives birth to, competing cultural, biological, political, and ecological vocabularies/imaginaries. In that sense, it is difficult to place “weed” in a biological taxonomy of any kind, since a plant that is defined as an unwanted weed or guest in one context can be regarded as a desired and beneficial ally to humans in another. Even within the same taxonomic rank of a genus, a specific plant species might be regarded as valuable in one context while, in another context, a plant from the same genus but of a different species is regarded as a threat to crops.

In my reading of immunity in superweeds, I build upon a new materialist reading of immunity (Jamieson 2016, 2017), which introduces a nuanced, ambivalent, and capacious theorization of the concept. Importantly, the new materialist reading of immunity chimes well with Alfred Tauber’s (2017) evolution of the concept of immunity, which attempts to rethink the disciplinary boundaries of immunology as an

environmental rather than clinical science—“where the latter is defensive and the former both defensive and tolerant/assimilative” (Tauber, email to author, May 19, 2020). According to Tauber, in order to be able to adequately portray the full functional spectrum of immune responses, these should be contextualized within wider teleological models beyond the defense-driven “mechanical model of on or off switches (i.e., ‘self’ and ‘other’ reflect the binary decisions of such mechanisms)” (2008, 238). Once the grounds for tracing what Tauber calls an “immune self” (1994) was no longer easily achievable, and the immune self’s central role in theorizing immunity was disrupted, new understandings could come about. Michelle Jamieson in her new materialist reading of the concepts of immunity, autoimmunity, and allergy, tries to refigure immune-reactivity’s conceptual grounds from one that emerges out of a self-defensive, stable, and insular “predetermined self” (2017, 22), to one which emphasizes its ability to change and transform, evidencing life’s “creative capacities” (2016, 110). Importantly for Jamieson’s reading, such creative capacities can at times even “destructively” undermine the subject such as in the case of autoimmune responsivity where the immune system attacks its own bodily tissues. In this paper, I build upon Jamieson’s new materialist reading of autoimmune and allergic bodily responses as a “body’s capacity for self-reactivity” (2017, 12), to suggest how a different form of “good”/“bad” embodiment of immunity may play out in superweeds. In other words, my analysis tries to make space for a more capacious idea of embodiment which includes some form of destructiveness and violence together with an organism’s innate creative capacity of and for life. This, in turn, shifts the conventional binary conceptualization of pathological and normal immune reactivity to a new more “ecological” conceptualization that understands immune response as an “ecological interrelationship” (Jamieson 2017, 22) between an organism and its environment. I claim that such a new materialist reading of immunity extends Tauber’s reconfiguration of immunology in novel ways, enabling, in turn, an opening up of the disciplinary scholarly practice of biopolitical scholarship around the concept of immunity. Analyzing how immunity plays out in non-human material life forms—outside of the bounded confines of the human bodily figure—allows us to further explore the critical potential and evolution of the concept inspiring a politics that does not fixate on the (human) body as its primary yardstick.

Exploring Immunity in Superweeds

The potential of the superweed to inhabit the concept of immunity that comes to populate it emerges from the superweed’s grounded and finite material reality. In that sense the superweed, with its “super” prefix, lingers on the fine line between being an

embodiment of an indestructible and everlasting “superpower-like” force that frustrates agribusiness’ attempt to eradicate it and, at the same time, aims to account for a weed’s own “survival-mode” of ever evolving or always becoming a superweed. As such, the superweed, in its non-human defiant character, seems to allow for a more ambivalent and nuanced exploration of notions such as passivity and activity which resist dichotomic biopolitical analyses that establish human life as a passive form of life that needs to be rescued from the grip of biopower’s actively threatening apparatuses of management and control. Reminiscent of Jacques Derrida’s double take of the notion of the *pharmakon* (1981) as both poison and cure, I introduce the genetically modified crop seeds commercially developed, patented, and marketed by Monsanto/Bayer as Roundup Ready since 1996. I then explore in more detail how these genetically modified seeds come to be materially rendered immune to herbicide (Roundup) and how superweeds develop their own resistant immune response to these herbicides. Before analyzing the stakes involved in the concept of immunity playing out in genetically modified crops and superweeds, a further short reflection on the delineation of weeds is needed.

Defining Weed

The diverse taxonomic factors that come into play in defining “weed” involve questions of trait, opportunity, scale, framing, peculiarity/particularity, benefit/harm, and the speed of reproduction. As weeds are defined in a rather operational lexicon and vocabulary, they always already point to the human desire or tendency to separate the living from the non-living along the nature/culture axis. At the same time, “weeds cause trouble in a quite objective sense, and our reactions to and treatment of them are often entirely rational. Nevertheless, the shape of our cultural response to them is familiar. The archetypical weed is the mistrusted intruder” (Mabey 2010, 17). Weeds, “are the boundary breakers, the stateless minority, who remind us that life is not that tidy” (291). In that sense, the weed is the “odd, bizarre, and still familiar” (Cohen 2011, 17) invasive guest, alien, or somewhat friendly ghost-like figure that haunts, lingers, multiplies (rapidly), and problematizes the human teleological desire for self-preservation as a human species. In other words, what the term “weed” primarily seems to host or contain, at a safe ontological distance, is a human led ambivalent fear as to what or how (human) life is meant to be preserved.

Superweeds—The Good, The Bad, and The Embodied

If we look at weeds from agri-business’ point of view, weeds provoke or embody a “bad” or even demon-like sense of immunity that an agricultural company such as

Monsanto/Bayer makes sure to communicate to the customers of their herbicide products. On the other hand, the same company which provides the herbicide “solution” (Roundup) for the “negatively” herbicide-resistant immune superweeds, also supplies farmers with “good,” “positively” immune or “already cured” seeds (Roundup Ready) that can withstand any such poisonous herbicides. In that sense these “medicated” seeds or plants embody a sense of immunity which is genetically engineered into them by their rightfully owned and patented owners Monsanto/Bayer. The genetic engineering of these seeds could be compared to the way medicinal plants gain agency by the value attributed to them by the knowledge communities that use them to their benefit. Yet what differs in these two attributions of agency to plants is that in their usage of medicinal plants, indigenous knowledge systems employ a more relational onto-epistemology that is located between plants and the indigenous knowledge systems and communities that use them, whilst the agency of genetically modified seeds remains in control of their patenting owners, thereby disembodimenting the genetically modified seeds from any active sense of agency. At the same time, superweeds can also be read as inhabiting or embodying their own sense of a “positive” immunity that withstands the “bad” herbicide-based weed management and control efforts of agribusiness by evolving from weeds to *super*(“positive”)-weeds.

As I elaborated upon in the introduction to this article, the word “weed” may ambivalently function as a placeholder for competing narratives. While from agribusiness point of view a weed that resists herbicides (superweed) can be seen as a negative factor in agribusiness market-orientated endeavors, from the point of view of the weed population, its potential exponential growth can be seen as a flourishing and affirmative embodiment of its vital organismic drive to sustain itself. Furthermore, once the body in question resists or mutates (weeds becoming superweeds), the concept of immunity becomes more nuanced, multifaceted, entangled, and open-ended in how it comes to define “good” and “bad,” self and non-self, culture and environment. Here, the immunity of the superweed can be understood—similar to Spinoza’s formulation of the principle of the *conatus* as that which “strives to persevere in its being” (Spinoza [1677] 1994, 159)—as a “positive” or innate force that the super weed embodies as it “changes its skin” in the simultaneous process of “positively” (from the non-human perspective of the superweed) and “negatively” (from both agribusiness’ perspective and the superweed perspective) seizing to be a weed and becoming a superweed. In this sense this “positive,” enhanced, or self-striving state of immunity also includes a “negative” notion of self-destroying or self-undermining parts of itself (weed) in order to evolve. This suggests a different form of “good”/“bad” embodiment of immunity in superweeds. In other words, when superweed immunity is read through a more ambivalent and

nuanced lens, this also means making space for an idea of embodiment that includes some form of destructiveness and violence together with an organism's innate creative capacity of and for life.

Superweed's Role? An Empty Ontological Category

Superweeds produce nothing, and yet their appearance and persistence is subversively uprooting. Superweeds are “just there,” continuing to evolve and change, if agribusiness likes it or not. The existence of a superweed being “just there” without a clear way of how to deal with such a presence, could be compared with how a disease manifests itself as a medical *symptom* in the body of a patient without an uncontested way of dealing with the symptom. Superweeds like diseases make history and are creative in doing so in the way they have managed to find solutions to evolve and withstand Monsanto/Bayer's Roundup Ready herbicides, yet the history they end up “making” is co-produced and evolutionarily contracted to the agro-industrial complex. But if the superweed is a bodily symptom, what, or where, is the body? Can we speak of a bodily symptom without a body? In that case, the superweed seems to function more like a symptom of an empty ontological category for the non-productive subject without a role/function that spreads across cultivated and uncultivated land. It does so as it fills empty (negative) spaces, just like it fills the categorical emptiness of not having a role, not being productive, not existing in order to fulfill a role or office. In his genealogical rumination of the concept of immunity, Roberto Esposito (2011, 5) points to the etymological root of immunity in the Latin word *munus* which refers to “an office—a task, obligation, duty” that one performs or “a gift that is given—rather than a gift received.” The *im-muni* in Esposito's account, which are defined negatively by what they lack (a gift), are those individual members of a community which are not given a gift (*munus*) to begin with, and therefore do not have the obligation to give something back in return. By analogy, the superweed, like Esposito's *immuni* that performs no role, task or office (*munus*) means that the superweed's “role” or task might be to not reciprocally give a gift (*munus*), or not fulfill or embody a predetermined role or function. Therefore, superweeds, from the point of view of agribusiness, also shouldn't be expected to have any such human qualities such as immunity, agency, or intention; alas, superweeds do develop their immunity to herbicide, hence the ambivalence.

By genetically mutating its own weak susceptibility to Roundup (glyphosate), the outlaw plant performs an “agential” turn and evolves into a superweed functioning in this ambivalent space as both the repetitively persisting unwanted guest or survivor that nobody wants and as a powerful superhero-like organism driven by change. In order to develop its newly acquired immunity to glyphosate, the superweed thus resists

the genetic law of agribusiness by changing into its own exceptional life form. In order to analyze the extent to which the superweed's immunity-led agential turn can inform our understanding of human and non-human agency and embodiment, I focus on the process of natural selection and show how the superweed's embodied immunity can challenge the way such a process comes to explain how populations of living organisms adapt and evolve.

Turning Natural Selection on its Head

Intentional genetic engineering of herbicide immunity in plant seeds can also happen naturally, when herbicides such as glyphosate impose an intense selection on exposed weed populations, resulting in a widespread weed population with a natural selection for herbicide-resistance. Some form of herbicide resistance is even said to occur “randomly” with trans-genetic transfers between genetically engineered glyphosate-resistant crops and exposed weed populations, resulting in superweed populations that are resistant to agri-business' profit-motivated grip of immunity. Ambiguously, there is a very fine and nuanced line running between an immune trait or gene which occurs due to agri-business' genetic engineering techniques, and the more “naturally selected,” or already existing, traits and their “random” mutations in superweeds. In addition, the manner in which the problem of the superweed is framed depends, as I mentioned in the introduction to this article, on who is doing the framing and for what teleological ends. Genetic engineering proponents say that superweed resistance develops through the weed's “random” genetic mutations, thereby ignoring their own role in these “naturally occurring” mutations (Bain et al. 2017, 219). Problematically this view is also based on a mechanistic and linear view of nature as essentially disembodied, passive, and evolving through natural selection. This dominantly new-Darwinist view holds that “new species arise through the gradual accumulation of random mutations, which are either favored or weeded out by natural selection” (Margulis 1967, 67).

Superweeds are situated by agribusiness within this new-Darwinist survival of the fittest framework, a framework which warrants agribusiness' methods of weed management and control. In that sense, I am interested in how the superweed comes to “rebelliously” turn natural selection on its head as a dominating framework and gain the upper hand by “intentionally” selecting for weakness rather than fitness. Doing so, a different form of embodiment may *become* about which is not reactive or negative (survival of the fittest, removal of the unfit), nor is it affirmative or “positive”/“giving” (such as Lynn Margulis' concept of symbiogenesis). Importantly, this is an embodiment that even resists itself, in the same sense that the superweed changes, morphs, or destroys its previous ancestral weed state to become superweed. Problematically, it is

also a form of embodiment or agency which is not easily analyzable as it is beyond traditional forms of analysis in the sense that neither the analyzing subject nor the object (superweed) are in control of it.

Conclusion

Finally, to conclude this article, I would like to return to the critical stakes of reading the superweed as a material-discursive object and what can be learned from such an analysis. By analyzing how the concept of immunity can play out in the non-human material-discursive object of superweeds, I aimed to unshackle the concept from its individual, autonomous, atomized, and human-bounded and bounding utilization. Doing so allowed me to further explore the critical potential of the concept and its evolution beyond a dichotomic biopolitical framework, “provoking a politics that does not concentrate on the body as its only scale” (Murphy 2017, 143). Instead, I have tried to outline how a new ontological framework for immunity can help formulate new material forms of embodiment which are neither affirmative nor negative. These material dimensions of embodiment come to subvert or problematize even their own ontological foundations, as the superweed comes to destabilize, subvert, and undermine even its own “subject position.” I have tried to show how when read through a new materialist lens, the destabilizing of the superweed’s own “subject position” can be read ambivalently as both a creative *and* destructive capacity of life which takes neither an affirmative nor negative form of embodiment. The reading of immunity through a new materialist lens also fits well with Tauber’s “ecological perspective” (2008, 234) on the concept of immunity, where instead of a “circumscribed, self-defined entity that is designated *the self* . . . the organism adjusts its own identity as it responds along a continuum of behaviors to adapt to the challenges it faces, and, indeed, ‘identity’ is determined by particular context” (234). The analysis of the material-discursive object of the superweed has also allowed me to start sketching new interdisciplinary grounds between the humanities and the natural sciences around the concept of immunity. In such an analysis, both the subject doing the analysis and the object of analysis itself are less in control of the analytical situation. Nevertheless, if we want to establish new and urgent political ecologies on a planetary human and non-human scale, this may require going into new transgressive, destabilized, and destabilizing ontological grounds. Whether seen as unwanted guests or self-sustained organisms driven by change, superweeds, in how they persist and evolve in arable land, can possibly start showing us the way to such ecologies.

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