Plant Autonomy and Human-Plant Ethics

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**ABSTRACT**

It has recently been asserted that legislative moves to consider plants as ethical subjects are philosophically foolish because plants lack autonomy. while by no means the sole basis or driving criterion for moral behavior, it is possible to directly challenge skeptical attitudes by constructing a human-plant ethics centered on fundamental notions of autonomy. Autonomous beings are agents who rule themselves, principally for their own purposes. A considerable body of evidence in the plant sciences is increasingly recognizing the capacity of plants to assess, perceive, and act on their environment. The primary purpose of their doing so is to generate the conditions for their own flourishing. with these plant purposes in mind, it is evidentially inappropriate to treat plants purely as instruments. In this age of environmental crisis, knowledge of plant intelligence and autonomy opens up a new debate on respecting and promoting the well-being of the plants that make life on Earth possible.

**INTRODUCTION**

In response to a Swiss bioethics committee charged with interpreting the “dignity of living beings,” an editorial piece in *Nature* has disputed the validity of incorpo- rating plants within the realm of ethical consideration.1 The editorial contests that ideas of dignity or inherent worth can only be applied to autonomous beings, and that therefore, in the case of plants, none can act as “a director of moral judgement.” The implicit argument is that plants do not have autonomy—“as if a plant sways in the breeze because it has decided to do so”; therefore, even contemplating ethical behavior toward plants is considered to be “downright silly.”2 It is argued that the recognition of autonomy in plants would prohibit agriculture. Ethical consideration for plants has also been framed as a threat to plant science research that involves killing plants or limiting their reproductive capacity.3

This paper is a response to this sceptical position. I commence by unravelling the claims against the applicability of interspecies ethics to plants. In particular, I examine the notion of autonomy, the constituent elements of autonomy and its role in moral consideration. Taking on the challenge set down by *Nature*, I question whether it is proper to regard plants as non-autonomous beings. Chiefly, in this paper I draw upon contemporary research in the plant sciences (some of which has

1 “Open to Interpretation,” *Nature* 453 (2008): 824.

2 Ibid.

3 Ibid.

been published in *Nature*) to aver that plants are indeed autonomous. In awareness of calls for the rooting of ethics in relationships, I argue for the moral consideration of plants based upon evidential and ecological appropriateness.

with particular relevance to claims that plant ethics are “silly,” I assert that the ethical consideration of plants is the *most appropriate* stance for humans to take toward plants. Contrary to the claims made in *Nature*, moral consideration for plants need not lead to claims for the cessation of agriculture. It would, however, by necessity, lead to a revision of human behavior toward plants, particularly in western cultures which characteristically are lacking in human-plant ethical relationships. In the context of the human assault on a natural world formed largely of plant life, this ethical revision has an important role to play in stemming the anthropogenic ecological crisis.

Unlike the Swiss government, I do not wish to argue here for moral consideration to be codified in legislation. I stand in broad agreement with Bauman that morality lies not within rules and laws, but within the outlook and behavior of individuals and groups.4 Following Bauman, I recognize that we are not moral because of laws—but have laws because we are fundamentally moral beings. Therefore, I suggest it may be slightly premature to argue for legal rights for plants in the man- ner of Christopher Stone, when our overwhelming attitude and behavior toward the plant kingdom treats plants as passive resources for human use.5 while Swiss legislators may be concerned about the ethics of preventing plants reproducing in laboratory experiments, I suggest that we need first to focus on our everyday, ingrained, and backgrounded behavior toward plants that more directly violates autonomy and threatens many species of plants, and the animals that live among them, with extinction.

**ENVIRONMENTAL BACKGROUNDING**

With a publication entitled *The Dignity of Living Beings with regard to Plants*: *Moral Consideration of Plants for their Own Sake,* the Swiss Federal Ethics Com- mittee on Nonhuman Biotechnology (ECNH) has generated a fair amount of atten- tion within the plant science community. Charged with interpreting an existing law directed at protecting “the dignity of living beings” the committee used a biocentric ethical approach as the philosophical basis of their investigation. Employing very similar arguments to Paul Taylor’s biocentrism, the committee equated “dignity” with “inherent worth,” in the sense of non-instrumental value, as articulated by O’Neill.6 They argued for this inherent worth with reference to the fact that plants have “interests” or a “good of their own,” The notion of “good” was employed

4 Zygmunt Bauman, *Postmodern Ethics* (Oxford: Blackwell Publishing, 1993), p. 61.

5 Christopher D Stone, *Should Trees Have Standing? And Other Essays on Law, Morals and the Environment* (Oxford: Oxford University Press, 1996).

6 Paul w.Taylor, “The Ethics of Respect for Nature,” in Andrew Light and Holmes Rolston, III, eds., *Environmental Ethics: An Anthology* (Oxford: Blackwell Publishing, 2003), pp. 74–84. John O’Neill “The Varieties of Intrinsic Value.” *The Monist* 75 (1992): 119–37.

in the sense of Taylor, in that we can think of “the good of an individual nonhu- man organism as consisting in the full development of its biological powers.”7 In this respect, the good of the plant is to continue living, to reproduce and flourish. The committee considered that this full development of its biological powers (the realization of its good) constituted the *purpose* or *telos* of the plant. On the basis that plants possess such a purpose, they stipulated that a plant is a morally con- siderable being. From this point, the committee went on to argue that any action such as “damaging their ability to adapt and reproduce beyond a certain extent would require justification, since the plants would then no longer be in a position to realize this *telos*.”8

Against this biocentric consideration of the plant kingdom, the brief counter- argument featured in *Nature* centers on the implicit claim that plants do not possess autonomy and therefore cannot possibly be ethical subjects. Examining this claim a little more deeply, it is apparent that there is a clash in the sense in which the no- tion of *autonomy* is being employed. Arguments denying autonomy use a Kantian notion of autonomy, as commonly employed in the sphere of human action. Here, in the realm of the human, the Kantian autonomous individual is one possessed of free choice and reason.9 As the plant has no choice about whether it is buffeted by the wind, the comments from *Nature* imply that the plant has no capacity for choice and reason. Under these terms, a plant cannot possibly be considered as an autonomous being and therefore is placed outside of moral consideration.

Faced with such assertions, a counterargument could proceed in a number of ways. One such way could be to take issue with the assumption that a being needs to be autonomous to be worthy of ethical consideration. Such an argument could take shape with an understanding of non-western epistemologies and ontologies that root ethics in relationships, rather than in essentialist, individual categories.10 while this approach could successfully undermine plant ethical exclusion, in direct response to the sceptical editorial, I instead take up the challenge of autonomy as a means to moral consideration.

In attempting to do so, I first take issue with the reasonableness of using a human- centered definition of *autonomy* in order to identify autonomy in other species. As Taylor has pointed out, it is “unreasonable to judge nonhumans by the values of human civilization” rather than by values derived from the lives of nonhuman species.11 If we use a human-based notion of autonomy as the yardstick for other species, it is almost inevitable that we will find nonhuman species lacking in this department. In ecofeminist analyses, the use of such human-centered criteria as the

7 Taylor, “Ethics of Respect for Nature,” p. 75.

8 Federal Ethics Committee on Non-Human Biotechnology, *The Dignity of Living Beings with regard to Plants* (Berne: Federal Ethics Committee on Non-Human Biotechnology, 2008), p. 17.

9 Keekok Lee, “Is Nature Autonomous?” in Thomas Heyd, ed., *Recognizing the Autonomy of Nature*

(New York, Columbia University Press), p. 58.

10 Graham Harvey, *Animism: Respecting the Living World* (London: Hurst and Co., 2005), p. 172.

11 Taylor, “Ethics of Respect for Nature,” p. 80.

basis of moral consideration is considered to be a deliberate act of exclusion.12 This closed stance “helps sanction injustice—the channelling of the world’s ecological wealth for the benefit of fewer and fewer organisms.”13 Perhaps this is why in recent articles concerning autonomy in nature, the Kantian (human-centered) notion of autonomy has been dismissed as inappropriate.14

Exploring a selection of the recent discussions of autonomy in environmental philosophy uncovers a different, more appropriate, definition. Thomas Heyd pinpoints the essence of autonomy as being “the capacity for ruling one’s self.”15 Thus, an autonomous being can “maintain its organization (at least for a time) in the presence of diverse external forces.” It is also able to “exert systematic force on its environment, at least passively, insofar as it seeks to maintain its integrity.”16 In addition, we can state that if this integrity maintenance is not passive, then the autonomous being is also capable of agency. That is, it undertakes *active doing*.17 The autonomous being often employs active, directed behavior in order to direct and maintain its own existence. Keekok Lee adds a further aspect to this understanding of autonomy by describing autonomous beings as existing “by themselves” and “for themselves.”18 That is, they bring themselves into being, and in existence their purpose is “not to fulfil any end or purpose of any external agents but entirely to maintain their own functioning integrity.”19 In summary, we can state that autonomous beings run their own existences and maintain their own integrity. If this maintenance is active, then the autonomous being can fundamentally be considered as an agent whose purpose is to maintain its functioning and existence.

Using definitions of *autonomy* that are not centered on the human, it is relatively simple to construct an argument that plants are autonomous beings. Thinking of Lee’s first criteria of autonomy, the plant kingdom brings itself into existence by setting seed and through the germination of that seed. Plant seed can be brought into suitable germination sites by a variety of dispersal methods (including human), but it is the plant itself that effects germination through the process of active growth in response to environmental cues. This recognition of growth as an active process is crucial. Not only is it relevant to ideas of participative coevolution between humans and plants, it has also underpinned theoretical advances in the plant sciences that

12 Val Plumwood, *Feminism and the Mastery of Nature* (London: Routledge, 1993), and karen warren, *Ecofeminist Philosophy* (Lanham, Md.: Rowman and Littlefield, 2000).

13 Val Plumwood, “Ecological Ethics from Rights to Recognition: Multiple Spheres of Justice for Humans, Animals and Nature,” in Nicholas Low, ed., *Global ethics and environment* (London: Rout- ledge, 1999), p. 189.

14 Thomas Heyd, “Introduction: Recognizing the Autonomy of Nature: Theory and Practice,” in Heyd, *Autonomy of Nature*, p. 8.

15 Heyd, “Autonomy of Nature,” p. 5.

16 Ibid.

17 Although the term *agent* is seldom associated with nonhumans, it is applicable in the sense that the agent is a being capable of acting in the world. As I show below, plants are agents with active and complex behavioral patterns.

18 Lee, “Is Nature Autonomous?” p. 64.

19 Ibid.

are of direct relevance to the consideration of plants as autonomous beings in the sense that they are sensitive, active, self-governing organisms.

**PLASTICITY, INTEGRITY AND AUTONOMY**

In his consideration of behavior in the plant kingdom, plant physiologist Tony Trewavas has equated growth movements in plants with active movement in the animal kingdom.20 while animals behave by moving from place to place, as sessile organisms, Trewavas argues that plants behave by growth movements in a fixed space. Active growth movements in response to prevailing environmental condi- tions have been known to botanists for centuries as *phenotypic plasticity*.21 This phenotypic plasticity is the ability that plants have to change their morphology in response to changes in the environment in order to maintain the integrity and increase the reproductive fitness of individual plants. An early description of the variation produced by phenotypic plasticity in plant species is found in Linnaeus’s *Critica Botanica* (1737). Linnaeus notes the appearance of several aquatic species, including a species of *Ranunculus* which:

Put forth under water only multifid leaves with capillary segments, but above the sur- face of the water later produce broad and relatively entire leaves. Further, if these are planted in a shady garden, they lose almost all the capillary leaves, and are furnished only with the upper ones.22

Phenotypic plasticity is made possible by the modular structure of plants (animals have a fixed non-modular structure) which consists of a leaf, a bud and a below ground root meristem. Restricted to the site of germination, this basic “module” can be put together in a wide range of complex structures with great variations in size, shape, and complexity. Flexible in growth and development, plants thus have the ability to adapt their phenotype, in response to signals from a highly variable and heterogeneous local environment in order to maximize their growth, survival, and reproduction. This plastic development is an active process that involves agency and directed action.

Plants assess the prevailing environmental conditions and then select the appropri- ate available responses in order to maintain their physical integrity and maximize their capacity to reproduce. Plants perceive the availability of present resources and

20 Tony Trewavas, “Mindless Mastery,” *Nature* 415 (2002): 841. Tony Trewavas, “Aspects of Plant Intelligence,” *Annals of Botany* 92 (2003): 1–20. Although known for his stance against organic agri- culture, Trewavas is one of the pioneers of the field of *plant neurobiology*, which aims to foreground the active, intelligent nature of green plants.

21 Sonia Sultan, “Phenotypic Plasticity for Offspring Traits in *Polygonum persicaria,*” *Ecology* 77 (1996): 1791–1807; Sonia Sultan, “Phenotypic Plasticity for Plant Development, Function and Life History,” *Trends in Plant Sciences* 5 (2000): 537–41.

22 Arthur Hort, ed., *The Critica Botanica of Linnaeus* (London: The Ray Society, 1938), pp. 201–02.

enact the most beneficial growth and development responses.23 Trewavas considers this plasticity of form to be “a visible witness to the complex computational capabil- ity plants can bring to bear to finely scrutinize the local environment and act upon it.”24 In this way, the plant has a directional goal, a purpose, which is to maintain and perpetuate its existence. In free living plants, the ability to exercise plastic growth, to adapt to micro-environments, is vital for attaining this purpose.

The ability to adapt to new and changing conditions typifies phenotypic plasticity. There are many examples of plastic behavior in plants but for brevity I concentrate on the action of roots. Roots are perhaps the most plastic of organs and are under tight control by the organism as a whole.25 In the underground world of roots, microbes, fungi, minerals, and other nutrients known as the *rhizosphere,* plants exploit rich soil patches by increasing their plastic root branching and their root growth. In the presence of few nutrients, root growth has been found to accelerate in order to facilitate the detection of new, more nutritious patches of soil in other locations.26 There is clear and active perception of the resources available, which for Trewavas involves the construction of a “three-dimensional perspective” of the local space.27 There is an ongoing assessment of the costs and benefits involved in exploiting the resources that exist in the soil in order to maximize fitness.

Plant roots clearly and intentionally avoid areas with poor nutrient levels, demon- strating awareness of their environment and confirming their status as beings actively striving to flourish.28 The active, below-ground assessment and discrimination of soil resources is integral for plant nourishment and survival. Studies estimate that this awareness and assessment can greatly increase the absorption of essential nutrients.29 Root plasticity allows plants to make choices about the soil patches they feed in, to the extent that plants are increasingly known in ecological studies as “foragers.”30

23 Phenotypic plasticity is made possible by the modular structure of plants (animals have a fixed non-modular structure) which consists of a leaf, a bud, and a below ground root meristem. Restricted to the site of germination, this basic “module” can be put together in a wide range of complex structures with great variations in size, shape and complexity. Flexible in growth and development, plants thus have the ability to adapt their phenotype in response to signals from a highly variable and heterogeneous local environment in order to maximize their growth, survival and reproduction.

24 Trewavas, “Aspects of Plant Intelligence,” p. 13.

25 Morphological plasticity is commonly expressed in growth habit and size, morphology and anatomy

of vegetative and reproductive structures, in biomass accumulation, growth rates and sex expression. Genotype determines whether the individual phenotype or character can be plastic: expression and extent of that plasticity is a function of a plants perception and assessment of its environment.

26 B. G Forde, “Local and Long Range Signalling Pathways Regulating Plant Responses to Nitrate,” *Annual Review of Plant Biology* 53 (2002): 203–24. R. M Callaway, S. C Pennings, and C. L Richards, “Phenotypic Plasticity and Interactions Among Plants,” *Ecology* 84 (2003): 1115–28.

27 Trewavas, “Aspects of Plant Intelligence,” p. 3.

28 See Chris Cuomo, *Feminism and Ecological Communities: An Ethic of Flourishing* (London: Routledge, 1998).

29 R. B Jackson and M. M Caldwell, “Integrating Resource Heterogeneity and Plant Plasticity: Modelling Nitrate and Phosphate Uptake in a Patchy Soil Environment,” *Journal of Ecology* 84 (1996): 891–903.

30 M. J. Hutchings and H. de kroon, “Foraging in Plants: The Role of Morphological Plasticity in Resource Acquisition,” *Advances in Ecological Research* 25 (1994): 159–238.

Close observation of plant behavior reveals that plants use assessment mechanisms in a similar way to animals and explore the soil to optimize the gathering of food resources.31 This perception and assessment also allows plants to avoid competi- tion. The roots of certain desert shrubs have been found to use root plasticity to deliberately avoid contact and competition with roots of other species.32 while this particular discussion of plant behavior relies heavily on Trewavas, it is also strongly supported by the expanding research on the sophisticated, information- processing activities in plants in relation to their surroundings.33 within the plant sciences community, the only significant criticism of plant intelligence has come from Richard Firn. In his response to Trewavas, Firn attempts to undermine the theory by arguing that intelligence is a property of individuals. Firn claims that the organs of plants operate individually, and therefore plants cannot be intelligent because they are not individuals in the same way as animals.34 Countering this claim, Trewavas references a substantial body of evidence which demonstrates both a remarkable amount of communication between plant organs and the coordination of action by the plant as an individual.35

Trewavas has also defended his review of active plant behavior against the asser- tions of Firn that plants operate in machine-like way using basic reflex reactions.36 Trewavas describes the process of *learning* in plants, which is necessary to deal with an enormous range of environmental conditions that have the potential to change rapidly over short spaces of time.37 The clearest demonstration of learning has emerged in laboratory experiments testing the growth abilities of plant tendrils. Growth experiments on plant tendrils have demonstrated their ability to assess the position of a support and actively move toward it. Reaching the support is the im- mediate goal, but if the position of the support is moved, then the tendrils are able to sense this change and adjust the direction of their growth movement in order to relocate it.38 Thus, plants make *real time* assessments of stimuli and actively respond according to both the current state and previous experience.

This is not automated, repetitive, purely stimulus driven behavior. At each point

31 Ibid.; Trewavas, “Plant Intelligence”; and Trewavas, personal communication, 1 November 2007.

32 Bruce E. Mahall and Ragan M. Callaway, “Root Communication among Desert Shrubs,” *Proceed- ings of the National Academy of Sciences of the USA* 88 (1991): 874–76.

33 See Eric D. Brenner, Rainer Stahlberg, Stefano Mancuso, Jorge Vivanco, František Baluška, and Elizabeth Van Volkenburgh “Plant Neurobiology: An Integrated View of Plant Signalling,” *Trends in Plant Sciences* 11 (2006): 413–19.

34 Richard Firn, “Plant Intelligence: An Alternative Point of View,” *Annals of Botany* 93 (2004): 345–51.

35 A. J. Trewavas, “Aspects of Plant Intelligence: An Answer to Firn,” *Annals of Botany* (2004): 353–57.

36 Firn compares the workings of plant life to the workings of an automated thermostat. Not only does this description of plant behaviour fail to take the complexities of phenotypic plasticity into account, it also displays a basic Cartesian assessment of the capacities of nonhumans. Firn, “Plant Intelligence.”

37 Trewavas, “Aspects of Plant Intelligence,” p. 4.

38 L Baillaud. “Mouvements Autonomes des Tiges: Vrilles et Autre Organs,” in wilhelm Ruhland, ed., *Encyclopedia of Plant Physiology: XVII, Physiology of Movements, Part 2* (Berlin: Springer Verlag, 1962), pp. 562–635.

in a behavior event, Trewavas notes that the plant is acting upon information from previous responses; a form of trial and error learning. There is also an integration of external information with knowledge of the internal state. Assessment of this assimilated information guides action that will ensure flourishing.39 This ability is integral to the autonomy of the plant kingdom.

In addition to the experiments on tendril growth, responses to water stress can also be put forward as instances of plant learning and reasoning. For a plant to respond to drought, for example by the abscission of leaves, it must be able to assess the present level of water against the optimum supply level. Trewavas summarizes:

The plant learns by trial and error when sufficient changes have taken place so that further stress and injury are minimised and some seed production can be achieved. The responses to water stress are modified by interaction and integration with other environmental variables, e.g., mineral nutrition, age, temp, history etc and are therefore not reflexive responses. Clearly *decisions* are made by the *whole plant*.40

Remarkably, in addition to this decision making via plastic action, there is also some direct experimental evidence for the existence of intention and choice in plants. A study of the feeding choices displayed by the non-photosynthetic parasite *Cuscuta europaea* demonstrates that this plant makes choices when selecting a host. These are based upon the level of sustenance that *Cuscuta* anticipates that the host will provide. If the host is deemed to have insufficient capacity to provide essential nutrients (i.e., if the host is revealed to be lacking in nitrogen), after initially coiling its tendrils around the plant, the dodder will *choose not to continue with feeding.* Instead it will uncoil and keep searching for another host, a host more suited to its dietary needs.41 This is a case of a plant employing an optimal foraging strategy to ensure that it does not waste resources.

Based upon Stenhouse’s definition of *intelligence* as the possession of “adaptively variable behavior within the lifetime of the individual,” Trewavas has posited that plastic behavior in plants is a clear demonstration of *plant intelligence.*42 Certainly, “the behavior of plants is not pre-programmed,” an understanding that undermines the concept of plants as passive *automatons*.43 Plants are intentional, intelligent, agents which actively try to maintain and perpetuate their own existence. An appreciation of plasticity confirms the theories of Cuomo and Taylor that the purpose of plants is to flourish. This conclusion clearly places plants within the definitions of autonomy provided earlier in this paper. The self-organization, the ability to perceive the environment, the capacity to discern and sift important stimuli, and to

39 Trewavas, “Aspects of Plant Intelligence,” p. 10.

40 Ibid., p. 5 (emphasis added).

41 Colleen K. Kelly, “Resource Choice in *Cuscuta europaea,” PNAS* 89 (1992): 12194–97.

42 David Stenhouse*, The Evolution of Intelligence: A General Theory and Some of its Implications (*London: George Allen and Unwin, 1974).

43 Trewavas, personal communication, 1 November 2007.

“respond appropriately,” is integral to plant autonomy. As studies of plant behavior are beginning to demonstrate, the possession of this ability is in fact integral to the maintenance of plant life.

**AUTONOMY AND MORALITY**

Philosophers generally disagree about exactly what it is to be moral, but most understandings of moral action pertain to *right* or *appropriate* conduct. Moral con- sideration most often involves considering the well-being of others as well as our own. The well-being of the nonhuman natural world has commonly been excluded from human consideration on the basis that it lacks qualities and attributes that are centered on the human.44 Constructed as radically *other* to the human, nature has been systematically denied the possession of many of the criteria that have come to define moral consideration, such as sentience, consciousness, awareness, voli- tion and rationality.45 As a significant part of the natural world, plants have been subject to this process of instrumentalization. In the same way as a wider *nature*, the general exclusion of plants from this consideration means that plants are treated purely instrumentally, as objects with no other purpose but human use.

Instrumental relationships remove limits to human use and are one of the major drivers of ecologically destructive behavior. 46 In the context of interspecies ethics, we can argue that such instrumental relationships are inappropriate on the basis of evidence and ecology. Plants are autonomous beings. They manifest and run their own lives. Their primary purpose is to exist *for themselves*. For Heyd, this fact necessitates moral consideration because it positions plants as selves, as subjects that stand alongside autonomous human selves.47 Here I argue that by regarding plants purely as passive instruments for human use, we are treating them as *less than they are.* As Plumwood eloquently states, “we do them an injustice when we treat them as less than they are, destroy them without compunction, see them as nothing more than potential lumber, wood chips or fuel for our needs. ”48

The focus on autonomy in this paper is not to be set in opposition to considerations of interspecies ethics based upon mutually flourishing relationships. The self-organization and self-purpose of other living beings are integral to the relation- ships of mutual flourishing (and kinship) that make life on Earth possible. Here I foreground plant autonomy and intelligence as one way of confronting the logic of purely instrumental human plant relationships. Plant autonomy is of particular importance as it challenges the notions of human superiority (which lead to human

44 Plumwood, *Feminism and the Mastery of Nature;* Plumwood, “Ecological Ethics,” p. 189; and Taylor, *Ethics of Respect for Nature,* pp. 79–83.

45 Plumwood, *Feminism and the Mastery of Nature,* pp. 142–60.

46 Ibid.

47 Heyd, *Recognizing the Autonomy of Nature,* p. 5.

48 Plumwood, “Ecological Ethics,” pp. 200–01.

domination) that persist even in the knowledge of ecological and evolutionary relat- edness. In this way, arguing for the significance of plant autonomy is an important part of constructing an ecological morality that, as Deborah Rose has shown, is both for the well-being of self and for the well-being of the others with whom we share the Earth.49

It is evidentially inappropriate to regard beings solely as objects, when in reality they are not. It is a deliberate act of othering. This “act of intellectual violence,” continuing to speak and behave as if plants have no other purpose but to serve humans, also has huge practical significances.50 Deliberately ignoring the autonomy of other beings is an act that “drives collective and systematic physical violence.”51 Thus, as Erazim Kohák writes, we face a choice between different “modes of interacting with reality—which render our world meaningful and guide our actions therein.”52 In this context, we face a choice between “treating trees as raw materials or treating them with respect.”53 To guide our decision between these ways of approaching the world (which he calls “manners of speaking”), Kohák insists that we should use notions of ecological appropriateness.54 In an ecological context, if we wish for health and well-being, then appropriate ways of relating to other beings are those that increase connectivity and allow the flourishing and continued existence of individuals, species, and ecosystems.55

At the time of an impending anthropogenic ecological disaster, humans are faced with choosing between two “modes of speaking” in their combined perception of and relationships with the natural world. A stark choice exists between relating to other-than-human beings with moral consideration or as mere resources for hu- man needs. The first way of relating can be characterized as one that “heals and sustains, the other that hurts and destroys ourselves and our world alike.”56 with this in mind we can argue wholeheartedly against assertions that considering the well-being of plants for their own sake is childlike, silly, and nonsensical.

wholly instrumental relationships with plant life are inappropriate because they are a very significant contributor to the current anthropogenic environmental predicament. As terrestrial ecosystems are to a large extent comprised of plants, the

49 Deborah Rose, “An Indigenous Philosophical Ecology: Situating the Human,” *Australian Journal of Anthropology* 16 (2005): 294–305.

50 Chakravarthi Ram-Prasad, *Indian Philosophy and the Consequences of Knowledge: Themes in Ethics, Metaphysics and Soteriology* (Aldershot: Ashgate, 2007), p. 9.

51 Ibid.

52 Erazim Kohák, “Speaking to Trees,” *Critical Review* 6 (1993): 385.

53 Ibid., p. 383.

54 Ibid.

55 Such a view has much in common with Aldo Leopold’s oft-repeated maxim that “A thing is right when it tends to preserve the integrity, stability, and beauty of the community, and the biotic com- munity. It is wrong when it tends otherwise.” Leopold, *A Sand County Almanac* (New York: Oxford University Press, 1949), pp. 224–25. Also see Deborah Bird Rose, “Indigenous Ecologies and an Ethic of Connection,” in Nicholas Low, ed., *Global ethics and environment* (London: Routledge, 1999), pp. 175–87.

56 Kohák, “Speaking to Trees,” p. 383.

lack of care and respect for plants for their own sake has significant environmental effects. The continued alteration and destruction of natural habitats by human beings is one of the major drivers of environmental degradation, species extinction, and global climatic change.57 The fundamental truth about natural habitats is that they are predominantly plant habitats. Natural habitats are populations of plants that exist in relationships of mutual flourishing with the birds, fungi, bacteria, reptiles, mammals, humans, etc.

Our ecologically inappropriate behavior toward plants is exemplified by the fact that the rate of habitat clearance by humans is at its historical maximum.58 During the last three centuries 12 million km2 of forests and woodlands have been cleared, 5 million km2 of grasslands have been lost, while cropland areas have grown by 12 million km2.59 Although temperate forest vegetation shows signs of recovery, tropical forest destruction proceeds at 130,000 km2 per year.60 This assault on plant habitats now directly threatens between 20 to 30 percent of plant species and up to 40 percent of all species with extinction.61 It also indirectly threatens biospheric integrity as a primary driver of global climatic change, with the IPCC estimating that “about 10 to 30 % of the current total anthropogenic emissions of CO2 are

. . . caused by land-use conversion.”62 Although there are many complex driv-

ers of habitat loss and environmental degradation, I contend that regarding plants purely as resource objects, as materials, is of great significance. From an ecologi- cal perspective, purely instrumental human-plant relationships are inappropriate because they pave the way to the destruction of individuals, species, populations, and the connectivities of respect, responsibility and care.63

**OPENING HUMAN-PLANT ETHICS**

Contemporary scientific *knowledge* of plants recognizes them as autonomous beings, but as yet, contemporary western *action* toward plants does not acknowl- edge their sentient, intelligent, autonomous status. we know that plants are active, receptive, aware, intelligent, autonomous beings that have perspectives and purposes of

57 United Nations Environment Programme, *Global environment outlook Geo4: environment for Development,* UNEP, 2008, p. xvi. Secretariat of the Convention on Biological Diversity, *Global Strategy for Plant Conservation* (Montreal: Secretariat of the Convention on Biological Diversity, 2002), p. 4.

58 David Tilman et al., “Forecasting Agriculturally Driven Climate Change,” *Science* 292 (2001): 281–84.

59 Navin Ramancutty and Jonathan A. Foley, “Estimating Historical Changes in Global Land Cover,”

*Global Biogeochemical cycles* 13 (1999): 997–1027.

60 UNEP, *GEO-4*, p. 82; and w. F Laurance et al., “The Future of the Brazilian Amazon,” *Science*

291 (2001): 438–39.

61 SCBD, *Global strategy for Plant conservation,* p. 4; C. D. Thomas et al, *“*Extinction Risk from Climate Change,” *Nature* 427 (2004): 145–48, and Stuart L. Pimm and Peter Raven, “Extinction by Numbers,” *Nature* 403 (2000): 843–45.

62 Intergovernmental Panel on Climate Change, *Climate Change 2001: Synthesis Report* (Cam- bridge: Cambridge University Press, 2001), sec. 3.2.4.

63 Rose, “Indigenous Ecologies,” pp. 175–87.

their own. Yet, our behavior toward plants treats them as useful objects, mere instru- ments for humanity. This chasm between knowledge and action is a major source of environmental injustice. By continuing the exclusion of plants from moral consideration, we are intentionally treating plants as less than they are, so that humans may use them without restriction. In human-plant interactions, therefore, moral action may necessitate behavioral changes in the human, which may in some circumstances restrict human action.

Awareness of plant autonomy and the ecological consequences of plant back- grounding suggest that incorporating plants within the realm of moral considerability is necessary for repairing relationships of care and responsibility between humans and the natural world. This view stands in sharp contrast to attitudes that regard plant ethics as infantile and ridiculous. In arguing for the appropriateness of moral consideration, it must be made clear that the operative word here is *consider*. As the human world demonstrates daily, the recognition of autonomy does not always generate respect and responsibility for the well-being of others. Other consider- ations may come into play, which may render caring for the well-being of certain individual autonomous beings as inappropriate. For example, in a plant context, it is not always ecologically appropriate to promote the well-being of certain species and individuals, such as invasive plant species which reduce ecosystem diversity and stability. However, this does not mean that in this instance the status of plants as ethical subjects has been ignored, simply that other factors have overridden this status. In the case of invasive plant species, the integrity and diversity of the system may hold sway, in the case of food plants, the need for human survival.

Plant ethics need not lead to the cessation of human use of plants. The necessity of violating the autonomy of plants, both in an ecological and agricultural context, need not vitiate claims to consider plants as subjects of moral behavior. Human beings may need to kill plants for food and shelter, to survive and reproduce. In this context, humans have a legitimate and obvious claim to violate the autonomy of other beings. Yet, with this claim in mind, it must be highlighted that there are a multitude of instances in which human beings kill, harm and violate the autonomy of plants, where it is not necessary for human survival. As Peter Singer writes, “the overwhelming majority of humans—take active part in, and allow their taxes to pay for practices that require the sacrifice of the most important interests of members of other species in order to promote the most trivial interests of our own.”64 while in this context Singer is writing with animal suffering in mind, clearly the same could be said for the violation of plant autonomy.

Humans violate plant autonomy by use and through death in many instances that are unnecessary. Many of these could be avoided by recognizing plants as appropriate recipients of respectful and responsible behavior. These conflicts between human wants and plant needs should be the primary focus of a wide-scale deliberation and negotiation of appropriate human-plant relationships. The current human “assault

64 Peter Singer, *animal Liberation* (London: Pimlico, 1993), p. 9.

on the environment” has subsumed much of the Earth, often to serve the “wants” of human life. The clear felling of tropical forests for corporate profit, the massive conversion of natural habitat into biofuel crops, and the transformation of Amazonia into pastoral grazing land for hamburgers are all large-scale examples of largely unnecessary human destruction of plant individuals, species, and habitats.

Necessity, of course, can be interpreted in a multitude of ways, which may lead to very different understandings of appropriate behavior toward plants. In light of the assertions of Bauman that morality must be individually negotiated, I do not seek to provide a prescriptive list of instances in which killing plants may be necessary or unnecessary. However, it may be helpful to consider that unnecessary killing takes place in the face of practically viable alternatives, e.g., local use of a forest for non-timber forest products and selective logging of some trees, rather than clear felling a whole forest. Not only are such engagements with plants often more economically productive in the long term,65 the turn away from arbitrary killing of plants helps foster the long-term relationships of care for nonhumans which are needed to counter the human appropriation of the Earth in the anthropocene.66

Even the smaller-scale, seemingly trivial examples of food overconsumption, the wastage of paper, or the removal (killing) of plants due to human aesthetic taste are also instances of neglectful human behavior. In the midst of the sixth great extinction crisis, it is in these arenas of conflict that caring for the well-being of plants for their own sake needs to be brought into the realm of possible and logical action. Rather than arguing for legal standing, I consider it more important to build awareness that plant lives are not *nothing*.

Plants are the subjects of their own lives and taking their lives arbitrarily is a deliberate disrespect. From this position, we can then work toward reducing the huge number of instances where we take plant lives unnecessarily, from the wasting of food to the overcultivation of land. As many plant (and animal) species no longer have enough space to flourish or to reproduce their own kind, promoting the well- being of plants must also incorporate measures that reduce the human pressures on plant habitats. Here, our current predicament is all important. Disregarding the needs of the ecologically fundamental plant kingdom, and putting human wants first, has contributed to a global ecological situation in which biospheric integrity is now at risk. If we wish to stave off mass extinction and perpetuate the human species, the time may be ripe for considering ways in which we can collectively prioritize the well-being of the other-than-humans that make our human lives possible.

65 Charles M Peters, Alwyn H. Gentry, and Robert O. Mendelsohn, “Valuation of an Amazonian Forest,” *Nature* 339 (1989): 656–65.

66 See Matthew Hall, “Questions of Human-Plant Love: Tales From the Arabian Highlands,” in Deborah Rose and Thom Van Dooren, eds., *unloved others: Death of the Disregarded in the Time of Extinctions*, unpublished book manuscript.