



Pesticide Occlusion and Harm: An Ecosemiotic Analysis

David W. Low (MEnvSc; PhD)
david.low7@bigpond.com

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Introduction

“A chemical that has no commercial value is easy to regulate.”

Phillip Landrigan 2001

Pesticides are designed by chemists to target and kill unwanted organisms that are inconvenient to our human priorities. As such, pesticides are designed to secure our lives by killing other lives. The deployment of toxic death in this sense is a technology of power through which governments legitimise toxic violence, not as an exception, but as a normalised ‘way of life’ (Mathur, 2022).

In this article, I will argue that the normality of our killing with pesticides has become dysfunctional in Australia. Further, I will suggest that the harms that are entailed with this normalised use of death by poison have become largely invisible to us. We have been inoculated to the dangers of pesticides by an administrative milieu that is carefully nurtured by the pesticide industry. As a result, Australians now mistakenly accept that it is possible to live safely within a cloud of toxic pesticides. In addition, our trust in the safety of toxins is being maintained via a system of assurances that are embedded within regulatory agencies that are controlled by vested interests. Our pesticide regulators have been captured by the pesticide industry (Clayton Utz 2023).



C-123 "Provider" aircraft spray Agent Orange, a 50/50 mixture of the herbicides 2,4,5-T and 2,4-D, over Vietnam during Operation Ranch Hand. Film still: US National Archives and Records Administration.

The social processes that normalised our mistaken trust in the safety of pesticides evolved into current use via a gradual acclimatisation. Somewhat paradoxically, our trust in the safe use of pesticides emerged out of war. During WWII, it began to be accepted that pesticides could be used as weapons. The British army deployed herbicides in the Malaysian conflict of the late 1940's (Biswas, 2001). This use of herbicide as a legitimate weapon of war then continued into the Vietnam conflict with the use of 'Agent Orange' and a number of other toxic defoliants.

Novel uses for pesticides in other wars against other forms of unwanted life were soon found. It gradually became mundane that pesticides should be used to kill unwanted life, for example, in a "war against weeds"; a war that is waged with impunity, no matter how polluting or dangerous (Low and Peric, 2011).

Note too that even though the use of pesticides as a weapon draws on the sciences, most notably chemistry, these scientific outputs are applied within a human generated political ecosystem. As I shall explain in more detail shortly, the legitimacy of fighting a war with chemistry has *domesticated* a comfortable cooperation between the industrial pesticide interests and the interests that sanction death (cf. Dedieu, 2022a; 2022b).

"A combination of war and chemistry has stripped contingency out of decision-making in the name of expediency. Worse, this has happened without much recognition of the entailed disconnection between chemical use and the damages inflicted on our ecological systems"

We thought we were being ‘modern’. We thought we could somehow use matters of fact to separate ourselves from matters of concern (cf. Latour 2000). Fortunately, the sciences are still functioning and are still able enough to warn us that our use of chemical warfare has become highly problematic: our thanatopolitically driven use of pesticides has become so wide-spread, so pervasive, so dangerous, we are now destroying our biodiversity and killing ourselves in the process (Groh et al., 2022; Beaumelle et al., 2023; Mueller et al., 2023; Sigmund et al., 2023; Rigala et al., 2023; Köthe, 2023; Rohani, 2023; Mancini et al., 2023; Pesce et al., 2023, Van Bruggen et al., 2018; Cavalier et al., 2023; Junaid et al., 2023; Paul et al., 2023; de Graaf et al., 2022; Mathur, 2022).

In sum, the sciences are telling us that our pesticide use is now negatively impacting the very lives that pesticides are supposed to be ‘protecting’.



An Ecosemiotic Analysis of the Problem Statement

From a semiotic perspective (i.e., from the perspective of the special study of signs and how signs function to create meaning) the findings of the special sciences cited above are viewed as socially constructed (Peirce, 1955; Fisher, 2006). Our scientific observations of biodiversity and human health are grouped together into a socially managed system of signs.

In a socially constructed sign-system guided by science, signs have a connection to something that is independent of how we *want* signs to be, but at the same time, our signs are also connected to something we have a human interest in finding out more about. This is how we use signs to make sense of what we observe scientifically, correcting and refining our sign classifications and implementing remedial responses as we go.

As we have seen from the evidence supplied by the special sciences, we can refine the above general semiotic method in order to focus sign use on an ecological concern. When we combine an interest in ecology with an interest in how signs create meaning, the result is *ecosemiotics*, a hybrid methodology that enables us to study the communicational conditions that sustain future life (Low and Peric 2011).

Ecosemiotics can help us to take a closer look at why pesticide harms are so opaque, or cannot be recognised at all. Used in a diagnostic sense, ecosemiotics assists us to see that the systemic occlusion of pesticide harm is reinforced by social norms and priorities that become tacit within the sign systems we use to progress pesticide action. Ecosemiotic analysis can reveal that our institutions literally cannot ‘think about’ the harms of pesticide use because the necessary categories to ‘think with’ have become degraded, or as I am suggesting, are hidden from view altogether (cf. Douglas, 1986).

In the following, I will use Australia as a case example of how ecosemiotics can be applied to matters of vital ecological concern. The question to be examined is: “What do Australian regulatory institutions allow us to know about pesticide use and the connected harms?”

The key institution responsible for the pesticide sign ecosystem in Australia is the Australian Pesticides and Veterinary Medicines Authority (APVMA). According to the APVMA, the most used pesticide class by value in Australia is herbicide. The APVMA has reported that herbicide sales figures for Australia have more than doubled in the last ten years and, based on industry projections, are set to double again by 2030 (cf. Figure 1.).



Figure 1. Herbicide sales in Australia 2000 - 2022. Source: APVMA 2023.

Tellingly for our purpose, the above current gross annual sales figures of more than \$3 billion for herbicides is as refined a level of analysis of herbicide use as is currently available publicly in Australia. While farmers and licenced applicators are required by law to keep a diary of their individual use, there is no bureaucratic system in place to aggregate and report herbicide use data in any publicly accessible form, other than provided above.

The lack of any granular refinement of use information is critical. For example, if use were to be reported by active ingredient, herbicide use data would be transformed into a valuable information source to facilitate reductions to applied herbicide toxicity (cf. Parker et al., 2023). Unfortunately, at present in Australia, which active herbicide ingredients are used, where, how much, and for how long is not reported. The same data shortfall applies to related pesticide classes, such as insecticides, fungicides and rodenticides.

The above has been assessed by a commissioned report to the APVMA – in a characteristically understated style – to be a “data gap” (Lee-Steere and Rainbow, 2023).

The gap is actually a yawning chasm.

How did this chasm of pesticide use occlusion come about?

Strategically Cultivated Ignorance

McGoey (2021) has argued that an occlusion of pollution data is something industries encourage in order to strategically avoid scrutiny and to maintain their market power. This seems highly likely in the case of the Australian pesticide industry, as measuring pesticide use in any publicly accessible manner is well-known to be ‘taboo’ and is resisted (Daw, Coulthard and Munyi, 2015). The reason is that if the occluded information were to escape into the public realm, it would become obvious to us that an incommensurable trade-off is taking place. It would become publicly evident that environmental and health values are being wantonly compromised by our pesticide use (de Valck, Jarvis and Coggan et al., 2023).

“That pesticides could be destroying life doubly – a distributed but targeted killing that compounds into a more general killing of our ecos – is morally repugnant. This is why pesticide use is under reported, or occluded altogether.”

As pesticide use has its roots in warfare, a lack of information on pesticide use can also be easily transformed into a social narrative in which poisoning is considered functional. In Australia, the transforming narrative is called ‘biosecurity’ (DAFF, 2022). In a biosecurity narrative, a ‘war against weeds and animal pests’ reduces policy complexity into an urgent task justifying expedient lethal action. Biosecurity is something performed by ‘officers’ and ‘licenced applicators’ who can legitimately use

lethal force without any need for discussion. Biosecurity, after all, is something we do in the ‘national interest’.

Given the above, in the next section I want to suggest that the actions intended to prevent us from knowing what we are doing with pesticides are in fact *causing* a proliferation of pests. Put in terms developed by Tsing, Mathews and Bubandt (2019), our modular simplification of life has trapped us into seeing the proliferation of pests as something that self-referentially enhances the rationale for further pest control using deadly, polluting pesticides (see also Aldeia, 2022).



Source: Pesticide Action Network UK

Ignorance as Auto-immunising Virtue

Given the consequences of pesticide use identified by the sciences and the obvious industry capture, we ought to allow ourselves to *legitimately* consider pesticide use as a massive self-perpetuating failure. The more we try to kill pests with pesticides, the more our ecosystems are poisoned and disrupted, and as a result, more pests are created that are in need of death.

“The manufacturing interests and commercial users of pesticides maintain and encourage our sense of their failure, but as an impetus to fail more, which is also highly profitable for them, but highly polluting for us.”

Whatever living thing that is valued within the above capitalocentric frame is therefore captured and entwined in the business of pestilence (Gibson-Graham, 2008). Indeed, put in terms used by biosecurity, this capture manifests itself in an endless focus on so-called ‘invasive species’ and a concomitant reliance

on pesticide usage to render up a perverted ecological simplification of nature's potential. All entwined life that is inconvenient to the accumulation of capital becomes demonised. Environmental care degrades into slogans such as, "help us fight the war" on weeds, rabbits, bugs, and so on, endlessly (Low and Peric, 2011). Included in this frame, ironically, 'conservation' is also a commodified product which now requires regular 'scheduled treatments' of toxic pesticides to remain viable.

To be clear, then, the yawning knowledge gaps identified by Lee-Steere and Rainbow (2023), VAGO (2021) and DAWE (2021) arise out of a collusion between the rules that guide culture and/or commerce and the responding rules governing the classification of toxic pesticides within regulatory agencies.

As noted earlier, the above collusion is a deliberately adopted industry strategy designed to increase market power and domination. Thus, without any data to connect pesticide use to health and environmental impacts, urgent regulatory intervention is curtailed (cf. Clayton Utz, 2023). In this sense, ignorance is more than just a 'gap to be filled', it is a valuable resource that those in power utilise strategically to continue 'business as usual' (Vallée, 2023; Knudsen, Pors and Bakken, 2023; McGoey, 2021).

As already argued, the main evidence for the above system of capture is that we have no detailed pesticide sales or use figures for anywhere in Australia. Nothing is recognised or recorded in a manner that would be usable by government land managers to improve pesticide use performance and assurance (cf. VAGO, 2021).



Australia's agriculture minister pays respect to his portfolio's traditional owners.

An important driver of the above problematic, I suggest, is that the system of pesticide classification – especially with regards to biodiversity – is dysfunctionally *delimited* by our cultural and commercial norms, particularly due to the traditionally privileged positionings of agriculture and government vegetation management. A self-imposed boundary condition of ‘hands off’ privilege gives rise to a highly organised form of pesticide impact ignorance. The self-imposed occlusion renders both assessment and change impossible. Indeed, even suggesting that an agricultural or environmental use of pesticides might compromise the sacred values of nature provokes intense feelings of unease, and even rage in Australia, hence dissent is eschewed religiously (Douglas, 1966).

The above concludes my discussion of what is problematic with respect to pesticide use when viewed through an ecosemiotic diagnostic. My findings concord closely with the recent review findings (VAGO, 2021; DAWE, 2021; Clayton Utz, 2023). I will next move to a closer analysis of what is problematic from a systems perspective and make some suggestions on what needs to be done.

Limits to Steering the Pesticide Ecosystem

To summarise our progress so far, I have argued that, despite a historically significant pesticide use and an alarming projection for an increase in future gross usage (and an entailed and necessary crash in biodiversity and negative health impacts) nearly all relevant government and industry actors at all levels consider Australia’s existing pesticide regulatory system to be generally satisfactory.

Our ecosemiotic diagnostic revealed that the above sense of self-satisfaction arises because the regulating institutions themselves are unable to recognise pesticide harms due to self-interest. As a consequence, there are no suitable classifications and therefore there are no data that could be used to connect usage to harm. The official position from all responsible agencies is that there is nothing untoward to worry about with respect to pesticide use. She’ll be right mate!

The identified lack of precisely aggregated pesticide usage data, I argue, is in fact a symptom of a dysfunctioning self-referential system, which I have characterised as a system of organised pesticide harm occlusion. This is an analytic outcome that has also been called “a system of toxic ignorance” (Boullier and Henry, 2022; see also Dedieu, 2022a; Alvesson et al., 2022, Dorsey and Ray, 2023).

“Off-target pesticide damage to our biodiversity and human health ought to be an important bioindicator of serious harm. However, our regulatory authorities (including the responsible human health authorities) are reluctant to act and instead cooperate to obscure the dangers (Vallée, 2023; Schneider, 2021).”

It is not clear whether the obfuscation of danger is intentional, or whether the authorities themselves have fallen victim to a culturally induced myopia which leads to an inability to recognise pesticides as something potentially harmful. For the regulators, it may be that their inability to ‘see harms’ is a regulatory artefact of the system working exactly as it should. In pesticide regulation, risks are systematically accepted on the behalf of the pesticide industry and properly processed via the system’s self-imposed limits. However, my argument is that these self-imposed limitations guide the system into

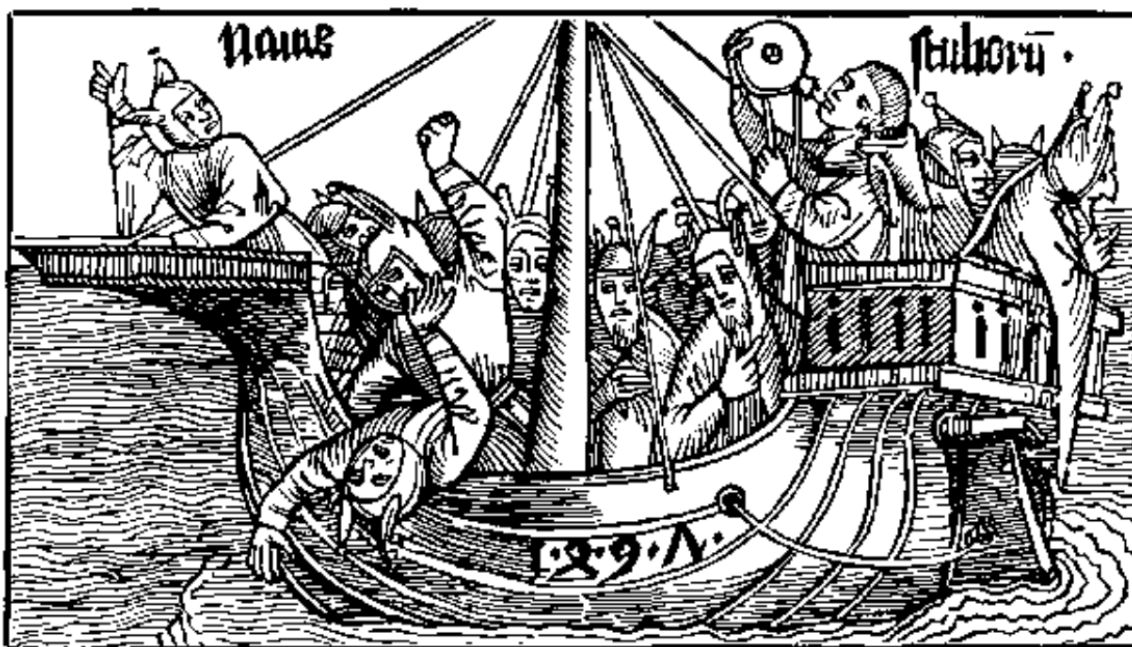
accepting, on our behalf, that it is ‘normal’ to live in a cloud of toxic pesticides. What I hope to make evident in this next section is that this ‘limit to steering’ can be described, and therefore included as a component of what needs to be addressed (cf. Luhmann, 1997).

Seen from ‘within’ the system (and, therefore, from a systems’ perspective), then, regulatory reform is not only unlikely, it is impossible. Within the pesticidal system, criticisms and dangers are objects to be absorbed to secure an uninterrupted continuation of the use of pesticides. Logically, regulations can be modified in response to emerging harms, but within pesticide regulatory agencies, all harms are instead converted to reified ‘endpoints’, quantified, and approved as ‘risks’ which are then accepted to be ‘within reasonable limits’. Reasonable for whom?

An important factor in the domestication of risk is that the data used by regulating agencies is supplied by the pesticide industry. To function, the regulators must absorb the company data smoothly, as to question any one aspect of the regulatory system is to put into question the entire system (Ferretti, 2018).

Mutual co-incentives are in operation. Indeed, the interconnections are so intricate and so well supported via the biased data generated by the pesticide companies, even if we were looking at the process retrospectively in a diagnostic sense, it is generally impossible to point to any specific agents of corruption due to the seamless operation of systemic capture. As Ferretti (2018) put it, “... both the corrupted and the corruptor have an interest in maintaining the public rules governing an institution because the very possibility of abusing the power of office entrusted to them is based on the stability of those rules” (p. 253).

The officers are ‘doing their jobs well’ – and the nation’s pesticide businesses are ‘thriving’. The system as a whole has entrenched pesticidal harm as a way of life that cannot be questioned effectively from any position *within* the system.



Albrecht Dürer's illustration for Sebastian Brant's Ship of Fools – 1494

As with many other political uses of death, a pesticidal thanatopolitics seeks to disconnect the outcomes of troubling and odious political decisions from any external mechanisms that would intervene sanely to manage those decisions. The special sciences can certainly reveal aspects of the dangers to those affected by the pesticides, but the regulating institutions cannot act on the dangers, as those dangers are not recognisable to actors who are *within* the regulating system. In this sense, politics has embedded the interest of ‘science’ as a field of activity that, when applied to pesticide regulation, has been transformed into a regulatory interest that is “beyond dispute”.

Somewhat paradoxically, then, because the special sciences are referenced within the regulatory system in a crippled manner, ‘science’ is an interest that cannot respond to the techniques and findings of the specialised sciences that the regulators actually claim to draw on. ‘Science’ is therefore a term used within regulatory agencies only in a degraded sense in order to armour the regulating agency *against* the intrusion of genuine sciences. The pesticide system therefore operates as what is known in the systems literature as a “self-referential system” (Luhmann, 1997).

The cheerful hope of this article is that we have diagnostically investigated the problems that arise out of this self-referencing regulatory process, and it is now possible to suggest some solutions that will break us out. I am not the only person ‘from the outside’ to recognise the need for reform (cf. Clayton Utz, 2023).

No doubt any discussion or recommendation to address the occlusion of pesticidal hazards and suggest ‘other than’ pesticide solutions to agronomic and ecological issues will be contested by those who benefit from the pesticidal *status quo*. Indeed, I fully expect every effort will be made by those within the system to herd the objects I have pointed out back into the self-referential fool’s quagmire that presently manages pesticides in Australia. That is the *legitimated* function of the current system. The pesticide regulatory system has been deliberately designed to serve only the interests of agrochemical companies and the users of pesticides.

Conclusion: Independent Enquiry as Systemic Correction

As cultural anthropologist Mary Douglas (1966) has explained, pollution always occurs in *relation* to a system of classification. Pollution is therefore always part of a system of signs, or it does not exist, hence, without a categorised relation between pesticide use and the many toxic impacts on ‘other-than targeted life’, pesticide harms do not exist, at least, not within the current institutional view of Australian pesticide regulators.

Pesticide pollution, when it is recognised at present, is therefore something highly anomalous to the system, and as such, *is* pollution. To the APVMA, anomalous pesticide events are to be ignored or minimised, as they make no-sense; they are institutionally speaking, ‘nonsense’. The regulatory institution must necessarily and always be right about its allocating of death to pestilence. Death is a technology of power and is not to be put into question.

In order to incorporate some care of our environment and health into the above situation, an alternative positioning is possible. As Alhojärvi (2020) has also argued, the alternative is to *loosen* our critical clasp on the pesticidal explanations that are self-referential and self-serving. Thus, to pry off capitalocentrism's iron grip on pestilence, we need to undertake an intellectual intervention with, "... a reparative motive that welcomes surprise, tolerates coexistence, and cares for the new, providing a welcoming environment for the objects of our thought" (Gibson-Graham, 2008 p. 619).

The above is not an easy task. Pests within a pesticidal system are currently *a priori* excluded from any other fate than death by poison. However, as the sciences are now showing us, those 'necessary deaths' are now multiplying the dangers of pesticide pollution to a globally lethal level, threatening *us* with extinction. As Alhojärvi (2020) put it, "... we simply cannot afford to disavow existing critical energies or to foreclose their potential for thinking ahead – nor to leave critique (or negation, for that matter) to those who only use them to cement capitalist realism" (p. 27).

The above is exactly why the pesticide companies have encouraged an institutionally enabled occlusion of pesticide harms – the occlusion can disconnect alarming health or biodiversity impacts from their (i.e., the pesticide companies and their politically embedded advisers) more important economic priority: profits. Pesticide pollution, within the current regulatory system, is therefore eschewed, indeed, the term 'pollution' is not even included in the glossary of terms defined by the APVMA on their web-site.

From an ecosemiotic perspective, pesticide pollution is therefore seen as a *symptom* of a system eschewing its capacity to warn itself of danger (Posner, 2000; Luhmann, 1997). This is why regulatory failures should not be thought of as a basis for system reinvigoration, but rather, failures should be seen as something that moves us on to a recognition of something more life-affirming. In an ecosemiotic framework, trouble and failures signal to the system from a position that is *independent* of what the system wants the case to be. An environment's dissent moves us onto finding an expanded, more fully developed sign of the trouble we are in (Low, 2008).

Our diagnostic ecosemiotic analysis suggests, therefore, that there are two quite different options that open up to address what is problematic here. First, and as already discussed, the regulatory system can continue to 'disappear' any anomalous violation of biodiversity or health value. Indeed, I have argued that this option is already 'hard-wired' into the sign-systems of regulatory agencies and, therefore, renders the regulating institutions powerless to change themselves effectively. This first option, therefore, is already an irretrievable failure, so excluded.

A second alternative opens up through embracing an awareness of the powerlessness of the responsible institutions to change 'how they think' (Douglas, 1986). To overcome this self-imposed limitation, we need to openly acknowledge the relevant institutions' helpless position and work to assist them to *expand* their system of classification, especially in order to accept data inputs from outside their system boundary. This action will enable the regulators to embrace change and adapt their internal classifications to accommodate and address pesticide pollution. To do this, leadership and external guidance by independently operating forces will be necessary.

To enable the necessary correction to external factors, then, the most central step will be to begin to measure pesticide usage. We cannot control something we cannot measure. To measure something, the object of the measurement needs to reference something that can connect the inside of the system to that which is outside the system.

To be clear, while individuals working in agencies or business make decisions about whether there is a need to use pesticides (e.g., via a risk assessment) and which chemical might be ‘best’, it is institutions that define the classifications that determine the information used, including, ideally, whether that individual choice encompasses an *independent* consideration of probable shared harms to health and biodiversity.

As we have seen, there are several fundamental ‘gaps’ in the approval and subsequent pesticide use management process operating currently; that is not under dispute, not even by the agencies concerned. For example, the regulatory assessment process acknowledges it is unable to assess harmful chemical synergies (Arreguin-Rebolledo et al., 2023; Siviter et al., 2021). Thus, everyone agrees, the real-world impacts of pesticides are not being captured or monitored (cf. Lee-Steere and Rainbow, 2023). We are living in a toxic pesticide ‘soup’, but we are being prevented from ‘seeing it’ in a real-world context.

“To see what is before our noses, we need to take our noses out of the feed trough. To do that, we need to embrace the pesticidal regulatory failure as a congenital dysfunction that cannot be cured, except via external intervening relations.”

To address the inherent violence of the disconnections inherent in the present pesticide system, *non-violent enquiry* offers a cure (Aho, 2020; Low, 2000). Non-violent enquiry draws on the sciences and bypasses the problem of attributing causal (or contributive) responsibility to those ‘inside’ the system. For example, non-violent enquiry would bypass holding APVMA officers responsible for corruption or capture from an externalist point of view by moving the focus *outside* to encompass an interaction between both the inside and outside (Ferratti 2018, Stirling and Burgman, 2021).

To achieve the above *dialogical* regulatory outcome, pesticide use data will be needed. The data will provide reference points to an external reality, thereby generating social links and external scientific relationships. These vital interaction points can be introduced into the work of the APVMA and conjoined agencies, for example, via state agricultural departments. These cooperative interventions should make redressive action possible and enable a reduction in pesticide use.

The above would be preferred politically as an option, I suggest, as pointing out a need for radical changes to the profit motives of the pesticide regulatory system is not politically palatable within a capitalocentric system. The companies are incapable anyway – self-regulation has already failed. Indeed, the feral nature of Australia’s pesticide industry has been argued in this paper to be due to a deficit of *independent* accountability. Stated even more closely, the dysfunction is due to the involvement of well-meaning individuals conjoined to corrupted, dysfunctional institutional practices that are self-referential and captured by a powerful industry (cf. Ferretti, 2018). Identifying and implementing points of independent socio-scientific reference and input should offer a cure.



The important finding of this paper, then, is that in order to enable claims to be made and challenged with respect to the effects of pesticides on our health and our environment, information on usage and the circumstances of that usage must be made publicly available.

I have come to the above central recommendation via an ecosemiotic method. Consistent with the maxim of pragmatism developed by Peirce (1955), the regulation of pesticides needs to connect *ecos* with our human priorities, but for the purpose of enabling the subject-matter of enquiry – in this case pesticide use – to interact with those impacted by pesticides. Pragmatism, when applied in Peirce’s intended scientific sense, therefore enables the impacts of pesticides to be considered relevant factors in establishing the acceptance or rejection of such uses in practice.

To the above recommendation I also add a further suggestion, this latter recommendation based on my own special area of expertise: scientific communication (Low, 2008). I take scientific communication to be a method of public enquiry that can be based on principles of non-violence; as these principles also guide genuine scientific enquiry (Low, 2000). Genuine scientific communication therefore aims to develop a *cooperative* understanding of the object of investigation by *involving as many people as possible*, as long as they are interested in the same subject-matter. As Ransdell (2000) has also argued, each additional person who becomes involved is thereby empowered to add complementary, yet distinct understandings of pesticide use, and how that use affects the beings we share the world with.

Again, the expanded understanding of pesticide use detailed here will only be made possible to the extent to which there is unrestricted access to *both* information about pesticide use, and to other people interested in the same subject-matter and who have access to the same data. Thus, wherever there is a regulatory attitude which discourages the above, or where there is a failure of the communicational freedom needed for it, there is good reason to think that the overall understanding of what is actually going on with pesticide regulation has been corrupted.



Credit: Audrey Peric-Low

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