

# Contentious perspectives on weeds

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## Weed psychology and the War on Weeds

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### Weed psychology

What part do emotions play in our dealings with weeds, including our decisions about waging war on weeds, and which plants to regard as the enemy? How did fear and loathing become so widespread as the typical response to weeds?

My thinking about the psychology of weeds began when I came across a perceptive review by Professor William Stearn in the 1956 *Journal of the Royal Horticultural Society* (Stearn 1956). What struck me was Stearn's suggestion that the appropriate sphere of science for considering weeds was psychology rather than botany: 'Taken as a whole, weeds are not so much a botanical as a human psychological category within the plant kingdom, for a weed is simply a plant which in a particular place at a particular time arouses human dislike...'

Weeds carry emotional impacts that are sometimes very powerful. Weeds are often considered unsightly, as disfiguring the landscape, or as a sign of disorder and neglect. Weeds attract adjectives such as 'ugly', 'pernicious', 'hateful', and 'noxious'; expressions of the emotions aroused by the threat to good order that such adjectives represent. Weeds growing on waste land, roadsides, ruins, rubbish heaps, and other uncultivated areas, where they might merely be thought of as untidy, attract these epithets as readily as weeds of farms and gardens.

Feelings of guilt may also be involved in our response to weeds. We may feel that to permit weeds to take over a garden, or to allow thistles to grow unchecked, is to fail to maintain proper standards, to be untidy, to be socially irresponsible, to set a bad example, to permit pollution. Such feelings can operate when we are told that a particular plant is a weed. We may feel a strong compulsion to remove the plant,

even if it has not been troublesome in this location, without pausing to ask 'Why do you say it's a weed?'

The depth of feelings that may be involved is demonstrated by Hamlet's first soliloquy contemplating suicide because of his disgust with the world after his mother's unseemly marriage to his father's brother, just two months after his father's death. How did Shakespeare bring home to his audience the reality of Hamlet's suffering? By the lines:

'...O fie! 'tis an unweeded garden,  
That grows to seed: things rank and  
gross in nature  
Possess it merely.'  
(Hamlet Act 1 Scene II)

Shakespeare uses the emotions aroused by a garden possessed by weeds rank and gross in nature to help us share in Hamlet's emotions. The unweeded garden around him is so unbearable that Hamlet wants to kill himself. Why do weeds give rise to such feelings? A consideration of human psychology helps us to understand what humans think, say and do about weeds.

In an article in *Gardens Illustrated*, 'Wonderful weeds', Frank Ronan argues that 'A weed, in fact, is a plant that will flourish with no help from us; that does not require our intervention. That is the insult, and why we despise it; a weed is a plant that injures our pride' (Ronan 2010). The suggestion that such feelings are involved in our response to weeds is very interesting (even if made tongue in cheek), but I think that something more than insults and injured pride is at work; that we are, deep down, frightened of weeds and the threat they pose to our need for order and control, not to mention the harm they can do. Fear is a key emotion in our response to weeds, and has been for a long time.

The *Book of Isaiah* (c. 742 BC) refers to 'the fear of briars and thorns' (Ch. VII; v. 25). Many people are subject to a deep-seated fear that weeds will take over their patch, some even fear for the environment or even the planet as a whole. The science fiction writer John Wyndham memorably exploited such fears in his fable of feral carnivorous plants, *The Day of The Triffids* (1951). The vital question is whether such fears are grounded in reality, or whether they should be seen as exaggerated and irrational.

One explanation of the psychological basis for our fear of weeds lies in the association between weeds and contaminants. Weeds have sometimes been likened to dirt. For example, in 1909 Professor Alfred Ewart (1872–1937), Government Botanist and Professor of Botany at The University of Melbourne, applied what he said was Palmerston's definition of dirt (matter out of its proper place) to weeds: 'A weed is a plant out of its proper place, and a troublesome weed is one which makes itself objectionable by continually asserting itself in places where it is not desired' (Ewart and Tovey 1909).

The idea that dirt is matter out of place was developed by the English social anthropologist Mary Douglas (1921–2007) as part of her analysis of concepts of defilement and pollution: 'If we can abstract pathogenicity and hygiene from our notion of dirt, we are left with the old definition of dirt as matter out of place. This is a very suggestive approach. It implies two conditions: a set of ordered relations, and a contravention of that order. Dirt then, is never a unique, isolated event. Where there is dirt there is a system. Dirt is the by-product of a systematic ordering and classification of matter, in so far as ordering involves rejecting inappropriate elements' (Douglas 1966). In the same way, weeds imply the existence of plants which are not weeds, and the exclusion of a plant described as a weed from the ordered world of acceptable plants.

Humans reject the notion of dirty as a contaminant, in contrast to the acceptance of the notion of cleanliness as virtuous. What is invoked here is a universal feature of human societies, the concept of pollu-

tion. Pollution ideas have been shown to be powerful influences on human behaviour. Neil Evenden, following Mary Douglas, pointed out that all societies identify contaminants, i.e. 'something that is out of place and hostile to the environment, as a danger to the well-being of individuals or society' (Evenden 1992). Sometimes it seems that social groups have a need to specify some aspects of the world around them as polluting, and that the need may be satisfied regardless of whether the threat identified is real or not. Mary Douglas also demonstrated that the human response to dirt is associated with our deep-seated need for order. Absence of order is something we tolerate with great difficulty. To identify something as a pollutant is to see it as threatening the appropriate order of things. When plants are treated as weeds, they are seen as presenting a similar threat. When weeds are thought of as polluting, their removal is required as a matter of course, without stopping to ask 'What harm are these plants actually doing?'

Our need for order is also reflected in the unease, fear even, that we feel about the absence of control. Out of control plants often attract the label weed. As noted, Professor Ewart objected to weeds continually asserting themselves in places where they are not desired. Many weeds present this difficulty. Some seem to have been designed to make control or eradication almost impossible; *Oxalis* species provide a good example. As many gardeners know, to their regret, to remove these weeds by hand-pulling of the plants or cultivation is likely to spread the underground bulbs and bulbils, which are significant means of dispersal (Pierce 1998).

Weeds have sometimes been defined as plants that are not wanted. This gave rise to a suggestion that it is a matter of human caprice whether a plant is a weed or not. Elmer Grant Campbell of Purdue University, in a short essay in *Science* in 1923, wrote that, 'we have an odd rule, under which any plant in the universe may instantly become a weed without the slightest change in character, habitat or position. Under this rule, a plant is a weed, not according to specific qualities nor by a definite concept in the mind of any man, but by human caprice.' (Campbell 1923). I do not agree with Campbell. It may be frustrating that there is no agreed set of necessary and sufficient conditions for use of the term weed; but it does not follow that its use is a matter of caprice.

Even if weeds are simply unwanted plants, human wants and desires are not capricious. Wants are not wanton chance occurrences or arbitrary feelings. They are not able to be taken up or discarded at a whim. Each person's wants are related to their upbringing, their individual conceptual structure and to the culture of the

groups and the society of which the individual forms part. As the philosopher Mary Midgley pointed out, 'Wants are not random impulses. They are articulated, recognizable aspects of life; they are the deepest structural constituents of our characters' (Midgley 2002). This is a long way from caprice, which has been defined as: 'a sudden change of mind without apparent or adequate motive; a whim'. But perhaps Campbell's real point was that calling a plant a weed is often the expression of how we feel about this plant in these particular circumstances. Which puts me in mind of the typical question asked by psychologists, 'How do you feel about that?' A more pertinent question for this discussion would be, 'Why are you frightened of that plant?'

To understand why weeds frighten us we must think more closely about their impact. There is nothing capricious about treating many plants as weeds, nor is it simply that they are hard to control. The farmer has his reasons for treating plants as weeds. To begin with, plants that volunteer in a crop compete with the crop for nourishment and water. Shakespeare provides an example in *Richard II*, when he has the Gardener in the Duke of York's garden say:

'...I will go root away  
The noisome weeds, that without  
profit suck  
The soil's fertility from wholesome  
flowers.'

Many pasture weeds have bad effects which are more serious. Weeds may be poisonous to humans or stock, or otherwise harmful because they have hard, sharp structures such as spines or thorns, which wound stock. Some weeds will taint dairy products or meat. Others harbour diseases of crop plants, or insect pests. Weeds with burrs to accumulate on fleeces have troubled sheep farmers in Australia. Further examples are given in works of reference such as Parsons and Cuthbertson (2001).

The emotions of fear and dislike that such plants arouse are understandable. Do we reject such plants for the specific troubles they bring? Perhaps we are governed by ancient responses and attitudes which have become engrained in our culture? Is a rationalization available for every occasion when a plant is called a weed? The critical issue is as to the appropriate response in all the circumstances. The emotions aroused and the actions they give rise to may be out of all proportion to the actual threat.

### Emotive language

Whenever a plant is called a weed, some of the psychological overlay associated with the class is invoked. We may not always

be conscious of the emotional and other forces at play, but we should recognize that they may be present. For years I was troubled by the fact that so many of the terms used in the vocabulary of weed science (words such as alien, feral, invader, infestation) were emotive and judgmental. The term invasion carries associations of attack on our homeland by enemy forces, and suggests that we should automatically take action against the invader. Why do we speak of aliens, with overtones of enemy aliens or space invaders, instead of exotics, which carry a hint of excitement and romance? Why, when human aliens can become lawful citizens by naturalization, do we fail to accept that naturalized plants have become part of the flora and continue to call them aliens? Why do we speak of feral plants instead of volunteers? Why do we speak of plants as invading rather than simply spreading, or increasing their range? Why do we speak of weeds infesting rather than simply being present?

I now understand that the use of emotive language is related to the fact that emotions are involved, even if unconsciously. The words used both reflect and compound emotions such as fear and anxiety, which distort our thinking about weeds. As James Brown of the University of New Mexico pointed out, 'There is a kind of irrational xenophobia about invading animals and plants that resembles the inherent fear and intolerance of foreign races, cultures, and religions... This xenophobia needs to be replaced by a rational, scientifically justifiable view of the ecological roles of exotic species' (Brown 1998). There is an irony about the present inhabitants of Australia allowing xenophobic attitudes towards new arrivals to flourish; but an even greater irony in prejudice directed towards exotic plants by people who cannot themselves claim to be indigenous. A civilized society should restrain xenophobia whether against people or plants.

If we are to achieve a proper understanding of weeds we should avoid the use of emotive and prejudicial language. To understand and describe the place of weeds in the natural order we should aim to use expressions that are value neutral and dispassionate. The same plant may seem very different if we call it a wildflower instead of a weed. We need to guard against the risk that our actions may be governed by our emotions; that we may treat plants as weeds in circumstances where to do so is not appropriate or justifiable. We should seek to overcome emotions of fear and guilt in our responses to weeds.

### The War on Weeds: are weeds our enemy?

References to the 'War on Weeds' are now common (Evans 2002). Government

agencies have declared war on weeds, and powerful forces have joined together in waging that war. Killing weeds is a multi-million dollar business for herbicide manufacturers and also for those recruited to the war effort. To some, it is clear that the management of Australia's weed problems is a form of warfare. Some claim to be winning the War on Weeds, or to have the authority to tell others how to do so. Learned papers are given about strategies to be adopted. Weed warriors are recruited to wage war. The idea of a War on Weeds reminds us of the much used and abused expression so prevalent today, the war on terror.

Just as talk about the war on terror contributes to deep seated feelings of fear and insecurity in the population generally, who are reminded that they may at any time become the targets of a terrorist attack as they go about their daily lives, so repeated references to the War on Weeds give rise to fears that we are under serious threat from weeds. The government agencies leading the War on Weeds seek to muster support for their activities by the call to take up arms. The War on Weeds is based on claims that alien plant invaders are threatening the world around us, the very environment in which we live. But the threat has, I believe, been exaggerated. Serious ecological harm has often been caused by the use of herbicides as a weapon to attack weeds.

A real problem about the war on terror is the inability to specify the enemy. There is a similar problem with the War on Weeds, the enemy is elusive and hard to identify. The weed status of many plants is disputed. Once, weeds were confined to horticulture and agriculture; even then it was uncertain whether many plants were weeds. If this was the equivalent of conventional warfare, we now have, in effect, total war as hundreds of plant species, which have been cultivated in gardens for many years, are said to be environmental weeds, or invasive plants.

These new categories are radically different to traditional weeds. The consequences of inventing these new classes of weeds have been profound. It is not just introduced plants which are under attack, although the campaign against naturalized exotics has become pretty remorseless, inviting the label xenophobia. In a bizarre attempt to save the bush from itself, native plants are being removed as weeds if they seem to be too successful. The, at times, fragile consensus as to which plants are weeds has broken down. The absence of a firm basis for distinguishing weeds from non-weeds is of increasing significance.

### Herbicides as weapons of war

The herbicides 2,4-D and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid),

developed during the 1940s, had become widely used as selective weed killers in agriculture by the 1950s. Sometimes referred to as phenoloxyl agents, these synthetic chemicals work within a plant by interfering with the plants' physiology for long enough to kill it. They are known as systemic herbicides because their mode of operation is by translocation within the targeted plant (King 1966). These new chemical weed controls seemed magical in their efficacy, and were part of a new era of agriculture based on increased mechanization, the wider availability of fertilizers and pesticides, and improved crop varieties (Zimdahl 1999). Unfortunately, long developed skills of farm husbandry, such as crop rotation and cultural control of weeds, were abandoned in the revolution, and it was only gradually understood that the new herbicide-dominated agriculture was unsustainable (Fryer 1983).

Herbicides were used as instruments of war in the 20th century. During the 1960s the United States military in Vietnam adopted a strategy against the Viet Cong and North Vietnamese of defoliating large areas of jungle to hamper movement of troops and supplies, and to destroy food crops. Aerial spraying over large tracts of the country was carried out, using millions of gallons of herbicides such as 'Agent Orange' and 'Agent Blue'. This was not just war on weeds, but war on an entire environment by what the German philosopher Peter Sloterdijk called terror from the air; a mode of warfare that he says began with the use of poison gas by the German Army in 1915 at Ypres in Northern France (Sloterdijk 2009). Long after the Vietnam War, the herbicides continue to have serious, long-term harmful effects on the people of Vietnam and on the US and allied troops involved in the spraying.

### Weed resistance

Weed warriors might characterize 'resistance' as weeds fighting back. One account describes the development of weed resistance in Canada as mounting 'a successful counter attack' (Evans 2002).

Weed resistance to herbicides is just another chapter in the long co-evolution of humans and weeds. From the plants' point of view, resistance should be seen as immunity from poison developed by the plant over generations. By repeatedly killing large populations of a plant with herbicide, humans select those members of the plant population with natural immunity to the herbicide. The immune varieties become more numerous and replace the varieties susceptible to the herbicide. Herbicide resistance is just one example of weed adaptation to cultivation practices. If weeds are seen as our enemy, humans have shaped the enemy and are, at least in part, responsible for what that enemy does.

Although not fully anticipated by weed scientists (Barrett 1983), herbicide resistance has now occurred world-wide. The most widespread and severe occurrences are said to be in the southern Australian grain belt, where resistant weeds are now encountered beyond cereal cropping areas, e.g. in orchards, pastures, roadsides, railways, perennial lucerne fields, and other areas where herbicides have been used repeatedly. Resistant populations of some 22 species are known in Australia (Preston 2000). We should ponder the lessons to be learned from this aspect of the War on Weeds.

### Collateral damage

United States forces use the term collateral damage as an acknowledged aspect of warfare. The expression is a euphemism used to refer to 'unintended' damage to people or facilities as a result of military action against enemy targets. Collateral damage is also a feature of the war against weeds. The damage may be direct or indirect. As an example, spray drift from aerial spraying of herbicides has often damaged plants other than those targeted. Other environmental harm such as contamination of water supplies has also been caused.

Most chemical pesticides are harmful to humans and the environment (Carson 2000). Pesticides are now seen as another form of atmospheric and environmental pollutant, together with acid rain and nuclear fall-out. Are any weeds so nasty that the bad effects of herbicides should be tolerated? Many now say that the use of herbicides to produce the perfect garden lawn, for example, is simply unacceptable. The spraying of roadsides with herbicides, instrumental in the selection of glyphosate resistant weeds, is hard to justify. Roadside weeds should be tolerated unless there is good reason to intervene. If control is necessary, slashing is preferable to the use of poisons.

### Propaganda

A disturbing aspect of the War on Weeds has been the use of propaganda. It has long been remarked that false and exaggerated claims about the enemy are common in times of war. As the epigraph to the English MP Arthur Ponsonby's *Falsehood in Wartime* (1928) put it, 'When war is declared, truth is the first casualty' (Ponsonby 1991). In our age, the dissemination of propaganda has become part of waging war. It is not surprising that the War on Weeds has to some degree been waged by the dissemination of exaggerated claims about the threat of weeds; claims that go beyond the scientific evidence, and are calculated to garner support for the war effort through feelings of fear and insecurity.

The natural tendency of uncontrolled or uncontrollable weeds to frighten us has



been reinforced by government propaganda. Literature from government agencies about the threat of so-called sleeper weeds provides a good example (Cunningham *et al.* 2006). What are sleeper weeds? The term comes from a paper by Richard Groves in 1999, in which he introduced the expression sleeper weed as a label for 'invasive plants that have naturalized in a region but not yet increased their population size exponentially' (Groves 1999). In 2006 Groves acknowledged that the concept of sleeper weed had gained a level of general acceptance and misuse before the science had been done (Groves 2006). I have argued elsewhere that this much-abused expression should be abandoned (Dwyer 2008), and will not repeat the detail here.

There is no reliable way to identify which of the 2500 plus naturalized exotics in Australia are sleeper weeds, or to establish whether the label can properly be applied to any of them. The expression 'sleeper weed' is calculated to attract feelings of fear of possible harm from plant invasions that not only may never happen, but which weed science cannot reliably predict. To invoke the term sleeper weed without a sound basis for their existence is to engage in propaganda. Government agencies, as part of their war on weeds, should not engage in psychological warfare against their own citizens.

Given the emotions associated with weeds, it is also understandable that these emotions should be a field of psychological warfare. Feelings such as fear, disgust, guilt, hatred and xenophobia can easily be manipulated. We may be conscripted into the War on Weeds without an opportunity to consider that there may be a better way to respond to this aspect of nature's realm.

### A call for a truce in the War on Weeds

What may seem to be victories over nature often have a way of being illusory. As Friedrich Engels (1820–1895) wrote more than 100 years ago in a much quoted essay, 'Let us not however flatter ourselves overmuch on account of our victories over nature. For each such victory it takes its revenge on us. Each of them, it is true, has in the first place the consequences on which we counted, but in the second and third places it has quite different unforeseen effects which only too often cancel the first... Thus at every step we are reminded that we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature – but that we, with flesh, blood and brain, belong to nature, and exist in its midst, and that all our mastery of it consists in the fact that we have the advantage over all other creatures of being able to know and correctly apply its laws' (Passmore 1980).

As horticulture and agriculture depend on the co-operation of nature,

without which we can grow nothing, ideas of conquest over nature are simply inappropriate. Successful gardening and farming require that we should seek to know and understand nature's ways on which our efforts depend. But we should not hope to subjugate nature to achieve our ends.

We must always keep in mind the implications of the fact that weeds are part of nature. Our relation with nature may be best understood as one of reciprocal interplay. Humans may use nature to serve their ends, but the ends of the plants and animals we cultivate could as well be seen as being served by humans. This insight was attributed by the German Philosopher Immanuel Kant (1724–1804) to the great botanist Carolus Linnaeus (1707–1778) (Kant 1928). Thus we cultivate plants for our own purposes, but from the plants' point of view the cultivated plants could be seen as using humans so that they may thrive and multiply. On this approach, man is a means rather than an end. For a plant to be taken up by humans and cultivated is a powerful and effective evolutionary strategy. That weeds should take advantage of the opportunities to reproduce and flourish, as presented by the horticultural and agricultural activities of humans (including the waste-lands they create), is an understandable feature of the natural order. We may need to accept that the plants we call weeds are inevitably part of nature's realm.

If it is understood that our approach to weeds should be part of our relationship with nature, the overriding question becomes: 'Does the threat posed by weeds justify the extreme measure of waging all out war on them?' The doctrine of proportionality, so often disregarded in the conduct of war, should be applied in our dealings with weeds.

Weeding has been a necessary feature of horticulture and agriculture from the earliest times that humans engaged in these activities, but an indiscriminate war on weeds is far from necessary. Weeding does not require a warlike attitude or the use of weapons of warfare, such as the broadcasting of the synthetic herbicides developed since the 1940s.

We call plants weeds when we want to attack them, just as we call members of an opposing military force the enemy. What makes weeds the enemy lies not in the plants themselves but in the humans' desire to eliminate them, whatever the basis for that desire. A different approach would be to stop being frightened of weeds, to acknowledge their virtues and their place in the realm of nature, and to seek a more peaceful co-existence with them. This approach should not be seen as surrender in the War on Weeds, but rather as a way to make peace. It is, in any event, time to declare a truce.

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## Changing of the guard: moving from a war on weeds to an outcome-orientated weed management system

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### Summary

Weed management has been likened to a war – the war on weeds. Whilst the concept of a war has created a sense of unity, supported by 'propaganda' and emotive language, the campaign has been far from a success. In fact it has actually hampered weed management by maintaining a deep-seated emphasis on the act of killing weeds, rather than on the outcome of that killing – an example of an outcome might be the response of native species that are threatened by a particular weed. In order to increase the effectiveness of weed management I argue that it is time for a changing of the guard or a transition from this so-called 'war on weeds' to a new approach: one that is focused on the outcome, which is not a war. Whilst an outcome-orientated weed management system is not new, i.e. it has already been used in a few specific cases, it is distinctly different from the concept of a war, and more in line with the broader objectives of many weed management programs. In order to transition to an outcome-orientated weed management system several challenges need to be overcome, specifically around establishing appropriate goals and monitoring weed management programs. In addition we need to ensure policy is aligned with management and research. Lastly, some deeply entrenched individual and institutional views on weed management need to be overcome. None of the challenges outlined pose a significant barrier to a transition to an outcome-orientated approach. Given the failure of the war on weeds it is now time to make such a transition.

### Introduction

Over the past few decades, management of weeds in Australia has been likened to a war, the war on weeds (e.g. Lonsdale 2002). This phenomenon has not been restricted to either Australia or the past few decades (e.g. Hildebrand 1946, McMillen 1989, Evans 2002). Whilst the analogy of war, backed by the process of killing of weeds (the enemy) plus the use of emotive terminology, created unity around the central cause of tackling the weed problem in Australia, it has not delivered the expected victories and successful triumphs of war. Instead, the analogy of a war has

actually stifled and hampered weed management by overemphasis on a few specific 'war like' actions of weed management. For example, where weeds are being managed for the protection of biodiversity, the emphasis of weed management must be on the response of that biodiversity to weed control, rather than on the act of killing weeds *per se*. In this paper I argue that the way we approach weed management needs to move away from the concept of a war to being directly focused or orientated towards management outcomes. Whilst some researchers and weed managers have already embarked on such a transition, it is important at this time to have a wider discussion on the challenges associated with making a broader transition, as well as on the potentially contentious issues that need to be resolved/addressed during the process.

### The war on weeds

There have been at least two main factors that have contributed to the philosophy of a war on weeds. Firstly the idea of killing a common enemy has been a central focus of many weed programs, which has contributed to a mind-set that killing weeds at all costs, and the causalities involved, are just an unfortunate consequence of the war. The idea that we can unite to fight the weed enemy, 'those plants that we all hate growing in places we do not want them', is highly emotive. Apart from the killing and casualties, it is not a war – there is no conflict – the enemy [weeds] are not actively hostile towards us; it is a one sided affair.

The desire to wage a war on weeds, especially by weed practitioners, has also prevented the monitoring of many weed management programs, as monitoring is perceived as a waste of resources (money and time), effectively diverting those resources away from the task of killing weeds. Such entrenched attitudes have actually been detrimental, as the outcomes of the vast majority of weed management programs have gone undocumented, despite the significant annual investment in weed control. And yet we are constantly seeking additional funds to fight this war.

If this had actually been a true war, there would have been a higher requirement for accountability of the actions. For example, set backs or losses in terms of