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INVASION BIOLOGY: CRITIQUE OF A PSEUDOSCIENCE

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For nearly thirty years (all of my adult life), I have watched the increasingly negative view of naturalised plant and animal species take over environmental discourse, policy and action. Some of that negative view has been focused on the permaculture concept and its practitioners for eclectic use of hardy plant species. As early as 1978 a few indigenous revegetation activists were publicly criticising permaculture as a serious threat to the natural environment. At the time I found this situation reminiscent of sectarian splits between the various communist groups of my parents' era and refused to entertain the silly idea that permaculture was inimical to indigenous biodiversity conservation.

Over the next two decades the influence of the permaculture concept and movement has grown to extent that it is defined in the Macquarie dictionary and has spread to over 100 countries. However, over the same time, the status of indigenous revegetation and the concurrent war on so-called "environmental weeds" has gone from fringe idea to environmental orthodoxy and government policy.

In the last decade I have been reluctantly drawn into an (inevitably negative) critique of this orthodoxy and the science which lies behind it. In the process I have continued to research and study the evidence for the more positive view of naturalised plants and animals as a foundation for co-evolved systems able to provide both ecosystem services and renewable resources in a low energy future.

Inevitably the discussion and response to my recent book *Permaculture: Principles and Pathways Beyond Sustainability* has found me increasingly embroiled in this debate partly because of the apparent scarcity of cogent ecological critiques of this orthodoxy outside the permaculture movement. So it was with some excitement that I received a review copy of *Invasion Biology: Critique of A Pseudoscience* by David Theodoropoulos.

Theodoropoulos attempts a very large project in this book. He reviews a great number of scientific papers from the rapidly growing field of invasion biology, provides a psycho-social analysis of the rise of nativist ideology in recent decades and lays out an alternative framework for global biodiversity conservation within a broad environmental sustainability agenda. The author puts a very strong case that Invasion biology is a pseudoscience and that nativist ideology is a danger to environmental thinking and society at large as well as a direct threat to biodiversity conservation.

The evidence provided of beneficial effects of naturalised plants and animals is drawn from the author's own observations and a significant number of peer reviewed scientific papers supporting his case. However he makes even greater reference to scientific papers and reports, which draw conclusions of great and varied harm from human spread of plants animals and microorganisms. In other words, Theodoropoulos uses evidence from the Invasive biology literature to support his own conclusions.

In my more limited reading of both scientific papers and more popular presentations of the nativist ideology I have been struck by how much of the evidence that is typically used to describe ecological harm can in fact be equally interpreted to indicate ecological benefits. For example after reading Tim Low's polemical attacks on naturalising exotic species in Australia (*Feral Future*) and the movement of Australian species beyond their pre-European ranges (*The New Nature*), my reaction was that Tim Low had collected together a wonderful and diverse



range of examples to support the ecosynthesis hypothesis¹ for which I was very grateful even though I rejected most of his conclusions.

While Theodoropoulos' discussion and references are naturally focused on plants (his prime area of expertise and interest) he does consider many important cases of naturalised animals, micro-organisms and marine life forms. Similarly the American focus is complemented by many examples from across the globe including Australia.

I would have loved to hear more about some of the examples of ecosynthesis, which Theodoropoulos identifies (although he doesn't use that term). He does enlarge somewhat with a few case studies such as the ecological role and reaction to *Eucalyptus* (presumably *E. globulus*) in California. It is interesting that the prime evidence cited for the role of eucalypts in supporting colonies of the apparently iconic Monarch butterfly comes, not from some eucalypt enthusiast, but a Monarch enthusiast (Marriott, D 1997 Where to see the monarchs in California *Monarch News* p 6-9). Similarly, as Tim Low acknowledges in *The New Nature*, all the bird watchers know that sewerage effluent treatment ponds in Australia are some of the best places to see rare and diverse water bird populations including threatened migratory species.

Theodoropoulos's discussion of the demonisation and widespread destruction of *Eucalyptus* stands after the disastrous Californian fires of 1991 reminded me of similar attitudes to pines (from California) in Australia.. However his argument that eucalypts may have helped rather than hindered in the bush fires is not all that convincing (at least for Australian bushfire aware readers) because, in our experience, oaks including Californian species are reasonable fire retardants while eucalypts in general (and *E. globulus* in particular) are among the most combustible of trees in both indigenous and naturalised stands. I have previously heard the argument that fire prone litter accumulation under stands of *E. globulus* in California is much greater than in Australia because of a lack of soil microorganisms adapted to breaking down toxic *Eucalyptus* oil and phenols. This led me to speculate that a more complete eucalyptus symbiotic micro ecology would solve this problem and assist a wider range of native understorey species to thrive. The author's observations and cited references suggest (to me) that maybe the beneficial soil microbes native or exotic are already doing the job. The evidence that "understorey cover and abundance was correlated with moisture availability not tree density" accords with our own refutation of the commonly stated view that nothing grows under pine trees in Australia.

This and other case studies in the book provide an insight into the huge field of ecological research waiting to be done on the symbiotic and beneficial interactions between indigenous and naturalised species. While I would have liked more case study information, the author would no doubt have been criticised for being selective in his choice of evidence if he had focused on case studies about which there was detailed research and evidence.

In part 2 of the book, the author shows how the demonising of naturalised plants and animals has striking similarities to the methods used by racist, xenophobic and fascist groups to demonise other people. Further he refers to historical evidence that "cleansing the homeland of

¹ that "weedscares" of colonising indigenous, Australian and exotic plants and animals represent new ecosystems that will establish self replicating dynamic stability over remarkably short periods of time



foreign plants” was an element of the Nazi domestic propaganda and program. While I and many others who dare to point out the benefits of naturalised plants and animals have certainly felt the wrath of believers of the nativist orthodoxy, I remain cautious about Theodoropoulos’ claim that recognised sociological methods prove that nativism is part of the same pathology as these more universally condemned ideologies. Cautious perhaps because I know nothing of this field of study and am somewhat sceptical that any taxonomy can be used to classify psycho-social phenomena with much certainty. But I certainly support his suggestion that sociologists and psychologists (without strong emotional connection to either perspective) should study the Invasion biology literature and the behaviour of its followers. To indulge in a biological metaphor, maybe we can hope that nativism is a sign of how xenophobia is being transformed into less pernicious forms prior to its final extinction from the human psyche rather than the beginning of a new virulent strain.

Theodoropoulos notes the fact that nativist ideology has its strongest hold in the USA, Australia, New Zealand and South Africa, all countries where there is huge guilt in the dominant white culture about dispossession of indigenous peoples.

I remain doubtful that Theodoropoulos successfully proves Invasion biology is a pseudoscience, simply because I can see how the same methods can be and are frequently used to discredit many ideas outside of the scientific mainstream which may nevertheless contain some value and truth. However I think it is clear that if scientists outside of Invasion biology were to look closely at the literature they may be shocked by the lack of scientific rigor and definitions, circular reasoning and emotion laden conclusions. Theodoropoulos’ strong polemical style is reasonable in a book of this nature but at times it does tend to undermine his criticism of inappropriate emotive language in the Invasion biology literature.

Although the author acknowledges the very serious impact of nativism on the development of sustainable resources to provide for human needs, his prime focus and passion is global biodiversity conservation for its own sake. Theodoropoulos points out how land management informed by Invasion biology is now destroying threatened and endangered species which naturalise outside their original range. In this way Invasion biology has become a real threat to biodiversity conservation.

But Theodoropoulos goes beyond pointing out the contradictions to suggest an alternative framework for biodiversity conservation in the third part of the book. He gives evidence that spreading plants and, to some extent animals, are actually ways to conserve global biodiversity in a world of climate change and other human impacts. I believe the case Theodoropoulos presents is interesting and has at least as much validity as the orthodox notion that we corral indigenous species in their “original” habitat. However, the fact that the framework is almost an exact mirror opposite of the orthodox approach to conservation feels a little too simple. This alternative framework is the least well supported part of the book but this may reflect that *Invasion Biology: Critique of A Pseudoscience* is really three books in one, a huge effort to fill the vacuum of cogent ecological arguments in favour of human caused spread of plants and animals.

For many years I have felt the need to articulate a strong positive view of naturalised plants and animals to counter the extremes of nativism. Without an articulation of this case, a real debate



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about the best biodiversity conservation strategies is not possible. Theodoropoulos has done a great service to the conservation debate by providing a counter case to challenge the manifold errors being perpetrated on environmental thinking and action by Invasion biology. Any shortcomings of this book probably reflect the author's understanding of the urgent need for a real debate. In a rapidly changing world all ideas are works in progress, in need of constant review, addition and update. It will be interesting to see over the next few years, if as a result of this book, there is an increase in the trickle of research papers published in peer reviewed journals of ecology and conservation biology which do reflect a more positive view of naturalised plants and animals. It will be even more interesting if this triggers a full blown debate leading to a paradigm shift or if the orthodoxy of Invasion biology prevails without much more than murmurings in the official scientific ranks.

In my own discussion and teaching about this subject I have already been recommending this book as essential reading for anyone seriously interested in biodiversity conservation as an integral part of the permaculture agenda.

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