Slaughter of the singing sentients: measuring the morality of eating red meat.

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Key words: ethics, vegetarian, vegan, meat, wheat, agriculture, sentient, environment, sustainability, kangaroo, cattle, mice, singing, voiceless.

The ethics of eating red meat have been grilled recently by critics who question its consequences for environmental health and animal welfare, but if you want to minimise animal suffering and promote more sustainable agriculture, adopting a vegetarian diet might be the worst possible thing you could do.

Princeton University professor and oft-cited spokesperson for the animal liberation movement, Peter Singer, has advocated the view that if there is a range of ways of feeding ourselves, we should choose the way that causes the least unnecessary harm to animals (Singer & Mason, 2006). In general, this is interpreted by most animal rights advocates to mean that we should, if possible, eat plants rather than animals.

Further, given the biological inefficiencies of converting plants into animals (i.e., it takes somewhere between two to ten kilos of plant, depending on the type of plants involved, to produce one kilo of animal), and given the limited amount of productive land in the world, it would seem to some to make more sense to focus our culinary attentions on plants - which are further down on the food chain than animals - and thus, it is argued, tap into more energy per hectare for human consumption. The presumption is that this also means fewer sentient animals will be killed to feed the ravenous appetites of ever more humans.

For many vegetarians and vegans these are key reasons why they have decided not to eat red meat, if they eat any meat at all. But before scratching rangelands-produced red meat off the 'good to eat' list, let's put presumptions about these ethical and environmental issues to the test.

Published figures from CSIRO and other sources in relation to Australia suggest that producing wheat and other grains to service a vegetarian/vegan diet results in at least 25 times more sentient animals being killed per kilogram of useable protein, more environmental damage and a great deal more animal cruelty. How is this possible?

In terms of environmental damage, agriculture to produce wheat (for e.g. bread, pasta & noodles) and other plant foods such as rice and pulses (legumes including beans, peas, lentils etc.) originally requires clear-felling native vegetation. That act alone results in the deaths of thousands of Australian animals and plants per hectare. Since Europeans arrived on this continent more than half of Australia's unique native vegetation has been swept away (Lindenmayer 2007) in large part to increase production of monocultures of introduced species for human consumption.

Most of Australia's arable land is already in use, so if more Australians decide they want more of their nutritional needs to be met by plants, land used to produce such crops will need to be even more intensely farmed. That would require one or both of two things to happen. Either it would require a net increase in the use of fertilizers, herbicides, pesticides and other threats to biodiversity and environmental health, or, if existing laws are changed, more native vegetation would have to be cleared to provide more land for agricultural purposes; or some combination of both. It has been estimated (Anon. 1, 2010) that to replace Australia's current red meat production with food suitable for a vegetarian diet without further abusing land currently dedicated to this purpose, it would be necessary to clear an area the size of Victoria plus Tasmania to produce the additional amount of plant-based food required.

In contrast, the majority of cattle slaughtered in Australia feed solely on pasture (Meat & Livestock Australia 2011, data for August 2011; see also Newton 2011). This involves the rangelands which constitute about 70% of the continent. Here grazing is on primarily native ecosystems which retain far higher levels of native biodiversity than survive on croplands. The rangelands can't be used to produce crops or other water- and nutrient-hungry introduced plants. This means that production of meat here doesn't limit production of plant foods for human consumption, and is the only way humans can get substantial nutrients from 70% of the continent.

While it is true that in some cases rangelands have been substantially altered to increase the percentage of stock-friendly plants and it is true that grazing by these animals can cause significant damage such as soil loss and erosion, it doesn't result in the 'blitzkrieg' for those native ecosystems that is required to grow crops. The significant damage to environments associated with growing wheat and other human plant food is increasingly coming under the spotlight causing some well-known environmentalists to question their own preconceptions about which causes more environmental damage. British environmental advocate George Monbiot, for example, publically converted (Monbiot 2010) from being a vegan to an omnivore after reading Simon Fairlie's (2010) expose of the flaws in arguments that production of meat is environmentally unsustainable. A similarly strong case has been argued for omnivory by environmental activist Lierre Keith who documented the awesome damage to global environments involved in producing plant foods for human consumption (Keith 2009).

But of course neither Fairlie, being British, nor Keith, being American, explored the opportunity to meet protein needs using sustainably wild-harvested kangaroo meat (Cooney 2011, Cooney *et al.* 2012). These are native species that have been an integral part of Australia's natural environments for at least 25 million years so, unlike introduced meat animals, they don't damage native biodiversity. Further, as soft-footed, low methane-producing marsupials with relatively low water requirements (e.g., Goodyer 2011, Wilson & Edwards 2008a, 2008b), they are responsible for little if any environmental degradation. They also produce an exceptionally healthy, low-fat meat.

But returning to the main point, in terms of sentient lives lost for protein produced in Australia, 70% of the beef produced for human consumption comes from animals raised on grazing lands with very little or no grain supplements. At any one time, only 2% of Australia's national herd of cattle are being 'finished' by eating grains in feed lots; the other 98% are raised on and feeding on grass (Anon. 2, 2006). In fact, 66% of cattle slaughtered in Australia feed solely on pasture (MLA 2011; see above).

To produce protein from grazing beef, cattle are killed. One death delivers on average across Australia's grazing lands a carcass of about 288 kilograms (Anon. 3, 2011) containing approximately 68% boneless meat (Anon. 4, 2005) which, at 23% protein (Williams 2007), equals 45 kilograms of protein per animal killed. Put in terms of lives lost to produce food, this translates to 2.2 animals killed for each 100 kilograms of useable animal protein produced.

In contrast, protein production from wheat requires that pasture land be ploughed and planted with seed. Anyone who has sat on a tractor ploughing pasture to plant wheat knows that the predatory birds that follow you all day are not there because they have nothing better to do. The acts of ploughing and harvesting kill small mammals, snakes, lizards and other animals in vast numbers. As well, grain storage requires the poisoning of millions of mice every year.

However, the largest and best-researched cost in terms of loss of sentient lives related to grain production is the poisoning of mice during plague conditions, such as those currently being experienced across vast areas of Queensland, New South Wales and Victoria.

CSIRO data indicate that each area of grain production in eastern Australia is subject on average to a mouse plague every four years (Singleton *et al.* 2005, Caughley *et al.* 1998). Mouse numbers rise to at least 500-1000/ha or more during these plagues (Singleton *et al.* 2005). Poisons used to control these plagues kill at least 80% of the mice present (Caughley *et al.* 1998).

Hence, considering only the killing related to mouse plagues and taking the most conservative estimate, at least 100 mice are killed per hectare per year (500/4 X 0.8) to grow grain. At average yields of about 1.4 tonnes of wheat/ha (Anon. 5 2008), with 13% of the wheat representing useable protein (Anon. 6, 2006), this equates to at least 55 sentient animal lives lost to produce 100 kilograms of useable plant protein. That's 25 times more killings than to produce the same amount of rangelands beef.

While acknowledging that some of this grain is used to 'finish' a minority of beef cattle in feed lots (as well as providing food for dairy cattle, pigs, poultry and pet birds), if we were to factor in the number of additional sentient lives lost during planting and harvesting of grains as well as 'pest' control associated with grain storage facilities, it would still be the case that many more sentient lives are sacrificed to produce useable protein from grains than from rangelands cattle.

There is a further issue to consider here in relation to making decisions about the ethics of becoming or remaining a vegetarian or vegan. At its heart, that issue is the question of sentience – the capacity to feel, perceive or be conscious.

You might not consider, for example, that the billions of insects and spiders that die during grain production are sentient creatures – despite the fact that they demonstrably can perceive and respond to the world around them, and often with great subtlety. Likewise, you may even dismiss snakes and lizards as cold-blooded creatures incapable of sentience, regardless of their undoubted capacity to, say, form pair bonds or care for their young. But, apart from their body size, which has nothing to do with sentience, how do you distinguish the sentience of cows, kangaroos and mice—all mammals like us with large brains and complex behaviours? In fact, of these three, we are almost twice as closely related to mice and cows as we are to kangaroos. Mice, cows and humans are placental mammals while kangaroos are marsupials. These two very different groups of mammals diverged from each other more than 125 million years ago.

The fact is that the sentient cousins we are killing every year by the millions to produce the plant products we eat are far more sentient than we thought. Mice, it turns out, sing personalised love songs to each other. Holy & Guo (2005), using wide-spectrum sound recorders, discovered that they sing complex songs. But even more amazing, each singer's songs change over time becoming steadily more complex.

We didn't know any of this about mice because their singing is ultrasonic and, until Holy & Guo did their research, these sounds had never before been methodically recorded and analysed. When the recordings are played back at a frequency we can hear, the sounds are extraordinary—a bit like the twittering of birds but far more complex. Singing of any kind, let alone the innovative singing exhibited by mice, is a rare behaviour among mammals being previously only known to occur in whales, bats and humans. Other rodents, particularly some from South America, are now also thought to be able to sing.

From more recent studies (Hammerschmidt *et al.* 2009) it is clear that girl mice, like swooning human teenagers, can't resist trying to get close to a skilled crooner. Other researchers (Grimsley *et al.* 2011) are trying to determine

whether the innovations and increasing complexity in the songs are genetically programmed or the result of these mice actually learning to vary their songs as they become more mature.

As part of these studies, it's now also clear that baby mice left in the nest sing to their mothers—a kind of crying song to call them back to their dependent young. For every female killed by the poisons we administer, on average five to six totally dependent baby mice will, despite singing their hearts out to call their mothers back home, inevitably die of starvation, dehydration or predation.

In terms of animal welfare, cattle, kangaroos and other meat animals when harvested are killed instantly. Mice on the other hand die a slow and very painful death from poisons including zinc phosphide which produces lethal phosphine gas, and/or anticoagulants which cause death from internal bleeding. From a welfare point of view, compared with 60 other control methods reviewed by Sharp and Saunders (2010), the methods commonly used to kill mice are regarded to be among the least acceptable modes of killing. Although joeys are sometimes killed or left to fend for themselves, only 30% of kangaroos shot are females only some of which will have young. Further, the industry's code of practice says shooters should avoid shooting females with dependent young. In contrast, many times this number of dependent baby mice are left to die when we deliberately poison their mothers by the millions.

Thus, replacing red meat in our diets with cereal, pulse and other grain products will lead to many more sentient animal deaths, far greater animal suffering and significantly more environmental degradation. For those intent on making ethical decisions about their foods of choice, it is clear that protein obtained from grazing livestock costs far fewer lives per kilogram produced than grain cropping and would, therefore, appear to be a much more humane, ethical and environmentally-friendly dietary option.

One could argue that grain-growing systems in Australia could be improved over time to become more animal welfare- and environment-friendly. But the reality of the here and now is that because our urban population must be fed, the wheat they consume costs more sentient lives per kilogram and does far more environmental damage than the beef, sheep and kangaroo they consume.

So, what does a hungry human do? Our teeth and digestive system are adapted for omnivory and we have evolved from a long line of omnivores (occasional side experiments in herbivory such as the big-toothed, flat-headed African 'Nutcracker Man', *Paranthropus boisei*, long ago went extinct). But we are now challenged to think about philosophical issues. To the extent that we eat red meat from grazing animals, we worry about the ethics involved in killing them if, as Peter Singer urges, there are other more humane ways of obtaining adequate nutrients.

Yet if we consider our use of grains and pulse foods to produce the kilograms of food we require, we end up being responsible for destruction of native ecosystems, significant threats to native species and at least 25 times more deaths of sentient animals per kilogram of food. To add to the challenge, we now also know that most of these same sentient animals we sacrifice to ensure we get to eat our grains sing love songs to each other—until we mass-slaughter them inhumanely by the millions.

An overview (Anon. 7, 2011) of environmental activist Lierre Keith's *The Vegetarian Myth* (Keith 2009) concludes: "The truth is that agriculture is a relentless assault against the planet, and more of the same won't save us. In service to annual grains, humans have devastated prairies and forests, driven countless species extinct, altered the climate, and destroyed the topsoil—the basis of life itself. Keith argues that if we are to save this planet, our food must be an act of profound and abiding repair: it must come from inside living communities, not be imposed across them."

Former Justice of the High Court, the Hon. Michael Kirby, noted that "In our shared sentience, human beings are intimately connected with other animals. Endowed with reason and speech, we are uniquely empowered to make ethical decisions and to unite for social change on behalf of others that have no voice. Exploited animals cannot protest about their treatment or demand a better life. They are entirely at our mercy. So every decision of animal welfare, whether in Parliament or the supermarket, presents us with a profound test of moral character" (Kirby 2011). It can be argued that we now know the mice that are being slaughtered to produce our grains do have a voice—love songs in fact but we haven't been listening.

Hence the challenge for the ethical eater is to choose the diet that causes the least deaths of sentient beings as well as the least environmental damage. On balance, if one chooses a vegan or vegetarian lifestyle, perhaps it should be for other than ethical or environmental reasons because, in terms of the number of sentient lives sacrificed and the extent of environmental damage, there would appear to be far more ethical support for an omnivorous diet that includes rangeland-grown red meat and even more support for one that includes sustainably wild-harvested kangaroo.

Acknowledgments

Thanks to many colleagues including Rosie Cooney, Peter Ampt, Grahame Webb, Bob Beale, Gordon Grigg, John Kelly, Suzanne Hand, Greg Miles, Alex Baumber, George Wilson, Peter Banks, Michael Cermak, Barry Cohen, Dan Lunney, Ernie Lundelius Jr and others who provided helpful comments. Thanks as well to anonymous referees for suggesting exploration of relevant additional issues. The drawing was kindly provided by Nikkita Archer who is awed by the intelligence of mice.

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