



SENTIENCE  
POLITICS

# Reducing suffering among invertebrates such as insects

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## Policy paper

Invertebrates such as insects, spiders, worms and snails may very well feel pain, and we should therefore take actions to reduce their potential suffering. The large number of such invertebrate individuals and the severity of the harms that they endure mean that their potential suffering would be an ethical disaster. Sentience Politics advocates that actions should be taken in several areas: Invertebrates should, when possible, not be used in research and teaching, and should not be used as food and feed or in the production of silk, shellac, etc. If invertebrates are to be used in these areas, we advocate actions to at least reduce their suffering. In addition, attempts to prevent invertebrates from damaging crops should use the least painful methods, and research should be done to develop methods that cause less suffering. Finally, policy analysis should take into account the resulting amounts of suffering among all invertebrates, whether it is caused by humans or not.

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# Reducing suffering among invertebrates such as insects

## Summary

“I am sure that insects can feel pain” said Vincent Wigglesworth, an entomologist and professor of biology.[1, p. 9] Several scientists and philosophers argue that because invertebrates such as insects, spiders, worms and snails may very well be able to feel pain or suffering, our moral concern should be extended to such beings. Different kinds of evidence have been used to infer whether they can feel pain, including facts about their nervous systems, observations of behavior that indicate learning to avoid harm, and evolutionary arguments about whether feelings of pain would give a fitness advantage. Despite a growing number of studies on invertebrate pain, the evidence is not conclusive, which raises the political and ethical question of what to do under this uncertainty. The uncertainty supports that we should care about the potential suffering of invertebrates such as insects, and take and avoid at least some actions to reduce their potential suffering in case they can suffer. Potential invertebrate suffering is worth paying attention to, even if it is unlikely that they can suffer, primarily because of the large number of individuals involved and the severity of the harms that they endure. For instance, thousands of insects can be killed by boiling to produce one piece of silk clothing. This means that if such invertebrates can suffer substantially, their suffering would be a large-scale ethical disaster. In addition, the fact that invertebrates are so neglected should appeal to effective altruists and others looking to have an outsized impact.

Humans harm invertebrates such as insects in many ways, but actions can be taken in at least four areas to reduce the potential suffering that we cause: invertebrates used (1) in research and teaching, (2) as food and feed, and (3) in the production of silk, shellac, etc. The fourth area is invertebrates harmed by humans in attempts to prevent them from damaging crops. We advocate that, when possible, no invertebrates should be used in research and teaching. In addition, no invertebrates should be used as food and feed, or in the production of silk, shellac, etc. If invertebrates are to be used in these areas, we advocate actions to at least reduce their suffering. For example, as a

number of scientists have argued, researchers could be required to induce insensibility to pain and suffering before doing potentially painful research on invertebrates. Similarly, welfare regulations should exist for industries that use insects to produce, for instance, silk and food. When preventing invertebrates from harming crops, the least painful methods should be used, and research should be funded and done to develop methods that cause less suffering.

Invertebrates also suffer in the wild, harmed not by humans but by natural causes such as diseases. We advocate that we should care about suffering whether it is caused by humans or not, and that analysis of the effects of policies should take into account the resulting amounts of suffering among all invertebrates.

## Introduction

Several scientists and philosophers argue that invertebrates such as insects, spiders, worms and snails may very well be able to feel pain or suffering, and that we should take various actions in case this possibility is true.[2][3][4][5] Most scientists argue for modest actions, such as welfare regulations requiring that invertebrates be made insensitive to pain and suffering before potentially painful research.[1][6][7] Several authors have raised the issue of animal welfare when insects are used as food and feed.[8][9][10][11] Some authors argue for a broader range of actions, including that animal organisations should pay more attention to such ‘lower’ organisms[12], or that we should intervene in nature to reduce suffering among wild animals, including insects[13]. Another author advocates the conversion of grass lawns to artificial materials to reduce invertebrate suffering, as well as reduced driving and reduced walking on grass.[14][15] This paper focuses on the more mainstream actions that we can take to reduce invertebrate suffering, such as not eating insects, avoiding products that use insects (such as silk), as well as introducing welfare regulations and selecting the least painful methods to prevent invertebrates from damaging crops. The paper also surveys the state of knowledge about whether invertebrates such as insects can feel pain

and discusses what to do in light of the inconclusive evidence. We use the terms ‘pain’ and ‘suffering’ roughly interchangeably. The research on invertebrate pain that we refer to generally focuses on whether such beings can experience or feel pain. In other words, whether there is something that it is like to be an invertebrate in pain, or whether the mental states are unpleasant or affective and aversive. Such mental states can be considered to be a form of suffering.

## Invertebrates such as insects may very well be able to feel pain

A common thought is that if a being can feel pain or suffer substantially then we should care morally about that being. So can invertebrates such as insects, spiders, worms and snails suffer or feel pain? This question has at least two sides: The first is what the scientific evidence says, and the second is considerations in philosophy of mind, ethics, and political philosophy. This section first briefly surveys the status of the scientific knowledge about whether invertebrates such as insects can feel pain, and then turns to the philosophical considerations.<sup>1</sup>

### Kinds of evidence about invertebrates’ ability to feel pain

There are at least six kinds of scientific evidence that can be used to determine which nonhuman animals can feel pain.<sup>2</sup> First, the brain structure and characteristics of the nervous system. For example, the claim that a being can feel pain is supported by the existence of components of a pain system such as nociceptors (neurons dedicated to detecting noxious stimuli), pathways, and ability to process such information. The existence of nociceptors has been considered to support that a being can feel pain, although it has been said to be neither necessary nor sufficient for feelings of pain.<sup>3</sup> Related is the presence of natural opioids and other natural analgesics. Second, physiological indicators, including stress-related responses to potentially painful stimuli such as heart rate, body temperature, and cortisol levels. Third, behavioral observations such as grooming an injured body part, trading off one motivation against another, changing behavior when external

analgesics are used, and learning to avoid aversive stimuli. The idea is that when there is apparent learning to avoid aversive stimuli, it may indicate that the being has experienced a motivational affective state that she remembers that makes her avoid harmful situations in the future.

The fourth kind of evidence is evolutionary arguments. One type of evolutionary argument is to point to evolutionary continuity; that is, a historical continuity where features of related species have evolved from common ancestors. The argument is that phylogenetic proximity supports that the beings probably possess similar mental features. Another kind of evolutionary argument that is used to infer, for example, conscious feelings of pain, is the idea that such feelings have an evolutionary adaptive function. Being able to sense and react to harmful stimuli is clearly an adaptive advantage in many cases; the challenge with this type of evolutionary argument is to determine whether and when feelings of pain, or other morally relevant mental states, are needed for the adaptive advantage, as opposed to other mechanisms that are not (as) morally relevant.

Fifth, evidence of cognitive ability is an evolution-related consideration. The presence of certain cognitive abilities may indicate that an animal has evolutionary use for feelings of pain. For example, if an animal has only rudimentary cognitive abilities, she may not notice similarities between harmful situations and so will not learn to avoid them in the future. Advanced cognitive abilities may also suggest that the being’s brain or mental functioning is more complex and “sophisticated” than one might think, which may suggest that the being’s subjective mental life is also more complex and “rich” than one might think. Sixth, behavioural repertoire is a kind of evidence similar to cognitive ability. A wide behavioural repertoire may suggest a more sophisticated subjective mental life.

### Studies on invertebrate pain

Evidence in favour of invertebrates such as insects feeling pain includes that parts of a potential pain system have been found in them. Nociceptors have been found in a number of invertebrates such as fruit flies, sea anemones, segmented worms, and snails.<sup>[17, p. 177]</sup> But the mere existence of nociceptors or other relevant receptors is not

<sup>1</sup>This section draws on my master’s thesis.<sup>[16]</sup>

<sup>2</sup>This categorization draws on works by Elwood, Animal Ethics, and Allen, although it does not strictly follow any of them.<sup>[17][18][19]</sup>

<sup>3</sup>Sneddon and colleagues [20, p. 204] lists nociceptors as one of the criteria for pain perception. According to Elwood [17, p. 177], “Because pain experience associated with tissue damage typically depends on nociception, a lack of nociceptors would suggest that the animal was insensitive to noxious stimuli and could not experience pain.... However ... the presence of nociceptors per se does not demonstrate that pain is experienced.” But Broom [21, p. 148] notes, “Vertebrate animals utilise both specialist nociceptors and normal receptors to gain information about actual or potential tissue damage. Hence, whilst the presence of specialist nociceptors is evidence for the presence of part of a pain system, their absence does not mean that no pain sensation can occur.”

enough to infer feelings of pain; the information registered by the nociceptors or other relevant receptors would plausibly need to be transmitted and processed (or analysed in the brain) for there to be feelings of pain.<sup>4</sup> Interestingly, such transmission and some such analysis has also been found in invertebrates.[21, p. 148] Sneddon and colleagues corroborate this when they say that “there is evidence that nociceptive information reaches higher learning centres in the insect brain,” referring to studies of fruit flies. They add, however, that “how nociceptive information is processed within the insect central nervous system remains almost entirely unknown,”[20, p. 208] which indicates that we know little about whether and to what extent there is an experience of pain.

An argument against pain in invertebrates such as insects is that they lack the properties of neural tissue that are required to feel pain.<sup>5</sup> A reply is that similar functions can arise in different brain structures.[17] Elwood takes the example that crustaceans and cephalopods can see despite having a different central nervous system and receptors than humans.[17, p. 177]

Evidence in favor of an ability to feel pain comes from studies on opioids. Opioids have a pain relieving effect in humans, and studies have been conducted on whether they have a similar effect in insects. There is some “evidence that opioids works as analgesics in cockroaches,” as morphine made cockroaches stay longer under a hot camera.[20, p. 204][23] Less aversion to heat when given analgesics has also been found in fruit flies.[17, p. 178][24]

Further evidence from behavior includes apparent learning to avoid harm. The idea is that such learning that lasts over time suggests that the being may experience and remember feelings, which help avoid future similar harms. Related findings from studies include that fruit flies learned to avoid an odor that preceded or accompanied an electric shock.[25][26] Similar findings have been made for bees and locusts.<sup>6</sup> It is not clear though whether such learning requires feelings of pain. For example, it has been said that “many withdrawal responses, and even some forms of learning about noxious stimuli, can be accomplished by spinal cords without mediation by higher brain systems,”[29, p. 352] which suggests that the this evidence from learning is inconclusive.<sup>7</sup>

A behavioral observation that may cast doubts on in-

vertebrate pain is that several species continue to walk with an injured limb or to eat while being eaten.[21, p. 149][20, p. 208] But this could be compatible with feelings of pain, because “there are parallels with mammals that do not show active responses when predators injure them even when physiological responses characteristic of pain are occurring.”[21, p. 149]

There is a range of evidence of cognitive abilities in invertebrates such as insects. Honeybees are famous for their communication and navigation skills, and further evidence of their cognitive abilities include that “honeybees can learn a complex learning task in which they have to select from previously unseen shapes on the basis of whether they are symmetrical or not.”[17, p. 181] In addition, hunting spiders appear to plan routes that at first take them away from their prey.[17, p. 181]

Finally, the behavioural repertoire of invertebrates such as insects sometimes surpass that of mammals such as moose and monkeys. The number of different distinct behaviors have been counted in several dozen species. What counts as one distinct behaviour? For example, among honeybees, one behavior is “corpse removal: removal of dead bees from the hive,” and another example of a behaviour is “biting an intruder: intruders are sometimes not stung but bitten.”[30, p. 998] The number of different behaviors in different insect species range at least from 15 to 59, while “amongst mammals, North American moose were listed with 22, De Brazza monkeys with 44 and bottlenose dolphins [with] 123.”[30, p. 997] Honeybee workers are the insects with 59 behaviors, which surpasses at least that of moose and De Brazza monkeys.

### Philosophical considerations

In addition to the scientific evidence just discussed, there are related philosophical considerations.[31][32][33][34] For instance, this scientific literature on invertebrate pain focuses on whether or not invertebrates can feel pain. A related philosophical question is whether the relevant kind of consciousness is either on or off, like a light bulb, or whether it comes in degrees. A related question is: if invertebrates such as insects can feel pain or suffer, to what degree can they do that? That is, if a bee can feel pain, how severe is that pain compared to pain in other species such as frogs, deer and humans? We know little about how

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<sup>4</sup>The combination of receptors, transmission and processing (analysis) might still not be sufficient to infer feelings of pain though.

<sup>5</sup>Key[22] proposes that certain properties of neural tissue are required to feel pain or experience affective states and argues that fish do not feel pain. Presumably, Key would say the same about invertebrates such as insects.

<sup>6</sup>Honeybees can learn to extend their sting in response to an odor paired with electric shock.[27] Locusts can learn to avoid odors associated with the consequences of eating toxic food.[28]

<sup>7</sup>Chittka and Niven present an overview of insect learning processes.[30]



severely non-human animals can suffer compared to one another and compared to humans, but at least one professor who works on insects believes that bodily damage is as painful for insects as for humans.<sup>8</sup> The philosophical questions are at least partly moral and political questions; for instance, which mental processes should we care about? This makes the question of invertebrate pain into a partly moral and political question: do invertebrates such as insects have the kind of mental processes that we should care about, and how much should we care about them?

### Conclusions about invertebrates' ability to feel pain

There is still little information about invertebrates' ability to feel pain from the perspective of the ethical and political question about whether and how much we should care about invertebrates and what we should do. We conclude from the literature that the best available evidence supports that there is uncertainty, but that there is also an ethically and politically important possibility that invertebrates such as insects can feel pain or suffer substantially. The main question becomes, which is the topic of the next section, what to do under this uncertainty about whether invertebrates can feel pain.

## Vast amounts of potential suffering suggest that we should care about invertebrates

The case for concern for invertebrates gets its force from the fact that there are so many individual invertebrates that might be suffering. For example, for humans who eat insects, each meal can contain many individuals, and vast numbers of insects are killed on crop fields, potentially very painfully. So even if it was unlikely that invertebrates such as insects can suffer, the number of them makes the issue important because even a low likelihood of a bad outcome is important when the risk in question would be a large scale disaster.<sup>9</sup>

Similar arguments have been made to argue for welfare regulations in the fishing industry: even though we may be less confident that fish can suffer compared to that pigs

can suffer, and even if we believed that the likelihood that fish can suffer is low, there are so many fish who are killed without being made insensible to pain and suffering, that it would be a very bad outcome if they can suffer.<sup>10</sup> The case for invertebrates such as insects is similar, with the difference being that we might be less confident that such invertebrates can suffer than that fish can suffer, but this greater uncertainty is on the other hand counterbalanced by the fact that there are so many more invertebrates at stake (even many more than the large number of fish).

Concern for invertebrates can also be argued for from different grounds that do not rely on the number of invertebrate individuals. For example, animal rights advocates should take into account that invertebrates such as insects may qualify as having rights. One could also argue on grounds such as virtue ethics or virtue consequentialism<sup>11</sup> that a decent person pays attention to and is cautious regarding possible suffering among invertebrates such as insects.<sup>[16]</sup>

A consideration in favor of taking some actions out of concern for invertebrates such as insects is that they are so neglected.<sup>12</sup> This means that an individual's or a group's efforts to reduce invertebrate suffering can have a high marginal impact, partly because those actions are otherwise unlikely to be taken by someone else (others are unlikely to pick up the slack), and partly because the most cost-effective actions have not already been taken.

In conclusion, the challenging question is not whether we should take (or avoid) some actions out of concern for invertebrates such as insects, since the answer to that question is clearly yes. As a clear case, we should not harm invertebrates for our sheer enjoyment. A slightly stronger and still very plausible claim is that we should be willing to bear trivial costs to guard against the possibility that invertebrates such as insects may suffer substantially. The challenging question is what we ought to do more exactly, and how large costs we should be willing to bear.<sup>13</sup> The most modest actions are those that are win-win in the relevant respects; for example, Wigglesworth argued that scientists should narcotize insects used in research, and added that "most operations on insects are actually facilitated if the insect is narcotized."<sup>[1, p. 9]</sup> The next section outlines the

<sup>8</sup>The person preferred to be anonymous.

<sup>9</sup>Several works point to the large number of invertebrates as a consideration in favor of their moral importance.<sup>[2][13][12][35]</sup>

<sup>10</sup>Lund and colleagues present a similar argument.<sup>[36]</sup>

<sup>11</sup>Virtue consequentialism says roughly that virtues are character traits that systematically produce good outcomes.<sup>[37]</sup> That is, virtue consequentialism says roughly that we should strive to have character traits that systematically bring about good outcomes and avoid bad outcomes.

<sup>12</sup>Neglectedness is commonly used as a criteria when selecting areas to work on in order to maximize one's positive impact. See for example <http://www.openphilanthropy.org/focus>, which says, "We've sought focus areas that are strong on some combination of the following criteria: ... Neglectedness: All else equal, we prefer causes that receive less attention from other actors, particularly other major philanthropists."

<sup>13</sup>What Munthe calls "the price of precaution."<sup>[38]</sup>



actions that Sentience Politics believes should be taken out of concern for invertebrates such as insects.

## Actions should be taken in several areas where invertebrates are harmed

Humans harm invertebrates such as insects in many ways, but actions can be taken in at least four areas to reduce the potential suffering that we cause: invertebrates used (1) in research and teaching, (2) as food and feed, (3) and in the production of silk, shellac, and other products. The fourth area is invertebrates harmed by humans in attempts to prevent them from damaging crops. We advocate that, when possible, no invertebrates should be used in research and teaching. In addition, no invertebrates should be used as food and feed, or in the production of silk, shellac, etc. If invertebrates are to be used in these areas, or until they have stopped being used, we advocate actions to at least reduce their suffering. For example, as a number of scientists have argued, researchers could be required to induce insensibility to pain and suffering before doing potentially painful research on invertebrates.<sup>[1, 6]</sup> Welfare regulations should exist for industries that use insects to produce, for instance, food and silk. When preventing invertebrates from damaging crops, the least painful methods should be used, and research should be done to develop methods that cause less suffering. A fifth area is suffering among wild invertebrates that is not caused by humans. We advocate that we should care about suffering whether it is caused by humans or not, and that analysis of the effects of policies should take into account the resulting amounts of suffering among all invertebrates.

### Production of silk, shellac, etc.

Humans harm insects in the production of silk, shellac, carmine, and other products. In the silk industry, silk worms are often killed by boiling. Roughly 10,000 worms are needed to produce one sari dress.<sup>[39]</sup> Shellac comes from lac bugs and is used as wood finish, edible glaze, and for other purposes. Carmine is a colorant made from crushed insects. It is used in foods, beverages, cosmetics, and other products.<sup>[40]</sup> The insects are killed by crushing during harvest, hot water, sunlight, steam, or baking in oven.<sup>[41]</sup> One author raises the sensible ethical point that “there’s something very concerning about the fact that we

think nothing of crushing insects by the billions every year, for no reason other than that we like certain things to look a certain way.”<sup>[40]</sup> We advocate avoiding products such as silk, shellac, and carmine, and instead using synthetic alternatives. We also advocate that welfare regulations and incentives should be introduced in existing such industries.

### Insects as food and feed

This paper focuses on the use of insects as food and feed (feed for animals in the animal industry) in Western countries. We recommend not eating insects and instead choosing a plant-based diet. The following are the three main reasons to choose a plant-based diet over eating insects: (1) Comparatively many individual insects are required per meal. (2) Insects are killed in ways that could plausibly cause them much suffering (if they can suffer), such as through boiling, roasting, freeze-drying, or sun-drying.<sup>[42, pp. 25, 107]</sup> (3) Even if the insects are raised in the best realistic way, their short lives and high mortality rates mean that there is much death and presumably associated suffering regardless of living conditions and slaughter methods.<sup>14</sup>

We advise against using insects as feed for animals in the animal industry. First, we want there to be no animal industry. Second, while there is an animal industry, it is a very risky choice to use insects as feed. The reasons are the same as for human consumption of insects: so many insects are needed that it would be a terrible disaster if they can suffer.

### Preventing invertebrates from damaging crops

Preventing invertebrates, for example insects, from damaging crops can be done in a number of ways, called ‘insect control methods.’ Such methods include the use of insecticides, but there are also other methods. For example, one entomologist estimates that cultural control is the most humane method, which means that one prevents insects from occupying a resource through practices such as crop rotation, mixing crops, and sanitation. Methods that appear to cause more suffering (if insects can suffer) include the spread of predators, pathogens or chemicals that cause dysfunctionality, since they appear to lead to slow deaths.<sup>15</sup> There should be incentives or regulations in place so that the least painful feasible control method is selected. In addition, research should be encouraged and

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<sup>14</sup>These three points are made by Tomasik.<sup>[10]</sup>

<sup>15</sup>For entomologist John Lockwood’s tentative rank order for the humaneness of insect-control methods and Brian Tomasik’s comments, see [http://reducing-suffering.org/humane-insecticides/#Jeff\\_Lockwoods\\_speculations\\_on\\_relative\\_painfulness](http://reducing-suffering.org/humane-insecticides/#Jeff_Lockwoods_speculations_on_relative_painfulness).

funded to develop control methods that cause as little suffering as possible.

### Invertebrates used in research and teaching

The most common action argued for by scientists out of concern for invertebrates is that researchers should be required to induce insensibility to pain and suffering before doing potentially painful research on invertebrates. Although this would be an improvement over current practices, it would be better, when possible, to avoid doing research on whole beings and instead shift to research on, for example, isolated tissue samples. Similarly for invertebrates used in teaching, the goal should be to avoid using them and at least to reduce their suffering if they are to be used.

### Wild invertebrates

Humans harm an enormous number of invertebrates such as insects, but most invertebrates live in the wild and are harmed by non-human causes such as predation, starvation, and disease. One estimate says that there are  $10^{18}$  insects alive at any given time; that is, about 100 million insects for each human on Earth.[43, p. 5] We should care about suffering among invertebrates whether it is caused by humans or not, similarly to how we care about human victims of diseases and natural disasters even though such human suffering is also natural. In addition, it is common to believe that it is admirable to help wild animals that are stuck or injured despite that such help involves interfering with nature. Actions that aim, at least partly, to benefit wild animals (including wild invertebrates) need to be well thought through. Analysis of the effects of policies should take into account that the lives of wild invertebrates are short and harsh, and it is far from clear that it is in the interest of future generations of wild invertebrates to come into existence.<sup>16</sup> In light of all this, policy analysis should consider how policies affect the amounts of suffering in wild invertebrate populations.

## Objections and replies

This section brings up five possible objections to what we advocate, and replies to them.

### Objection 1: It is intuitively absurd or silly that we should care about invertebrates such as insects.

**Reply:** First, a number of reputable scientists argue for concern for invertebrates such as insects and for taking precautionary actions because of the possibility that they may feel pain.<sup>17</sup> In addition, Albert Schweitzer, winner of the Nobel Peace Prize 1952, said that the truly ethical person stops to save an insect that has fallen into a puddle.[47] Christof Koch, the Chief Scientific Officer of the Allen Institute for Brain Science, tries to avoid stepping on insects.[48] Second, we should be skeptical of our intuitions about what is morally absurd or silly.[49] People have through history been oblivious to the moral catastrophes of their times, which we now in hindsight recognize as terrible wrongdoings. It would be naive to believe that our generation is so special that we have now reached final moral insight and are no longer making severe moral mistakes.

### Objection 2: The likelihood that invertebrates such as insects can feel pain or suffer is negligible.

**Reply:** In risk assessments, one should not only look at the likelihood side. Even a low likelihood can matter much if the danger or risk is severe enough. Examples include that a tiny risk of nuclear power plant failure is widely recognized as worth paying attention to. In the case of invertebrates, the severity of the danger or risk comes mainly from that there are so many individual invertebrates that are harmed, and from the severe harms that they endure.

### Objection 3: Insects cannot matter morally because that would make morality too demanding. We would not even be allowed to walk around anymore. We would have to live like Jain monks who sweep the street in front of them to avoid stepping on animals such as insects.

**Reply:** First, if one wants to reduce insect suffering, it is better to focus on the areas where the largest numbers of invertebrates potentially suffer, such as invertebrates used as food and feed, harmed by insect control methods on crop fields, or suffering in the wild. It can be permissible to harm some invertebrates for the greater good of reducing suffering among more of them (or among other beings). Second, the question of the moral importance and moral concern for invertebrates can be separated from that of the demandingness of morality. One can believe that morality is or is not demanding whether or not invertebrates such as insects have moral status.<sup>18</sup>

<sup>16</sup>For texts on the well-being of wild animals, including wild invertebrates, see works by Ng, Tomasik, Horta, and Knutsson.[44, 35, 45, 46]

<sup>17</sup>See the works cited in the introduction.

<sup>18</sup>The distinction between the demandingness of morality and whether invertebrates such as insects should be included in the moral scope may hold to different extents for different moralities. For example, an optimizing consequentialism is arguably maximally demanding regardless of invertebrates. On the other hand, deontological rules that prohibits killing would seemingly become very demanding if they also apply to insects.

**Objection 4: Even if invertebrates such as insects feel pain and suffer, I still do not care because I do not empathize with them, they cause problems or they are annoying or disgusting.**

**Reply:** Ultimately, what matters most is the suffering among individuals. First, that humans sometimes have difficulties empathizing with each other, including with those with different ethnicities and foreigners, is not a reason to disregard those humans. Relatedly, if a human harms or neglects the harm of another human, with the justification that she didn't empathize with the other human, or that the other human was annoying or disgusting, that would not be considered a valid justification. The same reasoning applies to non-humans including insects; that we may have difficulties empathizing is not a justification for harming or neglecting harm. Second, what humans empathize with or find disgusting is not a reliable guide for moral behavior. Humans might like more and empathize more with an animal with a furry tail (such as a squirrel) than an animal with a tail without fur (such as a rat). But the furriness of someone's tail is of course morally irrelevant. Similarly, one reason humans might fail to empathize with insects is that they are small and look different from us; but it would be implausible to claim that size itself or appearance matters for how much we should

care about someone. Obviously, a big good-looking human does not deserve more moral concern than an ugly small human. Third, regarding invertebrates such as insects causing problems ("pests"): this paper does not say that one is never allowed to kill invertebrates. For example, it is arguably permissible to kill insects that carry diseases in order to protect oneself. Neither do we advocate that insects should never be killed on crop fields; we argue that the least painful insect control methods should be used and developed.

**Objection 5: Isn't it environment-friendly to eat insects?**

**Reply:** First, it does not seem clear that eating insects is more environment-friendly than a plant-based diet. Eating insects is commonly presented as an environment-friendly alternative to eating cows, pigs, and similar animals,[50][42] but we are not aware of any research that shows that eating insects is better for the environment than eating plants. Second, concern for the environment would need to be weighed against the potential severe suffering among enormous numbers of insects. We believe that the suffering of individuals matters more. For these reasons, we advise against eating insects out of concern for the environment; instead, we recommend a plant-based diet.<sup>19</sup>

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<sup>19</sup>This paper draws on related work by Brian Tomasik, which can be found at <http://reducing-suffering.org>.



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Sentience Politics is an anti-speciesist political think-tank. We advocate a society which grants moral consideration to all sentient beings, regardless of their species membership. Our activities include political initiatives and the composition of scientific position papers, in order to encourage rational discussion on important issues.

Our philosophy is based on effective altruism: How can we use our limited resources (time and money) to reduce as much suffering as possible? Sentience Politics uses rationality and empirical science in order to identify and implement the most effective strategies. We also use this approach in order to select and prioritize the causes that we work on.

Sentience Politics was founded as a project of the Effective Altruism Foundation (EAF) in 2013. EAF is an independent think tank and project overseer founded at the intersection of science and ethics by a team of young, interdisciplinary individuals. It is a part of the fast-growing Effective Altruism movement, and aims to improve the lives of as many sentient beings as extensively as possible. In order to achieve this goal with limited resources, EAF uses rational thinking and evidence-based approaches.

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