Insect ethics and field entomology

A deep dive into practices of field entomology in the context of insect sentience and declines

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Degree project/Independent project • 30 credits
Swedish University of Agricultural Sciences, SLU
Faculty of Natural Resources and Agricultural Sciences
Environmental Communication and Management - Master's Programme
Uppsala 2025

Insect ethics and field entomology. A deep dive into practices of field entomology in the context of insect sentience and declines

Ethiek voor insecten en veld entomologie. Een duik in praktijken binnen de veld entomologie in de context van gevoelens en achteruitgang van insecten

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Credits:	30 credits
Level:	Second cycle, A2E
Course title:	Master thesis in Environmental science, A2E
Course code:	EX0897
Programme/education:	Environmental Communication and Management - Master's Programme
Course coordinating dept:	Department of Aquatic Sciences and Assessment
Place of publication:	Uppsala
Year of publication:	2025
Cover picture:	Dungfly. Waza_67 on: pixabay. Image free for use under the Pixabay content license.
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Online publication:	https://stud.epsilon.slu.se
Keywords:	Entomology, insect ethics, insect declines, social practice theory, environmental communication, biodiversity declines

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Abstract

As severe insect declines receive increasing attention from academic and societal corners alike, a call for more research has emerged. Simultaneously, indications of insect declines and insect sentience have given rise to conversations surrounding the topic of insect ethics. Knowledge gaps occur in the stance of the entomological community in these conversations and in the influence these conversations have on practices of field entomology, and by extension on ethical treatment of insects.

To explore this knowledge gap, this study analyses how practices of field entomology interact with conversations on insect ethics. The research problem is approached and analysed through elemental social practice theory. This framework allows for a relatively detailed understanding about how insect ethics may be incorporated in practices of field entomology already, where avenues for change based on insect ethics may be identified and which obstacles to change occur.

The analysis suggests that some changes in practices of field entomology are already occurring through interactions with conversations on insect ethics. These mostly relate to active decisions about research goals, designs and materials to prevent insects being killed or suffering unnecessarily. However, such decision-making processes were found to differ per entomologist, which suggests potential avenues for changes in the form of more communication among entomologists and/or more institutionalization of guidelines for decision-making. The analysis also suggests two potential obstacles towards change in practices of field entomology, namely that when costs are involved, money may outweigh ethics and that certain confrontations with insect ethics, especially from the social sphere, are perceived as frustrating rather than constructive. Based on these findings, this study makes several suggestions to researchers, entomologists and those involved with conversations on insect ethics alike. It argues that implementation of changes to practices of field entomology as well as conversations on insect ethics based on the understandings provided by this study could lead to insects being thought about and treated differently, and ultimately to less insects being harmed.

Keywords: entomology, insect ethics, insect declines, social practice theory, environmental communication, biodiversity declines

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SPT	Social Practice Theory
EC	Environmental Communication

1. Introduction

In 2017, a shock wave was sent through the world when a study revealed that the biomass of flying insects in several German nature reserves had declined by a staggering 76% in 27 years (Hallman et al., 2017). In response, academics, politicians and individuals started calling out for more research about insects, their functions and the extent and origins of declines, suggested to be achieved through increased sampling and describing of insects. Throughout this thesis, those activities and their purposes are referred to as 'practices of field entomology'. This call for increased research on insects has been met with ethical critiques, as practices of field entomology often involve killing insects. These mainly relate to ecological risks to insect populations (Lövei et al., 2021), neglecting possibilities of insect sentience (Fischer & Larson, 2019), setting a bad example (Drinkwater & Robinson, 2019) and killing living beings in general (Barrett & Fischer, 2024). In turn, such arguments are subject to critiques (i.e. Turin, n.d. in: Lövei et al., 2023; Monso & Osuna-Mascaro, 2020). This thesis refers to arguments in favour of insect ethics in field entomology and the discussions surrounding them as 'conversations on insect ethics'. This term was chosen because so far, the idea of insect ethics is hardly institutionalized, at least in Western societies, but exists practically only in the form of conversations.

Research about how practices of field entomology interact with these conversations on insect ethics is limited. This gap in the literature is relevant to fill for three reasons. Firstly, little is known about the influence which conversations on insect ethics have on practices of field entomology and by extension, the influence of these conversations on ethical treatment of insects. Secondly, ideas of the entomological community are underrepresented in current conversations on insect ethics. Thirdly, understanding how practices of field entomology interact with conversations on insect ethics could help change practices of field entomology to become more aligned with insect ethics. Therefore, this study aims to provide an understanding of *how practices of field entomology interact with conversations on insect ethics*. By studying the interaction between these two phenomena, this study improves existing understandings of both, with the goal of such improved understandings enabling changes in conversations on insect ethics as well as in practices of field entomology that ultimately result in less insects being harmed. The study approaches the research problem from an Environmental Communication (EC) perspective, using Social Practice Theory (SPT) as a theoretical frame.

In what follows, the background of the research problem, the problem definition, research questions, theoretical framework, methodology, results and discussion are presented. The study concludes with some concrete suggestions for those involved with practices of field entomology and/or with insect ethics.

2. Background

2.1 Insects are vital

Research shows that insects are the most diverse and abundant group of animals to have ever lived on our planet and it seems that we only covered the tip iceberg in our knowledge about them (Stork, 2018). We do know that they are incredibly important to the stability of ecosystems, as they play a crucial role in pollinating, nutrient cycling, biological pest and disease control, and food provision for other animals (Angelo & Lancaster, 2022). In other words, in a world without insects, plants would go extinct, we would drown in manure and other waste, pests would be out of control and animals dependent on insects for their food provision would starve.

Now, for decades, researchers have been describing and calling attention to the fact that insects are declining (i.e. Conrad, Woiwod & Perry, 2002; Goulson, 2003) but it was not until 2017 that serious alarm bells went off. A kick-starter was the so-called 'Krefeld study', by Hallman and colleagues (2017). The study analysed monitoring data of insect populations in 63 German nature reserves that had been collected over the course of 27 years. It discovered an average decline in flying insect biomass of a staggering 76%. Such strong declines have been mirrored in research from other countries, like the Netherlands (Zeegers et al., 2018) and Puerto Rico (Lister & Garcia, 2018). Moreover, declines did not only relate to losses in biomass, but affected species abundance too (Wagner, 2020). The exact causes are debated, but human activities are practically certain to be the driving factor (Goulson, 2019). Notably, pesticides, land-use change, deforestation, human-induced climate change, habitat degradation, introduction of invasive species and pollution have all been associated with insect declines (Donkersley et al., 2022).

The impact of the 2017 Krefeld study rippled beyond the academic community. Concerns about insect declines were picked up by journalists around the globe, with George Monbiot coining the term 'Insectageddon' in the Guardian (Monbiot, 2017). Newspapers from South Africa (Petersen, 2019) to Sri Lanka (Burrowes, 2019) reported about the apocalyptic declines. Moreover, Felgentreff and colleagues (2022) found that google searches for insect declines and protection methods spiked in Germany in the years that followed the publication of the Krefeld study. The matter also received political attention. For example, the European Union presented the EU Pollinators Initiative in 2018, followed up by 'A New Deal for Pollinators' in 2023 (European Commission, 2023). Another example is the US' Agriculture Improvement Act of 2018, which funds pollinator research and conservation across the country (Republican Policy Committee, 2018). It is important to mention in this regard that several articles have been

published which argue that political action is vital but has been too limited compared to the scope of the problem (i.e. Donkersley et al., 2022; Van der Sluijs, 2020; Forister, Pelton & Black, 2019).

2.2 A call for more research

In response to insect declines, academics, politicians and individuals have started calling for more research about the extent, origins and potential consequences of insect declines. Three arguments occur frequently when it comes to requests for more research. Firstly, that there are too few locations where robust, long-term monitoring of insects has been performed, meaning that in a lot of places, potential declines remain unknown (Hallman et al., 2017; Wagner et al., 2021; Thomas et al., 2019). Secondly, researchers call for a detailed account that describes which human activities harm which insect species and how (Wagner et al., 2021; Köthe et al., 2022; Thomas, et al., 2019). Finally, the importance of describing (new) species and their functions is highlighted by several researchers, who argue it is problematic that human activities may be causing species to go extinct that have not even been discovered (van der Sluijs, 2017; Wagner et al., 2021). To perform these types of research, the studies argue increased sampling and identifying of insects to be required. As those activities take place in the field and are performed by entomologists, the research methods and their purposes are referred to in this thesis as ‘practices of field entomology’.

2.3 Conversations on insect ethics

The call for increased research on insects does not go unchallenged. In recent years, several researchers have identified a difficulty of ethical nature that emerges in the context of field entomology. For example, in the context of insect monitoring, Lövei and colleagues (2023) as well as Larson and Fischer (2019) explain that field entomology traditionally uses destructive, often lethal methods that kill large numbers of individual insects indiscriminately. Pitfall traps, light traps and Malaise traps are described as standard collection methods (Henderson, 2021 in: Lövei et al., 2023). The Krefeld study itself exemplifies this by reporting that millions of insects were captured with malaise traps to perform the study (Hallman et al., 2017). Such practices invoke three types of arguments in favour of ethical caution, which in turn are subject to some discussion. Collectively, the arguments and the discussions surrounding them are referred to as ‘conversations on insect ethics’. The term ‘conversations’ is chosen because, at least in the Western world, there is hardly any institutionalization of insect ethics and the bulk of the topic exists only in conversational realms.

2.3.1 Possibilities of insect sentience

The use of lethal collection methods is argued to largely assume insects as subjects that do not warrant ethical protection, but arguments are now occurring that this assumption should change. In the Western world, all vertebrate animals enjoy some form of institutionalized ethical protection, for example by being included in the Three Rs framework[1] (Franco, 2013) and various (inter)national laws (Karolinska Institue, 2025). Insects are notoriously excluded from current animal ethics frameworks, and as such do not have any moral footing to stand on (Fischer & Larson, 2019). The reason for this lack of insect ethics is argued to stem from the notion that ethical protection is traditionally granted based on proven 'consciousness', or 'sentience' (Preece, 2012). Fischer and Larson (2019) clarify that the guiding principle to assess consciousness is pain. For a long time, it was assumed that insects do not feel pain and therefore did not qualify as moral subjects of their own, as a result of which they do not receive institutionalized ethical protection on the individual level (Fischer & Larson, 2019).

Empirical evidence increasingly indicates a likelihood of insects experiencing pain, and a possibility of sentience (Barrett & Fischer, 2019; Baracchi & Baciadonna, 2020). For example, there are now clear indications that bumblebees engage in socially complex behaviour such as playing and exploring (Bridges et al., 2024) and that chronic social isolation reduces sleep in fruit flies (Li et al., 2021). Still, there appears to be no academic consensus or conclusive evidence about insects experiencing consciousness (Birch, 2020). Moreover, some researchers express doubts about whether proof of sentience in some insects would even be enough to account for all insects and their different life forms (Monsó & Osuna-Macaró, 2020). In response, support for an alternative approach based on the so-called 'precautionary principle' is increasing, where a realistic possibility of sentience is argued to be enough for insect welfare protection, and for denial of moral consideration only to be justified if sentience is disproven (New York University, 2024; Fischer & Larson, 2019; Baracchi & Baciadonna, 2020).

2.3.2 The irony of killing to conserve

The second ethical dimension affiliated with field entomology and insect ethics is about the importance of insect numbers and diversity, and the irony of killing insects to conserve them. Barrett and Fischer (2024) argue that field entomology

[1] The Three R's framework was proposed by Russell and Burch in 1959 and became institutionalized through the 1999 declaration of Bologna. The framework suggests that the principles of Replacement, Reduction and Refinement should be considered guiding when researching vertebrate animals. This entails that researchers should aim to replace the use of animals in research whenever possible, reduce the amount of animals involved in the research, and refine the methods that are used to perform research to minimize harm (Franco, 2013).

may have unexpected effects on ecosystems. For example, there are cases where lethal traps can threaten entire populations of an insect species (Barrett & Fischer, 2024). Lövei and colleagues (2023) take a similar stance but add another interesting notion of relevance. The authors explain a logical critique on the ethical arguments in field entomology, namely that many other human activities, from pesticide use to driving a car, can be more harmful to insects than field entomology (Turin, n.d. In: Lövei et al., 2023). They proceed to argue that even if this is the case, entomologists bear a responsibility to set examples for others in society to follow. A similar argument is made by Drinkwater and Robinson (2019), who argue that entomologists risk losing public support for their goal of protecting insects if they underestimate the ethical components of their own work.

It is good to note in this regard that some protection does exist to prevent entire insect species from going extinct, such as the EU Pollinators Initiative and the US' Agriculture Improvement Act. However, such frameworks have been critiqued for being unstructured, insufficient and largely limited to pollinators (Angelo & Lancaster, 2022).

2.3.3 Concerns about taking life in general

Finally, an argument that is important to mention is that some movements express concern with taking life in general, whether sentience is proven or not and whether species subsistence is threatened or not (Barrett & Fischer, 2024). Two notable examples of such movements are the biophilia movement, which stresses conservation based on love for nature (Simaika & Samways, 2010) and the environmental ethic movement, which emphasizes intrinsic value of nature and human duties toward this intrinsic value (Heeger & Brom, 2001).

2.4 Suggested changes to practices of field entomology

Previous research has not only provided arguments in conversations on insect ethics but has also added to these conversations by investigating potential ways in which practices of field entomology could change to better account for insect ethics. Various researchers have suggested different sets of guidelines. The overarching aim of these guidelines seems for entomologists to express thoughtfulness and awareness of their responsibility when working with living beings. The reasoning behind the importance of such guidelines and some prominent examples are discussed below.

In research on humans and other vertebrate animals, regulations and ethical boards dictate that certain approaches or experiments are not allowed (Singer, 1996). Those ethical restrictions entail that the answers to some research questions are unknowable in cases where the knowledge that is gained is not

considered to outweigh the ethical costs. An infamous example is the outcome of the Nuremberg trials, where nazi researchers were condemned for conducting painful human experiments that were deemed unethical (Lifton, 1986 in: Singer, 1996). Since such institutionalized regulations rarely exist for insects, the responsibility of deciding whether knowledge is worth the cost currently befalls largely upon the entomological community, and to a certain extent, concerned members of society. Barrett and Fischer (2024) argue that the development of guidelines based on conversations on insect ethics can help members of the entomological community structure their decision-making processes in research that involves insects. The researchers suggest achieving such structure by following guidelines similar to the Three R's framework. The researchers recommend entomologists to always question if research using insects is required (replace), how many insects need to be involved in the research (reduce) and if the research must be lethal (refine) (see figure 1 in Barrett & Fischer, 2024). An additional point the authors make is the importance of 'killing humanely', by aiming to use methods that minimize harm to the insect.

In each of these frameworks, there is a dedicated role for the purpose of the research and the method that is used. A few more observations from the literature are relevant to discuss relating to these research purposes and methods. Firstly, it seems that certain research purposes of field entomology, like biodiversity conservation, are under discussion. Not necessarily in the context of insect ethics so far, but more generally relating to studies of ecology and climate change. Notably, debates exist about the usefulness of creating more ecological data to solve the climate crisis (Morton, 2018). Mentioning such debates here is important, because they may help the entomological community to decide whether certain knowledge is necessary or not, before even starting to work on ethical guidelines.

Regarding methods, an interesting and frequently mentioned development concerning field entomology is the emergence of new technologies, such as DNA analysis, camera traps, citizen science and sonar. Lövei and Ferrante (2024) provide an in-depth discussion of such emerging technologies in the context of conversations on insect ethics, including their advantages and disadvantages (see table 1 in Lövei and Ferrante, 2024).

2.5 Entomologists' position in conversations on insect ethics

Having explained why conversations on insect ethics in field entomology have societal and academic relevance, how they have emerged and what entomologists could theoretically do to engage with them, the question remains to what extent entomologists are in fact interacting with conversations on insect ethics.

Some of the authors mentioned earlier in the background who contribute to conversations on insect ethics, like Lövei and Ferrante (2024) also practice field entomology. However, it seems that the bulk of conversations on insect ethics form an external perspective on practices of field entomology. Recently, Barrett, Drewery and Fischer (2024) claimed to be the first study to address this gap in the literature by researching how entomologists experience and address concerns about insect welfare and whether they would be supportive of changing their practices. The results of their study suggested that 44% of the entomological community would be uninterested in any reforms, while 37% would be supportive of rigid, intensive reforms, indicating significant divergence in care about insect welfare. The study also reports on concerns associated with reforms, namely costs, feasibility, accountability and limitations to progress of research. Finally, entomologists were found to request a need for more resources and education (Barrett et al., 2024).

3. Problem definition and research questions

3.1 Problem definition

This thesis works from the premise of Barrett and colleagues (2024) that little is known about entomologists' beliefs about insect welfare and how they may address potential concerns in their own practices. However, this thesis looks specifically at field entomology, and in addition to looking at beliefs about insect welfare, this thesis also considers the potential impact of ethical concerns related to ecological effects of field entomology and of killing in general. Moreover, Barrett and colleagues' study (2024) only includes entomologists' own descriptions of their beliefs on and attitudes towards insect welfare. This means that if entomologists did not describe certain beliefs and attitudes, because they preferred not to or because they are not aware of them, these beliefs and attitudes remain hidden. Moreover, the studies' applicability in understanding how beliefs and attitudes translate into changed practices is limited. As such, this thesis argues that there is a gap in the literature about the involvement of conversations on insect ethics related to welfare, ecological effects and killing in general in practices of field entomology.

This thesis aims to fill that gap by looking at if and how conversations on insect ethics become involved with practices of field entomology from the lens of Environmental Communcation (EC). EC scholars aim to understand and solve environmental problems that occur in the social world by studying interactions, which exist in human talk and other forms of communication where beliefs, choices and behaviours about the environment are imagined, shared and judged (Cox & Pezzullo, 2018). EC scholars assume that these interactions shape the meanings, knowledge, ideas and outputs that make up the world, a process which is often referred to as 'co-construction' (or -creation or -production) (Fischer, Friman, Ganesh & Joosse, 2025; Harness, 2025; Joosse et al., 2020). This thesis assumes that the involvement of conversations on insect ethics in practices of field entomology can be looked at as an interaction process. By studying this interaction process, this thesis aims to understand what meanings, knowledge, ideas and outputs based have already been co-constructed through previous interactions but have not been made explicit and how more interaction could lead to new co-construction processes that have the potential to change practices of field entomology as well as existing conversations on insect ethics.

3.2 Research questions

This thesis aims to provide answers to the research problem by answering the following research question: *How do practices of field entomology interact with conversations on insect ethics?*

Three sub-questions were developed to structure the approach to answering this research question:

1. What do established and new practices of field entomology look like?
2. How do conversations on insect ethics occur in these meanings, materials and competencies, both explicitly and implicitly?
3. How can an understanding of occurrences of conversations on insect ethics or lack thereof in the meanings, materials and competencies of field entomology be used to change practices of field entomology as well as existing conversations on insect ethics?

4. Theoretical Framework

To understand how co-construction processes are occurring or could occur between practices in field entomology and conversations on insect ethics, this thesis uses Social Practice Theory (SPT).

4.1 Introducing Social Practice Theory

SPT is a non-unified body of theory that includes a wide array of fields and foci (Niccolini, 2017). Rödl (2025) unfolds that SPT understands society as being built up out of strongly routinized activities, known as practices. Rödl quotes Reckwitz (2002) to describe practices as "*routinized ways in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood*" (Reckwitz, p. 250 in: Rödl, 2025). The individuals performing the practices are referred to as 'practitioners', who are argued to operate in an inherently social atmosphere (Rödl, 2025; Niccolini, 2017). As this study is interested in the practices of entomologists when they perform research on insects in the field, the entomologists can be described as the practitioners of field entomology. Their practices entail all their sayings and doings that relate to the activity of studying insects in the field. It is important to note in this regard that practices are often intertwined and build on one another (Niccolini, 2017). As a result, it is likely that this study will come across several overlapping practices. These will be treated as 'sub-practices' that collectively make up the umbrella practice of field entomology.

Rödl (2025) explains that routinization of practices is important, because it guides decision-making without requiring constant active and reflective thought processes. However, the author explains that this routinization also entails an assumption about society staying roughly the way it is, whereas in reality, society changes all the time. In some cases, Rödl (2025) explains, such changes instantly disrupt a practice and require for routinized actions to be re-evaluated by using active and reflective thought processes to change the practice. For example, if one were to take the train to work every day, but the train services stop running, that change would disrupt the practice of 'traveling by train to work' and one would need to think and reflect on a new way to travel to work. According to Rödl (2025), such disruptions often help illustrate how routinized a practice may be. In a lot of cases, however, disruptions are not as direct as a train service that stops running. Societal circumstances surrounding a practice often change more subtly and do not require a practice to change immediately. However, if the practice remains the same while circumstances change gradually, this may cause the practice to lag behind. Rödl (2025) explains that SPT may provide deep understandings about the situatedness of practices, where disruptions may be

taking place but also where practices may be lagging behind. This is argued to be useful for imagining interventions.

Following this conceptualizaiton of SPT, this study theorizes arguments in favour of insect ethics as a change in social ideas that may disrupt practices of field entomology. It aims to provide a deep, situated understanding of where disruption may be happening, but also where practices of field entomology may be lagging behind.

4.2 Transformative, elemental SPT

To provide this situated understanding and to potentially imagine interventions, one model within SPT seems particularly useful, namely Shove, Watson and Pantzar's (2012) elemental approach. The applicability of elemental SPT lies in its deconstruction of practices into three distinct elements and in its transformative potential. The three elements which practices are deconstructed into are meanings, materials and competencies. The meanings can be thought of as ideas to a specific practice or context. The materials concern all tangible entities, such as technologies, bodies, 'things' or locations. Finally, the competencies entail what is required to perform a practice, such as skills and knowledge (Shove et al., 2012). It is important to note that while the elements are distinct from one another, a change in one element often impacts other elements of the practice (Shove et al., 2012). Regarding the transformative potential of SPT, Shove and colleagues (2012) reject the notion that changes in behaviour can be achieved by providing new information or suggestions for change and hoping that this will change people's attitudes. Instead, the authors argue that because of the routinization of practices, transformation is only realistic if practitioners consider a potential disruption to their practices to be meaningful and to make sense, as a result of which they may let go of certain routines and temporarily make active and reflective decisionsu until new routines that adapt to the disruption are formed. Rödl (2025) explains that this process can be considered from an EC perspective as practitioners co-constructing their own changes.

To illustrate the applicability of Shove and colleague's (2012) transformative and elemental SPT, it could be helpful to provide an example in the context of field entomology. Imagine, an entomologist is counting yellow dungflies on a patch of land. A possible meaning here could be that the entomologist wants to monitor the spread of yellow dungflies throughout a country. An important competency would be that the entomologist knows how to identify yellow dungflies. Regarding the material, the entomologist would perhaps use a lethal trap which the yellow dungflies fly into. The activity of counting yellow dungflies can be considered the practice in this example. Now, bringing change based on insect ethics into the example, elemental SPT suggests that simply telling an

entomologist they should not be using a lethal trap to research yellow dungflies because it is unethical may not lead to change. Instead, SPT suggests change is more likely to be achieved if the entomologists engages with the ideas from conversations on insect ethics meaningfully and co-constructs their own ideas about how to change their practices accordingly. For example, this could result in the entomologist enhancing their competency to recognize yellow dungflies in the field so capturing them with a lethal trap is no longer necessary, or in the entomologist deciding to use a non-lethal trap, or in the entomologist deciding not to count yellow dungflies. This example shows that by encouraging someone to co-produce changes in ways that are meaningful to them, different possibilities occur compared to external suggestions.

Kanarp and Westberg (2024) add the notion that critical reflection from the outside may still be helpful to outline potential avenues for change. But, in line with Shove and colleagues' (2012) ideas, these outlines need to make sense for practitioners and critical reflections from practitioners on their own practices is necessary for transformation.

As such, this thesis uses elemental SPT to understand where practitioners of field entomology may be co-constructing their own changes based on interactions with conversations on insect ethics already. Moreover, in line with Kanarp and Westberg's (2024) suggestion, it provides a critical external perspective on where other avenues for change may be identified. Finally, it aims to understand not only where changes are happening, but also where obstructions to change may occur, for example if changes suggested in conversations on insect ethics do not make sense for the practitioners. Collectively, these existing changes, avenues for change and obstacles to change can be understood as outcomes of the co-construction process between practices of field entomology and conversations on insect ethics.

5. Methods & Materials

This section describes the data collection process, the data analysis and the limitations of the research methodology for this study. SPT is deeply interwoven throughout this methodology, because it can be considered an inseparable package of theory, method and vocabulary, with methods at the very centre (Niccolini, 2017).

5.1 Data collection

5.1.1 Semi-structured interviews

Traditionally, the research design associated with SPT is participant observation (Nicolini, 2017; Shove et al., 2012). However, Shove and colleagues (2012) argue that elemental SPT integrates different research methods, like interviews and statistics, thereby moving beyond the methodological constraint of using only participant observation. Moreover, Nicolini suggests interviews as the second-best option when participant observation is not feasible. Whilst theoretically, participant observation could be a useful approach to studying the topic of this thesis, it is important to note that it is described as a time-consuming process to prepare and to perform the data-collection (Baker, 2006). Given that this study is performed as a Master thesis, where time for preparing and performing the data collection is limited, participant observation was not deemed a feasible approach. Therefore, the decision was made to approach the study using interviews instead.

The interviews format chosen was semi-structured and interviews were conducted in a conversational tone with one participant at a time. Adams (2015) explains that semi-structured interviews should contain a prepared interview guide, which follows a basic structure and leaves room for follow-up questions. This approach allows for interviews to be compared to one another, while also providing space to explore questions in-depth if deemed relevant, depending on the interviewee. Moreover, Adams (2015) explains various situations in which semi-structured interviews are particularly useful. Two of those are relevant to this study. Firstly, the notion that independent thoughts of interviewees are relevant to examine through probing questions. And secondly, that unknown issues may arise, which are interesting to pursue and explore more in depth.

5.1.2 Location: the Netherlands

All the interviewees were from the Netherlands and the interviews were conducted in Dutch. A core component of SPT is that it is situated in time and space and that the material world is considered inseparable from an ideational world. In other words, context plays a crucial role in how practices are (re)shaped

(Nicolini, 2017; Shove et al., 2012; Rödl, 2025). Rödl (2025) provides the example of food practices differing per country. A similar example can be drawn in the entomological context. Different countries have different traditions, norms, histories and material connections to insects. From insects playing a big role in Japanese storytelling (Hoshina, 2022), to insects being much less researched in the Global South than the Global North (Herrera et al., 2024), to religious scriptures like the Qur'an iterating insects as 'God-conscious' beings (Tlili, 2024). As such, it is not unlikely for field-entomology to differ from country to country. Therefore, this study focuses on one particular country, namely the Netherlands.

The reason for selecting the Netherlands is twofold. Firstly, the researcher is from the Netherlands. As such, she is familiar with the situational context, including the countries culture and norms, but also the major institutes that work with field-entomology. Secondly, the Netherlands has an active entomological community. Ranging from universities, to citizen science platforms, to professional institutes, to associations for youth to get acquainted with insects.

5.1.3 Participant identification

The Royal Entomological Society describes entomologists as "people who study insects, as a career, as enthusiasts or both" (n.d.). As such, the aim in this study was to interview entomologists across that spectrum of enthusiasts and professionals. To achieve this, the most significant institutes related to entomology in the Netherlands were identified through conversations with entomologists and google searches. The institutes that were considered most relevant and a brief description of their objectives, can be found in table 1.

Table 1. Overview of relevant entomological institutes in the Netherlands

Institutes	Objectives
EIS Kenniscentrum Insecten [European Invertebrate Survey Knowledge Centre for Insects],	Professional institute that aims to increase knowledge about spread, ecology and protection of invertebrates in the Netherlands (EIS Kenniscentrum Insecten, n.d.)
Naturalis Museum and Biodiversity Center	National research institute and museum for biodiversity. Researchers are committed to describing, understanding and maintaining biodiversity, including insects (Naturalis, n.d.)
Wageningen University and Research (WUR)	University that provides courses on entomology and hosts 'the Lab of Entomology', where researchers work on insect interactions (WUR, n.d.)

Nederlandse Entomologische Vereniging (NEV) [Netherlands Entomological Society]	Association for professionals as well as enthusiasts in entomology, hosting one of the biggest entomological libraries in Europe and involving 11 sub-sections to accommodate for varying focuses and interests within entomology (NEV, n.d.)
Veldshop.nl [fieldshop]	First website to sell equipment for researching insects (and other animals) in the field (veldshop.nl, n.d.)

Initially, the overview of entomological institutes in the Netherlands did not include veldshop.nl, youth associations and other universities than the WUR, hence they are put in italics. In the first round of participant invitations, six potential interviewees were approached. Two of them were affiliated with the NEV and one affiliated with each of the other institutes included in the initial overview (EIS, Naturalis, WUR and NIOO-KNAW). Four potential interviewees responded positively, two did not respond and there were zero negative responses. Based on the first four interviews, the NJN, veldshop.nl and other universities were added to the overview of relevant entomological institutes. Moreover, four additional potential interviewees affiliated with these institutes were suggested in the first four interviews. All of these additional potential interviewees were approached and responded positively, resulting in a total of eight conducted interviews. These covered institutes from table 1, except for NIOO-KNAW. Moreover, some interviewees were or had been affiliated with more than one institute from the list.

In the interviewee identification phase, some steps were taken to generate diversity. Reaching a fully representative sample of the Dutch entomological community was not realistic due to time constraints. However, to still ensure some level of diversity, it was ensured that potential interviewees of differing age, gender, education background and insect specializations were approached. As a result, the sample includes professional as well as amateur entomologists of different genders and ages, with a diversity of specializations, including generalists, people focusing on pollinators, but also experts on species like sawflies, hoverflies, fruit flies and parasitic wasps[2].

The interviewees were contacted via e-mail, with the inclusion of a document informing them about the study, which was written in English and translated to

[2] A table with an overview of the specific institutes and species that interviewees are affiliated with is not included. Given the limited number of entomologists in the Netherlands, such a table could cause interviewees to be traced back to individuals.

Dutch (see appendix 1). When they did not respond, one follow-up e-mail was sent. When they agreed to the interview, a consent form was sent, with the request to sign electronically or in person (see appendix 2). One of the interviews took place in person, at Naturalis. The other seven took place via Zoom. All interviews were recorded with written as well as verbal consent of the interviewee.

5.1.4 Interview guide

In line with the semi-structured interview approach, an interview guide was created, providing a basic structure for all interviews to follow with suggestions and room for follow-up questions. The interview guide as well as an English translation can be found appendix 3.

While constructing the interview guide, attention was paid to including descriptions of practices of field entomology to inquire about implicit absence or presence of conversations on insect ethics, but also to inquire explicitly about the potential disruption of conversations on insect ethics. To ensure that both elements were covered, the first half of the interview guide did not include questions about insect ethics but focused on describing past, current and future practices of field entomology. The aim of these descriptions was to identify potential latent presence or absence of conversations on insect ethics could be identified. In the second half of the interview guide, potential disruptions posed by conversations on insect ethics were actively probed, firstly by asking about previous interactions with conversations on insect ethics, how these interactions impacted awareness and how they came about. And secondly, by introducing similar questions as were included in the first half of the guide, concerning practices, but involving ethical dimensions in these questions to identify explicit presence or absence of conversations on insect ethics. It does need to be noted about this approach that the information sheet (appendix 2) and consent form (appendix 3) mention something about the study's interest in ethics. As a result, the possibility of identifying latent themes by describing practices without probing ethics is somewhat flawed, because interviewees' knowledge about this study's interest in ethics may have influenced the description of their practices. However, this was not possible to avoid as not including ethics in the information sheet and consent form would have been a violation of informed consent.

Moreover, Shove and colleagues' (2012) SPT framework was consulted for the construction of the interview guide. The aim was to ensure that questions were designed to enable the deconstruction of practices into meanings, materials and competencies, both before conversations on insect ethics were probed and after they were probed.

Finally, it was recognized that asking entomologists about their ideas on ethics and killing insects was a potentially sensitive topic. Therefore, some follow-up

questions which were designed in the interview guide only ended up being asked if the interviewer perceived the interviewee as willing to talk about their ideas on insect ethics. In some cases, follow-up questions related to insect ethics could have provided interesting insights, especially when practices did not seem to align with arguments in favour of insect ethics but were considered by the interviewer to entail a risk of making an interviewee uncomfortable. To some extent, this may harm the account of suggested avenues for change. As such, this avoiding of uncomfortable situations is considered a limitation of the methodology.

5.1.5 Transcription

The interviews were recorded and notes were taken by the interviewer during. After, the interviews were subscribed to intelligent verbatim. To do so, the transcription software TurboScribe was used, after which transcripts were checked manually by listening back to the recordings and adding or changing words and sentences where necessary. TurboScribe was selected as a tool first and foremost because it keeps the data private by giving only the researcher access and saving the records and transcripts encrypted. Moreover, there are no third-party transcriptions or APIs, the AI models are in-house and are not trained on the files or transcripts (Turboscribe, n.d.).

5.2 Data analysis

The interview data was analysed using a thematic approach combined with the basic elements of Shove and colleague's (2012) SPT framework. Braun and Clarke (2008) explain that thematic analysis is a foundational method for qualitative analysis. It minimally organizes and describes a data set in detail, to allow for identification, analysis and reporting of patterns that occur in the data. It is argued to be a highly flexible method that can be applied across a range of theoretical and epistemological approaches (Braun & Clarke, 2008). Given the theoretical underpinning of Shove and colleague's (2012) elemental SPT, a basic structure of the results was already established prior to the data collection, namely 'meanings', 'materials' and 'competencies'.

To create relevant themes within these elements that synthesize the data to show how meanings, materials and competencies of field entomology interact with conversations on insect ethics, the transcripts were coded using the software Atlas.ti. Following Braun and Clarke's (2008) recommendations for thematic analysis, the coding/data analysis process started with the researcher familiarizing herself with the research. Next, initial themes were coded, after which they were screened for prevalence. Themes were considered prevalent if they showed up in a lot of interviews or if they differed significantly from existing conversations on insect ethics and field entomology. Then, the themes were reviewed and fine-

tuned, written up in the results. This process resulted in the creation of six themes that were designed to provide answers to sub-questions 1 (what do established and new practices of entomological researchers look like?) and 2 (How do conversations on insect ethics occur in these meanings, materials and competencies, both explicitly and implicitly?).

In the discussion, the results are analysed using SPT and placed into the research context described in the background of this thesis. The results aim to clarify disruptions of practices of field entomology that occur based on interactions with conversations on insect ethics, which are not described in the existing body of research on insect ethics. Moreover, it aims to identify avenues for as well as obstacles to change that can be deducted from the results. Identified existing changes, potential changes and obstructions are used to formulate concrete suggestions to practitioners of field entomology and those involved with conversations on insect. In doing so, the discussion could provide insights into sub-question 3 (How can an understanding of occurrences of conversations on insect ethics or lack thereof in the meanings, materials and competencies of field entomology be used to change practices of field entomology as well as existing conversations on insect ethics?).

6. Results

Before diving into the various meanings, materials and competencies associated with field entomology, it could be helpful to describe what type of sub-practices interviewees engaged in.

Firstly, there is the sub-practice of sampling insects in a specific area, which nearly all interviewees spoke about and engaged in. The practice was described to consist of going to an area and identifying and counting the insects that occur there, using a mix of observing, catching and collecting. In some cases, interviewees explained they sample an area to look for a specific species, whereas in other cases they aim to get a general overview of which insects exist in an area. A second sub-practice is taxonomy, which was described to entail the describing of new species or relationships between species, for example with the goal of writing determination keys or adding to DNA databases. Thirdly, there is the sub-practice of collecting insects. For taxonomy and monitoring, catching or otherwise capturing insects is frequently deemed necessary, but some entomologists also engage with collecting as a separate sub-practice, where collecting is the main goal. Several interviewees engaged in this practice, and nearly all spoke about it. Most referred to building collections of physical (dead) specimens, but some interviewees also engaged in insect collection through photography. The fourth sub-practice is education. Interviewees described to be involved with the teaching of entomology to others in many ways, including university courses, summer camps, media performances and trainings. Finally, interviewees explained that a sub-practice of entomology is to observe insects, to learn about their movements, parasites, behaviour, food preferences, etc.

Oftentimes, the sub-practices were found to overlap and all interviewees engaged in more than one of them. Combined, the meanings, materials and competencies used in these practices can be understood to make up the practice of field-entomology.

6.1 Meanings of field entomology

The term ‘meanings of field entomology’ refers to the various ideas, intentions and thoughts which interviewees associated with their entomological practices. Based on the interviews, three types of meanings of field entomology were identified, namely ‘contribution’, ‘personal interest’’ and ‘paid requests’.

6.1.1 Meaning of contribution

All interviewees mentioned that an important reason for engaging in practices of field entomology was to contribute ‘something’ to the world. The exact ways of

contributing and reasons for doing so varied, but generally related to insect protection, creating descriptions of new species and education. Significant interaction with conversations on insect ethics was identified in these meanings of contribution. Nearly all interviewees seemed to be aware of potential harm that their practices cause to insects, but used the meaning of potential contributions to justify this harm:

> "For me, it is still the weighing of two evils against one another. I cannot perform research on all the problems that occur in the entomological world without causing a little bit of harm. To bring forward a Buddhist quote: "It is not about what you do, but with what intentions you do it." (Interviewee 2).

This weighing of potential harm against potential contributions was mentioned by most interviewees as a personal decision-making process. In most cases, interviewees seemed to value the meaning of contribution very strongly and worth causing certain harm to insects. However, there were a few exceptions where interviewees did actively question whether contributions outweighed potential harm:

> "Once, I also contributed to research on birds, where in Africa they wanted to know the diet of birds, for which they used malaise traps three years in a row. Twenty of them in a field. And they are counted only to the number of orders, resulting in one paper, and millions of insects went into those [traps]. That I find ethically very difficult. Because on the one hand, millions of insects died. On the other hand, probably not one species went extinct. So, do we want to keep doing research in that direction? Must we answer those questions?" (interviewee 6)

In such situations, interviewees demonstrated not only an interaction with conversations on insect ethics concerning biomass, species subsistence and killing in general, but also implied that contributions do not automatically imply ethical justifications.

An additional point related to decision-making processes about contributions compared to harm, is that some interviewees seemed to discuss the ethics of their practices with others, especially in the context of education: *"In all of our courses [about entomology], we do talk about why we do something, and we discuss whether it is appropriate to do it."* (interviewee 5). Other interviewees, however, described that in their experiences, such discussions with others are limited:

> "I think there is a culture among entomologists that certain things are just the way they are and that it is not talked about much [(…)] and I think more awareness about this could be justified, not only because of the ethical assessment of killing an insect, which may be problematic, but also because there are potential ecological effects." (interviewee 4)

These examples indicate that in this dataset there is a lot of awareness about conversations on insect ethics, relating particularly to biomass, species subsistence and killing in general. Interviewees seemed to use this awareness to decide whether contributions are worth the harm that is being caused. However, they did imply room for improvement in openly sharing such considerations, which can also be thought about as critical reflection. The notion that this is happening in the context of education could indicate that such open discussions may become more common in the future, when entomologists enter the field who have learned how to discuss these considerations.

Moreover, some interviewees suggested that institutionalization of guidelines on how to weigh contributions against harm could be useful. In these suggestions, several interviewees explicitly stressed the importance of basing guidelines on facts:

> "I find it important not to make this discussion an emotional one and to really look at the facts and at differences between vertebrates and invertebrates, and how this may sometimes require a different approach [(…)] I definitely think we could be stricter, and we should start justifying things with one another, how we do research, how we breed insects, what is possible and what is not, to create guidelines for that. But we do need a factual basis for this first (interviewee 8)

This emphasis on facts and rationality over emotions implies a positivist stance on ethics, at least for some interviewees. These examples imply that interactions between conversations on insect ethics and meanings of contribution are, at least for some interviewees, more likely to be productive and lead to changes in practices when arguments are based on facts.

A final point concerning interactions between conversations on insect ethics and meanings of contributing something seemed to occur. Interviewees expressed that in some situations, they experienced feelings of unfairness and disagreement when people critiqued entomological practices for killing insects, while in the view of the entomologists, those people themselves also contribute to killing insects and other animals. For example, by buying foods treated with pesticides, driving a car, killing mosquitoes, etc. Interviewee 1, for example, said: *"Some people say 'you are not allowed to kill animals', well fine, I usually answer: 'so you never kill mosquitoes?' And then their response is usually that they do [kill mosquitoes]. That's strange.* Most interviewees that mentioned this point seemed to indicate that such critiques felt even more unfair if people did not recognize the importance of contributions made by entomological practices:

> "It's an interesting thing, ethics, such a strange discussion. Because on the one hand we all feel that, damn you're catching flies with your nets and they're just dying and people have opinions, which I understand. And I feel that too, that it's something ([…]) but then if you look at agriculture, how many insecticides are used to produce the food that you and I eat, that kills billions of insects in the Netherlands every day, which we never

> speak about or look at. And then it does feel strange that I need to justify the [tiny number of insects I catch], which I use for scientific research." (interviewee 6)

Similar to the point of facts being important in conversations on insect ethics, these examples indicate that expressing awareness and critical reflection about the impact of one's own and other societal practices is important to entomologists. Broadening the conversations on insect ethics and acknowledging the importance of contributions made by entomologists seems to be argued to increase the productivity of interactions between practices of field entomology and conversations on insect ethics.

6.1.2 Meaning of personal interest

Despite all interviewees mentioning the meaning of 'contributing something' to be important, most interviewees indicated that their primary meaning for performing entomology relates to personal interests like curiosity and enjoyment. To illustrate, interviewee 7 said: *"I have a more socially involved side. But if I am honest and talking about what really drives me in my research, then it is purely curiosity."* Moreover, related to the meaning of personal interest, some interviewees explained that they entered entomology because of an interest in insects, whereas others were generally interested in nature and ended up focusing on insects at some point. Some interviewees indicated that this difference in background could have an impact on the way in they perceive the ethics involved in killing an insect. For example, interviewee 4 entered entomology from a general interest in nature:

> "My background is that of an ornithologist. From birds, I went to butterflies, from butterflies to dragonflies and from dragonflies to bees. Well of course, with birds you can absolutely not kill them for research, that would make you crazy. And that is also no longer accepted for butterflies, or dragonflies. Then I went to bees, and I remember thinking: 'oh, here one does get to kill insects'. That was not the default for me… whereas many entomologists come from a different direction. They start as entomologists and start collecting."

Whereas interviewee 1, who entered entomology from a deep fascination with wasps and eventually all insects, said:

> "Entomologists all kind of agree… that there is no other way [then to kill insects]. Ethical critiques come more from the outside. Bird enthusiasts who enter entomology through dragonflies and butterflies… they look a bit more critical. But well, that's dragonflies and butterflies, they are easy to identify in the field. They don't look at the small beetles."

These quotes seem to imply that in some cases, a background in research practices where ethics are broadly established and accepted, like ornithology, made the

interviewee more likely to engage with conversations on insect ethics then was the case for interviewees who entered field entomology right away.

A second indication of an interaction between conversations on insect ethics and meanings was not described explicitly but seemed to be implied in the sub-practice of collecting. Several interviewees described that some entomologists, especially in the past but even nowadays, seem to mainly collect insects for the personal enjoyment of tracking and owning them:

> "50 years ago, the goal for every entomologist was to collect as many insects as possible. Those entomologists still exist, but I think they are a minority now [(…)] and again, for me that is a discussion of purpose and materials. Collecting insect to have a fun collection, that is like a hunt. It is not forbidden in the Netherlands, but it does not serve anything [while you do kill bugs in the process of collecting]." (interviewee 2).

All interviewees that spoke of this 'personal interest' meaning in connection to insect collecting, implied that without the purpose of contributing something, killing insects is not ethical. This could be argued to indicate that despite personal interest being an important meaning behind entomology, caring about conversations on insect ethics dictates a prioritization of contributing something.

6.1.3 Meaning of fulfilling a paid request

A few interviewees who practiced field entomology in a professional and thus paid position, indicated the existence of a third meaning, namely fulfilling a paid request. The interviewees explained that there are various reasons why an individual, an organization or a government may want to pay an entomologist to perform field research:

> "Professional entomological research always has a practical root. Which makes sense, because you need to have a reason to put money into it. Examples are researching bugs in water, because they indicate water quality. Another example is veterinary research, where bugs may carry diseases onto cows and where you want to understand what is happening. Or for the health of humans. Finally, agriculture is an important one. When bugs eat our food, we want to research how to get rid of them, basically." (interviewee 2)

This quote by interviewee 2 indicates a potential interaction with conversations on insect ethics related to this meaning of fulfilling a paid request. Namely, that it shows how some projects in field entomology are dependent on and selected based on financial choices. This notion is not problematic in itself, but it does entail a risk that the instructions from a financer become leading, rather than the entomologists' personal preferences: *"If you ask me as a person, I am just as happy to go into the field with my camera [(...)], but when I am sampling for [redacted organization], I have to collect, otherwise I cannot properly identify the species."* (interviewee 1). This quote from interviewee 1 illustrates how taking on

the role of a professional, paid entomologist may influence the extent to which she involves her personal ideas about insect ethics into her practice. Interviewee 4 even described this interaction with conversations on insect ethics and the meaning of fulfilling a paid request explicitly:

> "I think the awareness among entomologists about a discussion on ethics is growing. A conversation is starting. But whether that will lead to behavioural change, or different methods. I do not know. A lot of work in entomology is still commercial, ecological advice, shaped by the requests of customers. And if costs matter, then passive, lethal catching becomes much more attractive.

These examples seem to imply a critical reflection by some interviewees about how personal ideas about conversations on insect ethics may be compromised by the meaning of fulfilling a paid request.

6.2 Materials of field entomology

The term 'materials of field entomology' refers to all physical materials that interviewees mentioned to use when practicing field entomology. They are grouped into two themes, namely 'materials to capture' and 'materials to identify'.

6.2.1 Materials to capture insects

This theme focuses around the most important materials interviewees mentioned to use when capturing insects. The term capture is used here to refer to lethal and non-lethal catching of insects but also to capturing on camera. Nearly all interviewees indicated that hand nets are one of their most used materials for capturing insects. Most interviewees also spoke about the use of traps for capturing insects, such as malaise traps, pitfall traps, colour traps, window traps, pot traps and light traps. Finally, nearly all interviewees described using cameras to capture insects. In most cases, cameras were used for photography, but a few interviewees also spoke about the use of AI cameras. Conversations on insect ethics were found to interact with these materials at several points, which are explained below.

All interviewees indicated an awareness that the choice of material to capture insects influences whether they are killed. Cameras were indicated to be used when interviewees wanted to avoid killing insects, hand nets and non-lethal traps were described to allow for active decision-making about when to kill a captured insect and lethal traps were described to kill insects passively and indiscriminately, for example because they drown in alcohol or soapy water. For several interviewees, like interviewee 3, this difference in insect deaths resulting from different capturing materials seemed to influence their choice in material use: *"For me, it is photographs or nothing. Sometimes, instead of photographing*

a bug flying around freely, I will capture them with a hand net and photograph them in the net or in a jar and release them after". However, interviewee 3 was the only interviewee that limited herself to non-lethal materials. Moreover, several interviewees indicated ethical difficulties with the use of traps but still described to be using them for research. For example, before the topic of insect ethics was probed, interviewee 7 said that: "*We use a lot of traps. Those can be traps where insects get sucked in, or where they can walk in, but they can't walk out*." Late on in the interview, after insect ethics were probed, she returned to this example saying that: *"bugs that walk into a trap often don't survive. They get thrown into a freezer, then they die, and you can count them [(…)] So yes, there is certainly an ethical dimension to that."* These examples indicate that interviewees are all aware that use of materials impacts insects being killed and that they recognize an ethical dimension in this regard. It seemed that the notion of killing was considered problematic in general and was not in all cases affiliated with insect sentience or insect declines. However, the extent to which interviewees indicated that they changed their practices because of this knowledge about the ethics of material use, differed significantly.

Another way in which conversations on insect ethics seemed to interact with materials to capture, was that descriptions of materials that allow for active decision-making about what to capture and kill seemed to bring forth different parts of existing conversations on insect ethics than traps which capture and kill passively. Several interviewees illustrated concerns about insect sentience but only made this explicit in the context of materials that involved active decision-making, not in relation to passive traps. For nearly all interviewees, concerns about sentience were not actively linked to a choice not to kill them, but instead of killing them in a way that minimizes harm. Often, interviewees mentioned use of a freezer in this regard:

> "For some species, like certain beetles and male wasps, you need to extract the genital to identify it, which is inside of the specimen. Well, I can tell you, it would be cruel to extract the penis of a living beetle. You do not want to do that. So, it is better to do so once he's dead. Yes, and then you need to kill him. There are different methods for doing so. Personally, I prefer the freezer, where they just fall asleep and do not wake up." (Interviewee 1)

It is good to note that such beliefs about sentience as indicated by interviewee 1 were not agreed upon universally in the dataset. Interviewee 6, for example, said that: *"I do not think insects can think. It is an instinct, so it is not sad. There is no wife and children waiting at home when I take one. That's my vision."* His statement about absence of sentience was the strongest out of all interviews, but other interviewees too expressed doubts and as mentioned earlier, none of the interviewees expressed sentience concerns in relation to passive traps.

Another dimension of conversations on insect ethics, namely insect population subsistence, was mentioned in relation to active as well as passive capturing materials. In relation to passive materials, population subsistence was sometimes expressed as a concern. Interviewee 4, as well as some others, indicated that there is a dominant idea in entomology that killing some specimens of a population does not pose a risk to population subsistence, but that this is not proven or guaranteed:

> "It is often assumed that if you take a small sample of a population, it is not that big a deal. But that is never measured. So that is something I do worry about. If you put up a colour trap in an area with a protected species present, and you catch a couple of that species, you may very well have an impact on their population. I think that is not talked about enough." (interviewee 4)

The interviewees that spoke about this risk seemed to indicate that it is especially pronounced when using passive traps, where the researcher has limited control over what insects and how many of them are being caught. Materials involving an active decision, instead, were described to enable a more careful approach that minimizes risks to population subsistence: *"Population growth is decided by females. As such, collecting male insects is of neglectable influence on population growth. So, if I capture a male and a female and I want to collect a specimen, I will always choose the male."* (interviewee 2). These examples indicate that for some interviewees, materials where active decision-making is involved give the researcher more control over the potential harm they may cause to insects, both concerning sentience and concerning population subsistence. For some entomologists, this seems to be a reason to prefer the use of materials where an active decision is involved over the use of passive traps. However, it does need to be acknowledged that most interviewees still used passive traps too.

In addition to invoking personal reflections, some interviewees explained that materials for capturing insects, hand nets in particular, seemed to attract interactions with conversations on insect ethics probed by people outside of the academic community: *"It stands out when you are walking around with a net. So, people start asking questions, like what are you doing? And then if you tell them you're sampling pollinators, the first question is 'oh, so do you kill those?"* (interviewee 4). Interviewee 4, as well as some others, explained that they often respond to questions involving conversations on insect ethics by explaining that they use selective materials and criteria for when to kill an insect, and that if they do, it serves research purposes. This implies an engagement with insect ethics. A few interviewees, however, indicated to avoid situations where their materials attract conversations on insect ethics: *"We try to stay under the radar of course, I am not going to provoke [(...)] we try not to wave around our hand nets in the middle of a theme park, so to speak.* (interviewee 2). These differing responses from interviewees to their materials attracting conversations on insect

ethics seem to be in contrast with one another. This indicates discrepancies in the dataset concerning willingness of entomologists to engage with conversations on insect ethics.

6.2.2 Materials to identify insects

All interviewees spoke about using microscopes and identification keys based on microscopic features to identify insects, sometimes in combination with insect collections containing dead specimens. Moreover, all interviewees spoke about DNA and in some cases eDNA analysis as emerging materials for identification. About half of the interviewees already used these techniques themselves. Finally, some interviewees spoke about AI cameras that identify insects based on photographs. Only a few interviewees indicated to use this technology.

Several interviewees explained that traditionally in field entomology, identification methods require dead insects, which are looked at under a microscope. However, they also explained that changes have started to occur in these materials:

> "Species identification keys used to be purely based on microscopic features, but people are now making them with a focus on visual characteristics that can be seen in pictures or field observations. That is a change I have seen and that I actively try to contribute to." (interviewee 3)

This change in types of identification materials provides possibilities for improved insect ethics. However, whether interactions with conversations on insect ethics were also the explicit reason why they are being developed was unclear from the interviews. Interviewees stated that improved cameras and increased knowledge about insect species enabled these developments, but did not elaborate on the intentions behind them. In addition, all interviewees that spoke about the development of new identification methods, indicated that photography and increased knowledge are still not developed enough to be able to identify every insect without killing it: these are not able to fully replace the use of dead specimens because certain species can only be identified microscopically: *"certain species of bees and hoverflies can only be recognized by microscope, usually on male genitalia"* (interviewee 2) and because photography is limited in what it can show compared to physical, dead specimens: *"You do need those museum specimens, I am not saying you can do it with photographs alone, definitely not. You can see a lot more with those specimens, where photos are limited."* (interviewee 3). The examples discussed in this paragraph show that work is being performed on identification materials that can be used to treat insects in a way that aligns with conversations on insect ethics. However, intentions of treating insects more ethically were not explicitly linked to those

materials and in addition, interviewees stressed that identification still requires dead insects sometimes.

In addition to modern identification keys and photography, many interviewees talked about DNA analysis as a revolutionary material for insect identification: "*For researchers, there is barcoding nowadays, which is revolutionary in the sense that at a low cost you can get a lot of species identifications done, by sending DNA into a lab and getting a list of species back"* (Interviewee 4). Initially, most interviewees seemed to consider DNA analysis a helpful material in insect identification. However, after conversations on insect ethics were probed, several interviewees reflected on potential problems of ethical nature with this material, amely that DNA analysis can easily and against a relatively low cost, identify insects from passive traps. Interviewees expressed concern that this may encourage increased use of passive traps where insects are killed even though they could technically also be identified without killing them:

> "Those new DNA methods can make it easier to process all [specimens from] samples, whereas this is usually limited to the knowledge of the person that is sampling. So, I think that a lot of people could find it more easily justified to catch insects, because they can identify everything right away and not just the groups they specify in." (interviewee 5).

Interviewees stressed that the ease of using DNA analysis could prove especially problematic regarding unnecessary killing of insects to recognize them when costs and time pressure are involved: "*There is a risk with molecular methods that it becomes so cheap, that identifying manually gets too expensive comparatively [(...)] from the perspective of a customer, it can be very attractive to only order assignments where DNA identification is used."* (interviewee 4). Some interviewees also indicated to work on minimizing these ethical problems related to DNA identification, by seeing whether the material can be used without killing an insect, for example by using only a leg: *"we used to just grind up the whole bug when performing such an analysis. Now we are starting to see if we can get there with one leg."* (interviewee 7). This approach was mentioned to invoke questions on sentience though: *"are they bothered by the fact that they have one leg less? Does that hurt? You don't know"* (interviewee 7).

Finally, some interviewees interacted with conversations on insect ethics in the context of identification materials when speaking about AI cameras and eDNA. These materials were explained to have potential for replacing passive, lethal traps without requiring the killing of insects for identification, instead identifying large amounts of insects based on camera footage and DNA found in soil samples. However, the majority of interviewees that spoke about these methods did not use them personally yet, and those that did, all mentioned that the application of these materials is limited so far: *"The alternatives I mentioned, eDNA, AI, they can help*

us along the way, but I do not think we can get far enough with them to truly replace other methods." (interviewee 8).

This theme shows contrasting directions for how practices of field entomology are developing. Increased use of new identification materials like cameras, determination keys, eDNA and AI identifications implies a development in a direction that interacts with conversations on insect ethics. However, interviewees indicated that these materials are not sufficient to fulfil all elements of field entomology that they consider necessary. Moreover, increased use of DNA analysis seems to entail a risk of field entomology moving away from interaction with conversations on insect ethics, as it increases killing of insects or causing pain to them.

6.3 Competencies of field entomology

The term 'competencies of field entomology' refers to abilities and knowledge which interviewees considered necessary to be able to engage in practices of field entomology. For the interviewees, the number one competency for an entomologist was clear to be the ability to identify insects. Moreover, this competency was found to provide several insights about the interaction between practices of field entomology and conversations on insect ethics. Therefore, 'ability to identify insects' is the sixth and last theme.

6.3.1 Competencies of insect identification

Ability to identify here refers to recognizing living and/or dead insects without using technologies like AI or DNA analysis. It was mentioned repeatedly by all interviewees and in all entomological sub-practices. Interviewees emphasized the importance of being able to recognize physical features of insect species, habitats where they occur and typical behaviours. Moreover, many interviewees emphasized that to gain these recognition abilities, putting time into learning by doing is necessary. *"It is the classic story, if you want to become good at something, you need to put in 10,000 hours. That applies to entomology too."* (interviewee 2). Several interviewees explained that they gained this experience at the 'JVN' or the 'NJN, which are two Dutch youth associations for nature studies. University education on the other hand, was argued repeatedly to be of limited use in learning to recognize insects: *"You don't learn how to identify insects in biology education in my experience. There is one course where you look at the identification keys as a joke, but it is not a systematic part of the education."* (interviewee 4). This argument occurred for interviewees that followed university education, as well as for interviewees who teach at universities.

The main interaction between the competency of identifying insects and conversations on insect ethics, seemed to be that interviewees ascribed differing

levels of care about the importance of identifying insects without killing them. Some interviewees, like interviewee 2, stated that the competency of identifying insects without killing them to be a top priority:

> "After 40 years in the field, I still find it unpleasant to kill an insect. I do not do it for fun [(…)] I have always strived to be able to recognize 100% of the bugs in the field, so that I don't have to collect any. And we [interviewee and his colleagues] are much better at that then generations before us."

Other interviewees seemed to indicate a preference for not killing, but expressed it less strongly, like interviewee 5: "Usually, I try to have a look first when I catch something [(…)] And if I already know [what species it is], I release it. Otherwise, I take it with me [and kill it]. Finally, some interviewees seemed to ascribe less importance to the ability of identifying insects without killing them, like interviewee 6: "There are some very common species, which are easily recognizable. But usually, I still take one or two, just to be sure." These seemingly differing levels of perceived necessity to identify insects without killing them, implies that the extent to which the competency of insect recognition interacts with conversations on insect ethics differs among the interviewed entomologists. It is useful to add an additional interaction with conversations on insect ethics here, namely that some entomologists who described identifying insects in the field as an important ethical competency, did mention that it is very time consuming. Passive collecting and using DNA analysis were explained to be more time and cost efficient than sending someone out into the field to observe. This implies that, when time and costs matter, this may influence a trade-off between the more ethical way of identifying and the more efficient way.

Another interaction between the competency of identification and conversations on insect ethics occurred in the context of gaining experience. Two different ideas about conversations on insect ethics seemed to occur. Most interviewees described that they aim to gather knowledge about how to recognize insects in the field, so they can perform practices of entomology while killing as few insects as possible: *"I am motivated to learn as much as possible about bugs, so I can recognize them in the field and not kill them."* (interviewee 2). These interviewees indicated that gathering experience with insects, their habitats and their behaviour in the field results in killing less, which indicates more ethical practices. A few other interviewees, however, described that to become an entomologist, one needs to know how to kill insects and recognize them when they are dead. Interviewee 1, for example, explained that some of her students do not want to kill insects as a part of learning how to recognize them. She described her vision on such expressions of conversations on insect ethics as follows:

> "That is allowed, I don't fail them. But you don't learn how to recognize the insect that way [(…)] If you don't want to, that's okay, I understand you can have reasons for not

> wanting to cut into an insect [(…)] but if you want to be serious about entomology, then you will have to kill them, unfortunately."

When asked whether collection materials, field observations or photographs could suffice instead, the interviewee explained that in her experience, this never leads to the same level of competency in identifying as capturing the insect, killing it and identifying it under the microscope does. These examples illustrate competing perceptions among some interviewees about whether training competencies of insect recognition leads to more, or to less insects being killed.

7. Discussion

Below, the most important results are discussed in relation to existing research presented in the background of this thesis. Special attention is paid to the changes, avenues for change and obstacles to change in practices of field entomology that can be identified and what this means for practices of field entomology as well as for conversations on insect ethics. The relevance of the findings is extended beyond this study to society and academia in the form of various suggestions.

7.1 Decision-making processes

One of the most significant disruptions in practices of field entomology that was found to stem from interactions with insect ethics, is that some entomologists have developed personal, active decision-making processes that account for insect ethics related to less killing of insects, insect sentience and potential ecological effects. Such decision-making processes can be found in themes 1 (meanings of contribution) 2 (meanings of personal interest), 4 (materials to capture) and 6 (competencies of identification). Examples of co-constructed decision-making processes are the weighing of contributions from practices of field entomology against the weighing of harm, the use of materials like hand nets that allow for active decision-making about when and how to kill an insect, and striving to identify insects in the field whenever possible to reduce unnecessary insect deaths. It does need to be noted that decision-making processes varied significantly between interviewees.

This finding aligns well with assumptions of SPT that when a practice is disturbed, this may lead to new, critical reflection processes where decision-making becomes active (Shove, 2012; Rödl, 2025; Kanarp & Westberg, 2024). Moreover, it shows how different practitioners make different adjustments to their practices in line with a way that makes sense to them. This finding strengthens the findings by Barrett and colleagues (2024) that entomologists have started developing guidelines of their own in line with conversations on insect ethics. In addition, the decision-making processes show a lot of elements discussed in existing literature about suggested guidelines for entomologists, like Barrett & Fischer's (2024) Three R's framework for insects (Barrett & Fischer, 2024), Dijkhoorn's (2020) step-by-step identification plans and Trietsch & Dean's (2018) insect collector's code. For example, interviewees educated themselves to identify as much as possible in the field or avoiding use of lethal traps when possible. In addition, the dataset adds notable new insight that seems underexplored in existing suggestions concerning insect ethics in field entomology, namely, that a few interviewees added a step before starting to think about how to make a research process more ethical. This step was to question whether certain research

problems or personal interests were important enough to outweigh the potential harm caused to insects in answering them were justified at all. This questioning of research purposes in field entomology could be further explored in existing debates about the usefulness of more ecological data to solve climate problems (Morton, 2018) and about unknowable research questions (Singer, 1996).

Based on the finding of active decision-making processes, this thesis formulates two suggestions. Firstly, it suggests entomologists to critically examine their own practices and see how they can implement active decision-making processes into those, for which the examples provided in this study could serve as inspiration. This applies to entomologists within, as well as outside of field entomology. Secondly, it suggests those involved with developing guidelines on how to make practices of field entomology more ethical to not only consider changes in a research process, but to critically consider whether a research contribution is necessary in the first place. This applies to those developing theoretical guidelines in the context of conversations on insect ethics, but also to university boards and even politicians in the scenario that guidelines on insect ethics become institutionalized.

7.2 The financial costs of ethics

A second significant finding concerns a potential obstacle to changes taking place in practices of field entomology based on interactions with conversations on insect ethics, namely that when costs become important in practices of field entomology, this may pose an obstacle to the involvement of insect ethics in such practices. This risk both explicitly and implicitly in the dataset and can be found in themes 3 (meanings of fulfilling a paid request), 5 (materials for identification) and 6 (competencies of identification). The identified risk can be summarized as follows: theme 3 shows that when finances matter for practices of field entomology, this may cause an entomologist to let the instructions from a financier become leading, rather than their personal preferences. The decision-making processes influenced by conversation on insect ethics mentioned earlier in this discussion were not found in relation to the meaning of paid requests. This observation was found to be potentially detrimental to insect ethics when costs of less ethical practices are cheaper than costs of more ethical practices. Themes 5 and 6 find that the latter is often the case indeed, particularly in the sub-practice of sampling, because passive catching of insects and analysis using DNA is the least time consuming and therefore cheapest option. As such, the results indicate that when costs are important this may overshadow insect ethics.

This finding aligns well with SPT in the sense that it shows how a change in meanings influences materials and competencies too. Moreover, it shows that if something, in this case financial costs, prevents change from making sense to a practitioner, the practice is less likely to change. From an EC perspective, the

difference in interactions with conversations on insect ethics between meanings of contribution or personal interests and meanings of fulfilling a paid request could be looked at as a power imbalance. SPT is criticized sometimes for being able to detect such power imbalances but not being able to provide an understanding of them (i.e. Rödl, 2025; Niccolini, 2017). As such, future research is recommended to further explore this power imbalance between insect ethics and money.

Another argument in favour of more research about the power imbalance between insect ethics and money is that existing conversations on insect ethics provide limited insight into the role of money. Barrett and colleagues (2024) and Lövei and Ferrante (2024) touch upon the matter of costs in entomology but seem to not explicitly describe the potential tension between money and insect ethics within practices of field entomology which are described here. Moreover, this thesis recognizes the risk of money overshadowing insect ethics as a potential argument in favour of stricter, institutionalized regulations on ethics, which could be a contribution to existing conversations on insect ethics.

Moreover, this thesis recognizes that certain emerging materials, notably eDNA analysis and AI cameras, hold the potential to become an alternative to lethal passive traps and DNA. Theme 5 (materials of identification) finds that these materials avoid the killing, while being less time-consuming than other practices that avoid killing, like manual identification in the field. However, the interview results as well as research by Lövei and Ferrante (2024) shows that so far, these materials are not able to replace passive lethal traps and DNA analysis.

Based on the identified risk of money overshadowing insect ethics, this thesis suggests more research about the power imbalance between money and ethics. Moreover, researchers as well as developers are encouraged to improve the applicability of eDNA and AI cameras in field entomology. Finally, this thesis suggests that those involved with conversations on insect ethics, practices of field entomology and/or the financing of insect research recognize this risk and critically reflect on their own role.

7.3 Communication with actors from the social sphere

A third finding which is relevant to discuss, is that interactions with conversations on insect ethics were found to often stem from the social sphere and that responses to such interactions differed between interviewees and contexts. This finding outlines some obstacles to change, but also enables the identification of potential avenues for change to avoid these obstacles. Findings about interactions with conversations on insect ethics in the social sphere are described in themes 1 (meanings of contributing), 2 (meanings of personal interest) and 4 (materials to capture). These themes show that sometimes, interviewees indicated that when being confronted with arguments about insect ethics, they responded by explaining their practices and the decision-making processes based on ethics,

whereas other times interviewees expressed frustrations and even preferred to avoid these confrontations. Notably, frustrations of entomologists were identified when those that criticize practices of field entomology were not perceived to be mindful of other practices that cause harm to insects. Similarly, frustrations were identified when conversations on insect ethics were perceived to focus on emotions rather than arguments based on facts.

From the perspective of SPT, rejections by practitioners of field entomology to interact with certain confrontations on insect ethics seems to present an obstacle towards practices of field entomology changing because of conversations on insect ethics. This seems to be in line with Shove and colleagues' (2012) argument that if arguments to disrupt a routine do not make sense to a practitioner, the practice is unlikely to change. This thesis argues that practitioners of field entomology as well as societal actors interacting with practitioners about insect ethics have a responsibility to make these interactions more constructive. As explained, some practitioners already do so by responding to confrontations on insect ethics with an explanation of the decision-making involved in practices, an example which could be helpful for other practitioners to follow. The importance of not shying away from conversations is strengthened by Drinkwater and Robinson's (2019) argument that entomologists risk losing support if they underestimate the ethics of their work. In addition, the frustration about other practices than entomology causing harm, is foreseen by Lövei and colleagues (2023), who argue in response that entomologists can be considered to set an example for others in society to follow.

As such, this thesis suggests practitioners of field entomology not to shy away from confrontations on insect ethics. Instead, it recommends following the example set by some interviewees who involve active decision-making processes in their practices and to explain the basis of their decisions when they are confronted with arguments about insect ethics, thereby actively contributing to conversations on insect ethics as well as contributing to setting an example and maintaining public support. Simultaneously, this thesis suggests for people who are concerned about insect ethics to recognize that discussions with practitioners of field entomology about insect ethics may be more constructive when arguments involve facts and recognition of harm by other practices.

7.4 Communication within entomology

Finally, this thesis found that some interviewees frequently discussed insect ethics with fellow entomologists, especially in the sub-practice of education. Other entomologists, however, expressed limited experiences with such discussions. Findings about differing interactions within entomology are described in themes 1 (meanings of contribution) and 2 (meanings of personal interest). Using these findings, a potential avenue for change can be identified.

From an SPT perspective, it could be helpful for entomologists to exchange thoughts about how their practices are being disrupted by conversations on insect ethics and potentially change their practices to account for insect ethics collectively. The usefulness of such discussions is illustrated by discrepancies described in the result about how practitioners of field entomology involve insect ethics in their practices. An example of such a discrepancy can be found in theme 6 (competencies of insect identification), where some entomologists were found to express strong beliefs that educating could lead to less killing of insects, whereas others emphasized that education needs to involve killing insects. By engaging in discussions and perhaps even confronting one another about insect ethics, practices of field entomology could perhaps be changed further to involve less harming of insects by discussing what may make sense for the practice. Prior research by Barrett and colleagues (2024) identifies a similar issue and stresses the need for more education about insect ethics. This thesis agrees with that suggestion, but adds that simply exchanging thoughts or looking at examples set by others may be at least as important.

7.4.1 Limitiations and future research

There are several limitations that are important to be addressed in this study, as well as avenues for future research. Firstly, the selected theoretical framework, SPT has limited use for explaining adjustments and frictions that occur on a deeper level, as shows in relation to the power imbalance of money and insect ethics. Secondly, the research was conducted in a Western country. The methodology as well as some interview results indicate that in other parts of the world, practices of field entomology differ. Finally, the sample size of 8 interviewees is relatively limited. As such, the results cannot be considered representative of the wider entomological community. Despite these limitations, the results can still be helpful to inform entomologists, policy makers and those involved with conversations about insect ethics, especially in the Netherlands, and also provide an interesting basis for future research.

Throughout the discussion, some avenues for future research have been identified already, namely additional research about the power imbalance between insect ethics and money and about improving development of AI cameras and eDNA technologies. In addition, this thesis recommends performing a similar study to the one presented here but with a larger sample size and if possible, involving participant observations. In such a study, the approach and most important findings of the present study could be tested and expanded. Moreover, more studies involving non-Western perspectives on insect ethics are encouraged, as well as studies on how such perspectives compare to and could change Western perspectives.

8. Conclusion

This study has provided an account of how practices of field entomology interact with conversations on insect ethics related to sentience, ecological impacts and killing in general. It argues that understanding the interaction between these two phenomena leads to a better understanding of both, which can ultimately be used to envision and implement changes that result in less harm to insects, both individually, in terms of biomass and biodiversity. The study was approached using elemental SPT, which allowed for practices of field entomology to be deconstructed into meanings, materials and competencies. Conversations on insect ethics were positioned as a potential disruption to these meanings, materials and competencies.

The most important findings of this study are that firstly, some entomologists have started involving active decision-making processes in their practices that lead to less insects being killed or harmed, but these processes are not universal. Secondly, costs may form a potential obstacle to changes in practices of field entomology based on insect ethics. Thirdly, that there may be obstacles and room improvement in how interactions between practices of field entomology and conversations on insect ethics take place in the social sphere. And finally, that there may be room for improvement in communication about insect ethics within the entomological community.

Overall, this thesis suggests that as severe insect declines progress and research increasingly points toward insect sentience, it is time to change the ways in which we think about and treat insects. Entomologists have a powerful position to set an example in this change for others in society to follow. To do so, entomologists are recommended to (keep) looking critically at their practices and making active decision about when killing insects is justified. In addition, it recommends for entomologists to communicate openly with each other, as well as with people and organizations outside of the entomological community about these decision-making processes encouraging others to critically evaluate their own practices too. Moreover, this study recommends for those concerned about insect ethics whether in society, governance or academia to remain critical of other practices, including their own, and to communicate constructively with entomologists about insect ethics.

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Popular science summary [English]

Recent studies have argued that the way in which people in the Western world think about and treat insects needs to change, by recognizing them as beings that deserve and require ethical protection. This study suggests that entomologists have the power and responsibility to set an example towards more ethical thinking about and treating of insects, for others in society to follow. This is suggested to be achieved by involving ethics in research about insects and actively communicating to others within and outside of the entomological community about the ways of, and necessity for achieving such change.

In the past years, evidence of severe insect declines has led to calls for more research about the causes and consequences of these declines. Frequently, entomologists are tasked with performing such research, but ironically, their research tends to involve insects being killed or possibly suffering too. This puts entomologists into a difficult position, having to deal with questions like, when is it justified to kill or potentially harm an insect for research? When should it be avoided? And how can it be avoided? In contrast to vertebrate animals, little to no regulations exist to guide these questions. Therefore, this study aims to provide some guidance. It is the first study to do so based on experiences of entomologists.

The findings of this study suggest first and foremost, for entomologists to (keep) reflecting critically on decisions like why and how they perform research, asking themselves how killing and potentially harming insects could be minimized. The study found that many entomologists engage in such processes already but that not all of them talk to each other about these decisions. This is considered a missed opportunity. As such, entomologists are suggested to engage in discussions on insect ethics with each other more frequently.

The study also identifies an important obstacle to more insect ethics being involved in research, namely that financial costs of a research approach may risk overshadowing the importance of insect ethics. Additional research is recommended about how new technologies and potential regulations on insect ethics could circumvent this obstacle.

Now one may read this and think, ‘but are there not other activities that kill insects too, potentially at a much larger scale, like driving a car or treating crops with pesticides?’ Indeed, while entomologists are encouraged to set the right example, it needs to be recognized that they are not solely responsible for changing the ways in which insects are being treated and thought about. Other societal activities that each of us may be involved with on a daily basis require critical rethinking too.

This study was approached by interviewing eighth entomologists from the Netherlands and analyzing these interviews using social practice theory.

Samenvatting voor Populaire wetenschap [Dutch translation]

Recente studies beargumenteren dat de wijze waarop mensen in Westerse culturen insecten bejegenen en behandelen moet veranderen, door ze te benaderen als wezens die ethische bescherming verdienen en zelfs nodig hebben. Deze studie suggereert dat entomologen de macht en verantwoordelijkheid hebben om een voorbeeldfunctie in te nemen in deze verandering richting vernieuwde omgang met insecten, die anderen in de maatschappij kunnen volgen. De studie laat zien hoe dit bereikt kan worden door ethiek voor insecten te verwerken in onderzoek en door actief te communiceren met anderen, zowel binnen als buiten de entomologische gemeenschap, over het belang van een nieuwe aanpak.

In de afgelopen jaren heeft bewijs over de achteruitgang van insecten geleid tot een roep om meer onderzoek naar de oorzaken en gevolgen van deze achteruitgang. Deze taak komt vaak bij entomologen te liggen, maar ironisch genoeg maakt het doden en mogelijk pijn doen van insecten vaak ook deel uit van hun onderzoeksmethoden. Hierdoor belanden entomologen in een lastige positie, waarin ze om moeten gaan met vragen als, ‘wanneer is het gerechtvaardigd om een insect te doden of pijn te doen voor onderzoek?’ ‘Wanneer moet dit voorkomen worden?’ En ‘hoe kan dit voorkomen worden?’ In tegenstelling tot onderzoek naar vertebrate dieren bestaan er nauwelijks regels om zulke vragen te navigeren. Daarom probeert deze studie een aantal richtlijnen aan te geven. Het is de eerste studie die dat doet op basis van ervaringen van entomologen.

De bevindingen van het onderzoek suggereren dat het belangrijk is voor entomologen om kritisch te (blijven) reflecteren op de beslissingen die ze maken, bijvoorbeeld over wanneer en hoe onderzoek uitgevoerd wordt. Het is hierin belangrijk om af te wegen hoe het doden en mogelijk pijn doen van insecten zo veel mogelijk gelimiteerd kan worden. Het onderzoek laat zien dat veel entomologen zich al met zulke beslissingen bezighouden, maar dat ze hier niet altijd over praten met andere entomologen. Dat is een gemiste kans. Daarom wordt het entomologen aangeraden om vaker met elkaar te discussieren over ethiek voor insecten.

De studie laat ook een mogelijk obstakel zien om ethiek voor insecten meer in onderzoek te betrekken, namelijk dat de kosten van een onderzoek het belang van ethiek voor insecten soms lijken te overschaduwen. Meer onderzoek is nodig naar hoe nieuwe technologieën en mogelijke regels over ethiek voor insecten dit obstakel kunnen omzeilen.

Nu zou het kunnen dat je dit leest en denkt ‘maar zijn er niet hele andere activiteiten die ook insecten doden, wellicht zelfs op grotere schaal, zoals autorijden of gebruik van pesticiden?’ En inderdaad, hoewel deze studie

entomologen aanraadt om het goede voorbeeld te laten zien, is het ook belangrijk om te benadrukken dat zij niet als enige verantwoordelijkheid dragen om de manier waarop insecten worden bejegend en behandeld te veranderen. Andere activiteiten in de maatschappij waar wij allen wellicht aan bijdragen moeten ook worden voorzien van een kritische blik.

Deze studie werd aangevlogen door middel van acht interviews met entomologen in Nederland. De interviews werden geanalyseerd door de lens van social practice theory.

Acknowledgements

I would like to express my sincerest gratitude to my supervisor René van der Wal for his many words of advice, without which this thesis would have been unlikely to be finished, but at least as much for his enthusiasm and passion about this topic. There were times where I lost excitement about the topic myself, but speaking to you, René, always reinvigorated my enthusiasm.

Moreover, a lot of gratitude goes out to the eight entomologists that were willing to share their experiences and discuss the details of what it means to be an entomologist with me.

In addition, I would like to thank Malte Rödl for his words of advice.

Finally, I am greatly indebted to Amber Jansen, Emilia Goessler and Lorenzo Bartoccetti for being in the trenches with me from the Netherlands, to Sweden, to Italy, to France these past months and for always lending a listening ear.

Appendix 1: Participant information sheet (English version + Dutch translation)

English version:

Participant Information Sheet: Practices of entomologists in the Netherlands
You are being invited to take part in a research study that is part of my Independent Master Thesis Project at the Environmental Communication Division at the Swedish University of Agricultural Sciences (SLU). Before you decide whether you want to participate, I would like to inform you why I am conducting this research and what it involves. Please read the following information carefully and discuss it with others if you wish. If anything is unclear or if you would like to have additional information, please ask. Thank you for your time.

Who will conduct the research?
Jasmijn Godding, Master's student
Environmental Communication Division
SLU (Sveriges Lantbruksuniversitet Uppsala // Swedish University of Agricultural Sciences Uppsala)
Almas Allé 8
750 70, Uppsala

What is the aim of this research
In recent years, various academic papers have debated the best practices for collecting and researching insects in the context of harm-minimization and ethics. Simultaneously, rapid technological advancements lead to the (potential) emergence of new methods for collecting and researching insects.

Building on these developments, I aim to investigate established and new practices in entomological field-research in the Netherlands. I approach the study using a qualitative methodology, namely semi-structured interviews. I plan to code the data from these interviews using the lens of social practice theory, which breaks practices down into materials, meanings and competencies.

Why have I been selected for this project?
You have been asked to participate in this study because you conduct, or have previously conducted, entomological field-research in the Netherlands. You will be one of around 10 to 15 interviewees selected from various research institutes in the Netherlands.

What would I be asked to do if I took part?

In the interview, I will ask you questions related to your field-research on insects (past, present and future). My interest lies particularly with the types of research methods, reasons for selecting these methods, ethical considerations and alternative/emerging methods in your research (field).

What happens to the data collected?
All data will only be used in a way that has been agreed upon with you prior to the interview. Moreover, your data will only be stored until the independent project has been assessed and the grade registered in the SLU student registry (estimated June 2025).

The data will be used to inform my independent research project and may be included in oral or written form into other outcomes of this research, such as presentations.

Your name and other personal data will be anonymized. However, as I would like to use quotes and the number of entomologists in the Netherlands is limited, complete anonymization cannot be guaranteed. If you would like to participate in the research, but do not want to be quoted or want to review the quotes before I use them, please let me know and we can arrange something .

What happens if I do not want to take part or if I change my mind?
You can decide whether or not you want to participate in this study. If you decide to participate, you will be given this information sheet to keep and be asked to sign a consent form. If you decide to participate you are still free to withdraw up until the end of the independent project (estimated June 2025) without providing a reason and without detriment to yourself.

What is the duration of the research?
The interview will last around 30-60 minutes, or as long as you are willing to give me.

Where will the research be conducted?
You can decide on the location for the interview. I could come to meet you in person at a location of your choice or we would talk via telephone, Zoom or Teams.

Will the outcomes of the research be published?
As this is an independent project within a school setting, the outcome of this research will not be published.

Who do I contact with questions or complaints?
You can contact the student performing this study:

Jasmijn Godding
Jngo0004@stud.slu.se
+31 6 28 81 32 63

Or her supervisor
René van der Wal
Rene.van.der.wal@slu.se

Dutch translation:

Informatie voor deelnemer aan de studie: Een duik in gevestigde en opkomende praktijken in veld-entomologie en de invloed van deze praktijken op de omgang met, en denkwijze omtrent insecten
U wordt bij deze uitgenodigd om deel te nemen aan een onderzoek dat deel uitmaakt van mijn onafhankelijke masterscriptie project aan de afdeling Environmental Communication [milieucommunicatie] van de Swedish University of Agricultural Sciences (SLU) [Zweedse Universiteit voor Landbouwwetenschappen]. Voordat u beslist of u wilt deelnemen, informeer ik u graag over de inhoud van dit onderzoek. Lees de onderstaande informatie zorgvuldig door en bespreek het desgewenst met anderen. Mocht er iets onduidelijk zijn, of mocht u aanvullende informatie willen, dan vraag het gerust. Hartelijk dank voor uw tijd.

Wie voert het onderzoek uit?
Jasmijn Godding, Master's student
Environmental Communication Division // Afdeling Milieucommunicatie
SLU (Sveriges Lantbruksuniversitet Uppsala // Zweedse Universiteit voor Landbouwwetenschappen)
Almas Allé 8
750 70, Uppsala

Wat is het doel van dit onderzoek?
In de afgelopen jaren is in verschillende academische artikelen gedebatteerd over de beste praktijken voor het verzamelen en onderzoeken van insecten in de context van ethiek. Tegelijkertijd leiden snelle technologische ontwikkelingen tot de (potentiële) opkomst van nieuwe methodes om insecten te verzamelen en onderzoeken, die eveneens ethische vragen oproepen.

Voortbouwend op deze twee ontwikkelingen doe ik in mijn scriptie onderzoek naar de gevestigde en opkomende praktijken in entomologisch veldonderzoek, en

de invloed van deze praktijken op de manier waarop met insecten wordt omgegaan en hoe er over ze wordt gedacht.

Met praktijken bedoel ik de wisselwerking tussen gewoontes, materialen, methodes en betekenissen van de verschillende dimensies van entomologisch onderzoek.

Ik benader dit onderzoek door middel van een kwalitatieve methodologie, namelijk semi-gestructureerde interviews. De data uit deze interviews codeer ik met behulp van 'social practice theory', een theorie die praktijken ziet als het samen komen van specifieke materialen, betekenissen en competenties.

Waarom ben ik geselecteerd voor dit onderzoek?
U bent gevraagd om deel te nemen aan dit onderzoek omdat u entomologisch veldonderzoek doet, of heeft gedaan. U bent een van de 10 tot 15 deelnemers die zijn geselecteerd uit verschillende onderzoeksinstellingen in Nederland.

Wat wordt er van mij gevraagd als ik deelneem?
In het interview zal ik u vragen stellen over uw veldonderzoek naar insecten (in het verleden, heden en de toekomst). Mijn interesse gaat met name uit naar de typen onderzoeksmethodes, de redenering voor het gebruik daarvan, ethische overwegingen en alternatieve/opkomende methodes in uw onderzoek en onderzoeksveld.

Wat gebeurt er met de verzamelde gegevens?
Alle gegevens worden enkel gebruikt op een manier die voorafgaand aan het interview met u is overeengekomen.

De gegevens worden gebruikt voor mijn onafhankelijke onderzoeksproject en kunnen in mondelinge of schriftelijke vorm worden opgenomen in andere resultaten van dit onderzoek, zoals presentaties of publicaties.

Uw naam en andere persoonsgegevens worden geanonimiseerd. Echter ben ik van plan citaten te gebruik en gezien het aantal entomologen in Nederland beperkt is, kan ik volledige anonimisering niet garanderen. Als u wilt deelnemen aan het onderzoek, maar niet geciteerd wil worden of de citaten wilt inzien voordat ik ze gebruik, dan kunnen we daar afspraken over maken.

Wat gebeurt er als ik niet mee wil doen of als ik van gedachten verander?
U kunt zelf beslissen of u wel of niet wilt deelnemen aan dit onderzoek. Als u besluit mee te doen, krijgt u dit informatieblad om te bewaren en wordt u gevraagd een toestemmingsformulier te ondertekenen. Als u besluit om deel te nemen, bent u nog steeds vrij om u terug te trekken, tot het project ten einde is (naar schatting juni 2025) zonder opgaaf van reden en zonder nadeel voor uzelf.

Wat is de duur van het onderzoek?
Het interview zal ongeveer 40-60 minuten duren, of zo lang als u bereid bent om mij te geven.

Waar vindt het onderzoek plaats?
U kunt zelf de locatie voor het interview bepalen. Ik kan u persoonlijk ontmoeten op een locatie van uw keuzen, of we kunnen het interview via telefoon, Zoom of Teams houden. Zowel weekenddagen als doordeweekse dagen zijn wat mij betreft mogelijk.

Worden de resultaten van het onderzoek gepubliceerd?
De insteek van het onderzoek is die van een educatief project, maar er bestaat een kans dat de resultaten, of een deel daarvan, na afronding van het onderzoek worden gepubliceerd.

Met wie kan ik contact opnemen wanneer ik vragen of een klacht heb?
U kunt altijd contact opnemen met de student die dit onderzoek uitvoert
Jasmijn Godding
Jngo0004@stud.slu.se
+31 6 28 81 32 63

Of met haar begeleider
René van der Wal
Rene.van.der.wal@slu.se

Appendix 2: Information and consent sheet (English version + Dutch translation)

English version:

Department of Environmental Communication
Jasmijn Godding (student)

INFORMATION AND CONSENT FORM

10/02/25

When you consent to take part in the independent project "A deep dive into established and emerging practices in entomological field-research, and the influence of these practices on the treatment of insects" you consent to the Swedish University of Agricultural Sciences (SLU) processing your personal data. Consenting to this is optional. However, if you do not consent, you cannot take part in the project. This form aims to give you all the information you need to decide whether you consent to participating in the project and to SLU processing your personal data.

Consent is the legal basis for processing your personal data. You can withdraw your consent at any time, and you do not have to justify this. However, withdrawing your consent will not affect the processing that has already taken place. SLU is responsible for processing your personal data. SLU's data protection officer can be contacted at dataskydd@slu.se. Your contact person for the project is the student Jasmijn Godding (jngo0004@stud.slu.se). You can also contact the supervisor René van der Wal (rene.van.der.wal@slu.se)

The research consists of semi-structured interviews, and will collect the following personal data:

Table 2. Overview of personal data collected for informed consent

Description	Justification	Comments
Name; email address and/or phone number	Necessary for contacting and setting up the interview	Name, email address and phone number are processed separately to research data. Pseudonyms are used to identify participants in the project. Only the student and their supervisor will have access to the original names.

Age; gender; educational background; affiliated research institute	Necessary to provide context to the interview data	
Interview audio recordings	Necessary to transcribe interview and conduct coding analysis	Audio recordings are deleted after transcription. Names in the transcript are pseudonymized.
Information about past and current field-research on insects, with a focus on the methodology. Questions pertain to types of research methods, reasons for selecting methods, ethical considerations and alternative/emerging methods.	Insight into established and emerging practices in the field of entomology and the impact of these practices on insects.	The information about interviewee's field-research on insects will be discussed in aggregate, without revealing specific details that could readily identify the interviewee.

The purpose of processing your personal data is to allow the SLU student to carry out their independent project "A deep dive into established and emerging practices in entomological field-research, and the influence of these practices on the treatment of insects" with good scientific quality. Your personal data will not be transferred to other organisations or companies.
Your personal data will be stored until the independent project has been assessed and the grade registered in the SLU student registry. After that, the data will be disposed of. The data will be handled in a way that prevents unauthorised access. More information on how SLU processes personal data, and about your rights, is available at www.slu.se/personal-data. You have the right, under certain circumstances, to have your personal data erased, corrected or limited. You also have the right to access the personal data being processed, and you have the right to object to the processing of your data.

If you have any comments, contact the data protection officer at dataskydd@slu.se. If you want to make a complaint, contact the Swedish Authority for Privacy Protection at imy@imy.se. Read more about the Swedish Authority for Privacy Protection at www.imy.se.

☐ I hereby consent to take part in this independent project and to SLU processing my personal data in the manner explained in this text, including any sensitive data I may submit.

_____

Signature Date

_____

Name in block letters

Dutch translation:

Afdeling Environmental Communication [milieucommunicatie]
Jasmijn Godding (student)

INFORMATIE EN TOESTEMMINGS FORMULIER

10/02/25

Deelname aan een onafhankelijk project bij SLU (Zweedse Universitetiv oor Landbouwwetesnchappen) – toestemming en informatie over de verwerking van uw persoonsgegevens

Wanneer u instemt om deel te nemen aan het onafhankelijke project "*A deep dive into established and emerging practices in field-ecology and the influence of these practices on the ways insects are being treated and thought about"* [Een duik in gevestigde en opkomende praktijken in veld-entomologie en de invloed van deze praktijken op de omgang met en denkwijze omtrent insecten] geeft u SLU toestemming om uw persoonlijke gegevens te verwerken. Toestemming is optioneel. Wanneer u geen toestemming geeft, kunt u echter niet deelnemen aan het project. Dit formulier is bedoeld om u van alle informatie te voorzien die u nodig heeft om te besluiten of u toestemming geeft voor deelname aan het project en voor de verwerking van uw persoonlijke gegevens door SLU.
Consent, ofwel toestemming, is de wettelijke basis voor het verwerken van uw persoonlijke gegevens. U kunt uw toestemming te allen tijde intrekken en u hoeft dit niet te rechtvaardigen. Het intrekken van uw toestemming heeft echter geen invloed op de verwerking die al heeft plaatsgevonden. SLU is verantwoordelijk voor de verwerking van uw persoonsgegevens. U kunt contact opnemen met SLU's functionaris voor gegevensbescherming via dataskydd@slu.se. Uw contactpersoon voor het project is studente Jasmijn Godding (bereikbaar via

jngo0004@stud.slu.se). U kunt ook contact opnemen met de begeleider van dit project, René van der Wal (bereikbaar via rene.van.der.wal@slu.se)
Het project bestaat uit interviews en zal de onderstaande persoonlijke gegevens verzamelen en verwerken:

Table 3. Overview of personal data collected for informed consent translated in Dutch

Omschrijving	**Rechtvaardiging**	**Opmerkingen**
Naam; e-mailadres en/of telefoonnummer	Nodig om contact op te nemen en het interview af te nemen	Naam, e-mailadres en telefoonnummer worden apart van de onderzoeksgegevens verwerkt. Er worden pseudoniemen gebruikt om de geïnterviewden in het project te beschrijven. Enkel de student en diens begeleider hebben toegang tot de originele namen.
Opleidingsachtergrond; gelieerd onderzoeksinstituut	Nodig om context te geven aan de interviewgegevens.	
Geluidsopnamen interview	Nodig om interviews te transcriberen en codering analyse uit te voeren.	Geluidsopnamen worden getranscribeerd met behulp van TurboScribe. Namen in het transcript worden gepseudonimiseerd.
Informatie over eerder en huidig veldonderzoek naar insecten, met nadruk op de methodologie. De vragen hebben betrekking op huidige/toekomstige methodes, redenen om gebruik te maken van	Nodig om inzicht te verkrijgen in gevestigde en opkomende praktijken in veld-entomologie en de invloed van deze praktijken op omgang met en denkwijze over insecten.	Het onderzoek en de methodes voor insectenverzameling van de geïnterviewde worden in hun geheel besproken, zonder specifieke details te onthullen waarmee de geïnterviewde gemakkelijk

	deze methodes, ethische overwegingen.		geïdentificeerd zou kunnen worden.	

Het doel van de verwerking van uw persoonlijke gegevens is om de SLU-student in staat te stellen diens onafhankelijke project uit te laten voeren met goede wetenschappelijke kwaliteit. Uw persoonlijke gegevens worden niet gedeeld met andere organisaties of bedrijven en worden zodanig behandeld dat onbevoegde toegang wordt voorkomen.
Meer informatie over hoe SLU persoonsgegevens verwerkt en over uw rechten vindt u op www.slu.se/personal-data. U hebt onder bepaalde omstandigheden het recht om uw persoonsgegevens te laten wissen, corrigeren of beperken. U hebt ook het recht op toegang tot de persoonsgegevens die worden verwerkt en u hebt het recht om bezwaar te maken tegen de verwerking van uw gegevens.

Als u opmerkingen heft, kunt u contact opnemen met de functionaris voor gegevensbescherming op dataskydd@slu.se. Als u een klacht wilt indienen, kunt u contact opnemen met de Zweedse Autoriteit voor privacybescherming op imy@imy.se. Lees meer over de Zweedse autoriteit voor privacybescherming op www.imy.se.

☐ Ik geef hierbij toestemming om deel te nemen aan dit onafhankelijke project en voor SLU om mijn persoonlijke gegevens te verwerken op de manier die in deze tekst wordt uitgelegd, inclusief eventuele gevoelige gegevens die ik indien.

_____

Handtekening Datum

_____

Naam in blokletters

Appendix 3: Interview guide (English version + Dutch translation)

English version:
Ask verbal consent for recording
Start recording

Before we start the questions, I once more would like to stress that participation in this interview is voluntary and if you want to terminate it early for whichever reason, that is no problem. If there are questions you feel uncomfortable answering for, let me know and we can skip that question or end the interview.

I am conducting this interview for my Master's Thesis. Today, I am interested in learning from you about the established and emerging practices in entomological field-research, and the influence of these practices on the way insects are being treated and thought about.

When I say practices, I refer to the interplay between habits, materials and methods that are common in your research, and the meanings of different elements of your research.

I would like to emphasize in this regard that my background is that of a social sciences student, not of an entomologist. So it may occur that I ask you for clarifications even about common methods, as I am a bit of a newbie. In addition, my interest for today really lies with field research, so it may occur that I steer the conversation away from experiences in the laboratory.

Do you have any questions so far?

Then let's move on to the interview

Interview Guide
Question 1: Could you briefly tell me about your journey to becoming an entomologists

- (academic background, entry into entomology)

Question 2: What insects do you work with?

- Other animals?

Question 3: What kind of entomological field research have you been involved in?

- Either directly, or through peers or through educating others?

- **Question 4: What is your primary motivation for doing the research you do?**

Question 5: What would you say are the most common methods you use when researching insects in the field?

- Why do you use, did you use or recommend others to use these specific methods?
- Has your method-use changed throughout the years?

Question 6: Do you keep an eye out for the development of new methods for entomological field research?

- What role do you see for new technologies in your research field?
- How do you learn about these new methods?

Question 7: How much of your research is dependent on insect catching and collecting?

- Do you recognize ethical dimensions in this regard? (internally and externally)

Question 8: Is there frequent ethical discussion concerning insect catching and collecting in your institute or wider field?

- (what is being discussed?)
- (what is the response in these ethical discussions)
- Have you noticed changes throughout your career in this regard
- Where do you think these discussions originate?

Question 9: Do you need to apply for ethical permission when performing research on insects?

Question 10: We spoke earlier about the development of new methods for entomological field research. What is their role in these debates concerning ethics?

- Personal consideration of alternatives to catching and collecting?
    - Promising developments
- Did you ever get training on insect ethics?
- What is your view on insect sentience?

Question 11: Do you have thoughts (or concerns) on how the ethics around field-entomology may change in the next ten years or so?

That was my last question. Thank you very much, you have given me a lot to think about. Are there any other matters you would like to discussing relating to this conversation? Or do you have any questions still?

Thankyou, I will now stop the recording.

Dutch translation:

Toestemming vragen om op te nemen
opname starten

Voordat we aan de vragen beginnen, wil ik nogmaals benadrukken dat deelname aan dit interview vrijwillig is en als je om welke reden dan ook eerder wilt stoppen, is dat geen probleem. Als er vragen voorbij komen waarop je liever geen antwoord geeft, laat het me dan weten en dan slaan we die vraag gewoon over, of kunnen we het interview beëindigen.

Ik doe dit interview voor mijn masterscriptie. Mijn onderzoek is gericht op de gevestigde en opkomende praktijken in entomologisch veldonderzoek, en de invloed van deze praktijken op de manier waarop met insecten wordt omgegaan en hoe er over ze gedacht wordt.

Met praktijken bedoel ik de wisselwerking tussen gewoontes, materialen, methodes en betekenissen van de verschillende dimensies van entomologisch onderzoek.

Ik wil hierbij benadrukken dat mijn achtergrond die is van een student in sociale wetenschappen, en niet van een entomoloog. Het kan dus voorkomen dat ik om opheldering vraag, zelfs over veel voorkomende methodes. Daarnaast ligt mijn interesse voor vandaag echt bij veldonderzoek, dus het kan gebeuren dat ik het gesprek weg-leid van ervaringen in het laboratorium.

Heb je tot nu toe nog vragen?

Dan stel ik voor dat we verder gaan met het interview.

Vraag 1: Kun je me in het kort vertellen over de weg die je afgelegd hebt om entomoloog te worden en blijven?

- (academische achtergrond, intrede in de entomologie, met jaarsaanduiding)
-

Vraag 2: Met wat voor insecten werk je (vooral)?

- Werk je ook met andere dieren?

Vraag 3: Bij wat voor entomologisch veldonderzoek ben je zoal betrokken geweest?

- Rechtstreeks, maar ook indirect, bijvoorbeeld via collega's of door studenten te instrueren?

Vraag 4: Wat is jouw primaire motivatie om het onderzoek te doen dat je doet?

Vraag 5: Welke methodes gebruik je het meest om veldonderzoek te doen naar insecten? Voor je eigen onderzoek, maar ook voor onderzoek van collega's of bijvoorbeeld studenten?

- Waarom kies je juist deze methodes?
- Is er in de loop der jaren verandering opgetreden in de methodes die je gebruikt of aanraadt aan anderen?

Vraag 6: Houd je de ontwikkeling van nieuwe methodes in entomologisch veldonderzoek in de gaten?

- Zijn er in de afgelopen pakweg tien jaar veel nieuwe methodes geïntroduceerd en wellicht ook genormaliseerd binnen je onderzoeksveld?
- Hoe kom je in aanraking met dit soort nieuwe methodes?

Vraag 7: Tot op welke hoogte is jouw onderzoek afhankelijk van het vangen en verzamelen van insecten?

- Is daar voor jouw een ethische dimensie aan verbonden? (intern en/of extern) (zo ja, dan proberen te verdiepen: in welke zin, etc?)

Vraag 8: Kom je wel eens ethische discussies tegen over het vangen en verzamelen van insecten?

- Waar kom je deze discussies tegen?
- (wat wordt daarin besproken?)
- (wat voor reacties zie je hierop voorbijkomen?)
- Heb je gedurende je carrière veranderingen opgemerkt omtrent ethische discussies over insecten?
- Waar denk je dat deze discussies vandaan komen?

Vraag 9: Moet je wel eens ethische toestemming aanvragen wanneer je onderzoek doet naar insecten?

Vraag 10: We hebben het eerder even gehad over de ontwikkeling van nieuwe methodes voor entomologisch veldonderzoek. Spelen die een rol in ethische discussies over insecten?

- Persoonlijke overwegingen wanneer je insecten vangt en verzamelt om onderzoek naar te doen?
- Veelbelovende ontwikkelingen?
- Trainingen over insecten ethiek?
- Mening over het bewustzijn van insecten?

Vraag 11: Heb je inzichten, of zorgen die je zou willen delen over hoe de ethiek rondom veld-entomologie zou kunnen veranderen in de komende tien jaar?

Dat was mijn laatste vraag. Enorm bedankt, je hebt me veel gegeven om over na te denken. Zijn er nog zaken die jij graag wilt benoemen met betrekking tot dit gesprek? Of heb je nog vragen?

Nogmaals, heel erg bedankt. Ik stop nu de opname.

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