

Ecolinguistic Approach to Online Finnish Discourse on Invasive Alien Species

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Abstract

This ecolinguistic article investigates how alien species are perceived in mundane interactions in Finnish online discussions, based on data collected from the popular Finnish Suomi24 online discussion forum. We ask: What organisms does the lexical item *vieraslaji* ‘alien species’ cover for the forum participants, and what kinds of discourses are built around the term *vieraslaji*? The results of digital content analysis and discourse analysis show that nonhuman animals and humans are much more common topics than plants; this indicates that the nature discourse related to alien species is animal centered and that certain species dominate the discussions. The lexical item *vieraslaji* is used in affective contexts, reflecting the fact that discussion of invasive species is emotionally laden. Our analysis also reveals that the discursive features of online discussions on invasive species show similarities with online anti-immigration hate speech discourse, and that xenophobic discourse is partially inspired by the nature discourse. Based on these results, we argue that a more diverse discussion about alien species is needed.

Introduction

Globally, the natural environment faces many changes. In fact, the sixth mass extinction has arguably started, and it has an impact on many ecosystems (e.g., Kolbert, 2014). However, that is not the only factor altering our environment. Other factors have an influence on the quantity of species and the balance between them. One central cause behind changes in biodiversity is nonhuman species traveling to new regions outside their native distributional range (Kumschick et al., 2014). Such species are classified as *invasive alien species* (sometimes also *non-native*, *introduced*, *foreign*, or *exotic species*¹), and they are defined as opposite to *native species*, which have autocolonized an area since a selected time in the past (see, e.g., Warren, 2007). Being *invasive* refers to having an adverse impact on the new environment (see MacNeely, 2011). Humans tend to have rather negative attitudes toward alien species, especially, which are perceived as threats to the existing local environment and its culture (see Rotherdam & Lambert, 2011). However, there is no universal consensus about the effects of alien species on local ecologies (Russell & Blackburn, 2017).

In this study, we analyzed the perceptions and attitudes of the general public toward alien species from a linguistic perspective. The data come from naturally occurring online discussions in the most-visited discussion forum in Finland: Suomi24 (‘Finland24’). We treat the online discussions as *vernacular public*

discourse (Johansson, 2017): everyday talk taking place in a (digital) public space produced by ordinary social actors. We approach the perceptions and attitudes toward alien species by examining how the Finnish expression *vieraslaji* ('alien species') is used in the data.² The expression is a lexical item that belongs to the scientific terminology of biology and has a specific meaning in that context, but as with many other terms, it is also used in mundane interaction. We are interested in the mundane use of the term and how it potentially differs from the definition the term has in a scientific context. Our main research questions are as follows: 1) How do participants in the online forum use the lexical item *vieraslaji*, and what species does the term cover for them? 2) What kinds of discourses are built around the lexical item *vieraslaji* in these discussions?

Much of the research on alien species has been conducted by natural scientists, and their focus has been, for example, on ecological changes of flora and fauna (e.g., DAISIE, 2009). However, some studies have focused on broader social and societal issues around alien species. A volume edited by Rotherdam and Lambert (2011) addresses alien species in terms of the perceived threats and environmental concerns that surround them, and Shackleton et al. (2019) highlight how people's perceptions influence the management of invasive alien species (see also Coates, 2007; Selge et al., 2011). In the aforementioned studies, the role of language and linguistic choices in debates and discussions on alien species is acknowledged; for example, the linguistic use of different terms referring to "alien" and "native species" has been addressed in several articles (see also Warren, 2007, on the critique of the classification of species as either "native" or "alien"). However, studies on the use of these terms in different datasets are largely absent (see Larson, 2008, on scientific discourse on invasive species). We aim to fill this gap in the research by providing an empirical description of the ways in which the Finnish word for 'alien species' is used in everyday online discussions. Our research also brings a novel perspective to studying human–nature relations, as non-expert perceptions about alien species have not been studied in a Finnish context.³

Our approach is ecolinguistic. The term *ecolinguistics* has several definitions (Stibbe, 2015, pp. 7–8), but by and large, the term is used relatively broadly; for example, Herlin (2012) states that any linguistic research with a focus on human–nature relations may be called ecolinguistics, and Zhou (2021) argues that ecolinguistics has developed into an umbrella term covering any linguistic research with an ecological perspective. According to Fill (2018), research done as *ecolinguistics* can be summarized as dealing with the role of language concerning the environment (in its biological/ecological sense). Within ecolinguistics, our study is connected to an emerging interest in human–nature relations (see, e.g., Cook & Sealey, 2018; Cornips, 2019; Peltola et al., 2021; Poole, 2022) because our focus is on how humans perceive other species.

Methodologically, our study is anchored in linguistic (language-focused) content analysis and digital discourse analysis (see, e.g., Gredel, 2017, and Garcés-Conejos Blitvitch & Bou-Franch, 2018; also referred to as *computer-mediated discourse analysis*; Herring, 2004). We are concerned with the use of a specific lexical item, *vieraslaji* ('alien species') in a particular digital communicative setting, that is, Finnish online forum discussions. In the analysis, the focus is on the semantic and lexical features and syntactic context of the target item *vieraslaji*, as well as the discourses in which the item is used. By *discourse*, we refer to meaning-making practices tied to specific social action as expressed through language (Fairclough, 1992; see also van Dijk, 1997; Johnstone, 2002). By analyzing discourse, we thus analyze language in a specific context and for specific purposes (for a more comprehensive discussion on the use of the term discourse, see Partington et al., 2013). Our methods are data-driven, and the analysis concentrates on the identification of the linguistic phenomena in the data.

The article is structured as follows: In the next section, we introduce our data – how and where they were collected and analyzed. The section afterward presents the analysis. We analyze how participants understand the Finnish term *vieraslaji* by identifying which species the term is used to refer to. Then, we focus on the discursive features of the term by analyzing the contexts in which the term is used. Finally, we sum up the key points and results.

Data

The data come from the electronic Suomi24 corpus available in the Language Bank of Finland. The corpus consists of posts written in the Suomi24 ('Finland24') online discussion forum, which is the largest online discussion board in Finland. The corpus is tokenized and morpho-syntactically annotated; this means that

the raw text material in the corpus has been broken into sentences and words (*tokens*), which have then been annotated with morpho-syntactic analysis done by FIN-CLARIN at the Department of Modern languages, University of Helsinki. (For a description of the Suomi24 data in Finnish, see Lagus et al., 2016.) The same data have been used in other studies that focus on the linguistic features of Finnish online discourse (see, e.g., Jantunen, 2018; Johansson et al., 2018; Lahti, 2018; Lehti et al., 2020; Määttä et al., 2020, 2021). In this study, we used the sub-corpus “The Suomi24 Sentences Corpus 2001–2017,”⁴ which consists of discussions that took place on the Suomi24 discussion forum between January 1, 2001, and December 31, 2017; the data contain 351,985,002 sentences and 4,132,665,850 tokens.

We conducted a search with the lemma *vieraslaji* in the corpus by using the Korp concordance tool. Altogether, the data included 1,659 hits of the lemma. Because we intended to qualitatively analyze each occurrence and the surrounding context, we had to narrow down the search results. Therefore, we decided to focus on the occurrences of the lexical item *vieraslaji* in the nominative singular form (i.e., the basic form of the word). In Finnish, case indicates the syntactic function of a phrase, so focusing on the nominative case narrowed the syntactic context to subject, predicative subject complement, and some object positions (see Karlsson, 2017; see also Hakulinen et al., 2004).

How studying singular instead of plural forms affected the analysis is complex. It could be expected that the singular form is used to talk about specific alien species rather than the phenomenon as a whole, but in Finnish, a singular form may also be used to create a generic reference. According to a comprehensive grammar of Finnish (Hakulinen et al. 2004), a nominal phrase in singular form can be used to create a generalized, unspecific reference to a category of referents, in which case the clause is not tied to a specific time or place. Hakulinen et al. (ibid.) mention that these so-called generic nominal phrases in singular form are especially typical when talking about species-specific behavior or characteristics (see also Vilkuna, 1992). Also in our data, *vieraslaji* in singular form is used to talk about a certain species in a general manner, not to refer to a specific individual (e.g., *Milloin esim. Metsäpeurasta (Rengifer tarandus fennicus) on tullut vieraslaji* ‘When did Finnish forest reindeer (*Rengifer tarandus fennicus*) become an alien species’). Given the aforementioned tendencies in the use of nominative singular forms in Finnish, narrowing the data gears our collection of tokens toward predicative expressions that describe and identify certain species as alien. This is in line with one research objective: to find out which species are typically defined as alien in online discussions.

After narrowing our focus to nominative singular forms, we removed double hits caused by quoting. This resulted in a collection of 348 sentences with the token *vieraslaji*. These sentences occur in discussion threads dealing with various topics; in our collection, the most common discussion forum topic categories⁵ are “Society” (N=140), “Pets” (N=75), “Regions” (N=57), “Hobbies” (N=31; common sub-categories are “Nature and hiking” N=11 and “Hunting” N=20). The largest topic category, “Society,” included plenty of cases in which *vieraslaji* occurs in hate speech directed at immigrants, refugees, and minorities; we discuss this in the analysis section. In some cases, there are references to several species in sentences containing *vieraslaji*, thus, the total number of references to different species types is somewhat higher than the number of sentences (348) in our collection.

Data collection was followed by a micro-level linguistic analysis of the dataset. In the analysis, we focused on which species were referred to in connection with the use of the lexical item *vieraslaji*. In all, 358 references were made to various species. We classified these into four categories according to the type of species referred to: 1) nonhuman animals, 2) humans, 3) humans as animals, and 4) plants. The classification was data-driven and typical for the study of nature in the humanities, where, instead of making a clear difference between humans and animals, scholars rather say *humans* and *nonhuman animals*, emphasizing that humans are animals as well (see, e.g., Tooley, 2011). This categorization is appropriate for our study, but we also needed to add a separate category for human-related hate speech because it emerged so strongly in the data. In addition, we had a single occurrence in which the item referred to in connection with *vieraslaji* was a sport. This was the result of a word play; we considered it insignificant and did not analyze the occurrence. Table 1 presents the frequency of references to different species in our data.

Species type	N of references in data	%
Nonhuman animals	202	56.4
Humans (hate speech)	112	31.3
Plants	35	9.8
Humans as animals	8	2.2
Sports	1	0.3
TOTAL	358	100

Table 1. Frequency of references to different species in the data

Analysis: Alien Species in Online Discussions

This section presents our analysis. In the first subsection, we examine which species participants in the online discussion forum described using the Finnish term *vieraslaji* and how these descriptions are linguistically formulated. The section is organized based on the categorization presented in Table 1, that is, by references to nonhuman animals, plants, humans as animals, and humans in hate speech. To find out how mundane, everyday definitions of the term differ from scientific definitions, we compare the mentions of the different species to the Finnish Natural Resources Institute's official list of alien species in Finland. In the second subsection, after identifying the alien species present in the online discussion of our data, we analyze the discursive features related to the use of *vieraslaji*: What themes are repeated, and what do they say about the general public's attitudes toward alien species?

In this section, examples are presented from our data. The original Finnish data are *italicized*, and the English translation is placed below the excerpt. The original examples are reproduced as they were written. When translating the excerpts, we have tried to stay as true as possible to the original Finnish text, translating the information conveyed by, for example, discourse markers, particles, and conjunctions. However, for the sake of clarity, we have normalized idiosyncratic features of the original messages, such as nonstandard spelling and punctuation, in the translation.

Identifying 'Alien Species'

Among the 358 referents that the lexical item *vieraslaji* has in our dataset (see Table 1), the most common referent group is "nonhuman animals"; approximately half the occurrences of *vieraslaji* refer to this group. Table 2 shows the different nonhuman animal species (or larger groups such as invertebrates) referred to, as well as the number of references. The table also shows whether the species is included in the Finnish National Resources Institute's official register of alien species. This can be shown only for individual species, not larger, generic groups (e.g., "fish species"). The comparison reveals that the most common topics of conversation, the cat, common raccoon dog, white-tailed deer, and American mink, are officially alien species. Occasionally, however, people may think that a species is alien when it is not.

The Finnish Natural Resources Institute maintains an online portal, "Invasive Alien Species in Finland." They define *invasive alien species* (in Finnish *vieraslaji*) as a species that has transferred from its original habitat to a new area because of human influence, either intentionally or unintentionally. The portal includes both Finnish national- and European Union-level lists of alien species, and it is our source for the official alien species status of plants and animals.

Species	N of references	Listed as alien species by Finnish Natural Resources Institute
Cat	70	yes
Common raccoon dog	24	yes
White-tailed deer	14	yes
American mink	12	yes
Invertebrate species	11	
Great cormorant	7	no
Wolf	7	no
Goose species	7	
Dog/wolfdog	7	yes (wolfdog only)
Generic animal species	7	
European hedgehog	6	no
Alien species outside Finland	5	
Fish species	5	
European rabbit	4	yes
Common pheasant	2	no
Rat species	2	
Frog species	2	
Nutria or North American beaver	2	yes
Wild boar	2	no
European pine marten	1	no
Alpaca	1	no
European badger	1	no
Cattle	1	no
Mute swan	1	no
Muskrat	1	yes
Total	202	

Table 2. References to nonhuman animals in the data

As Table 2 shows, the species that clearly dominates in the animal discourse is the cat. There are numerous comments about cats being harmful to Finnish nature. The online discussions focus on pet cats whose owners let them go out freely. According to the aforementioned online portal *Invasive Alien Species in Finland*, pet cats are officially alien species if they have free access to nature, and only wild cats are considered a pernicious alien species. A cat is considered wild when it obtains all its food from nature. However, cats are not newcomers to Finland; the oldest archaeological cat bone findings are from the late Iron Age, between the ninth and eleventh century (Keinänen & Nyman, 2020). The following comment is an example of an utterance that places the cat among alien species:

1. *Kissa on suomen luonnossa vieraslaji, joka tappaa hirmuisen määrän suomen luontoon kuuluvia eläimiä, varsinkin linnunpoikasia.*

‘In Finnish nature, the cat is an alien species that kills a terrible number of animals that belong to Finnish nature, especially bird chicks.’

Linguistically, the comment is formulated as a declarative sentence, the first part of which presents the claim (‘In Finnish nature, the cat is an alien species’), while the second part describes the characteristics of the alien species in question by depicting the typical behavior of cats. The second part of the sentence is a relative clause, initiated by the relative pronoun *joka*. The sentence structure in (1) is quite typical for our data: First, the alien species is identified with a predicative clause, and then the typical actions or characteristics of the species in question are described with a relative clause. We can also see the common referential pattern in which the alien species – in the case of (1), *kissa* ‘cat’ – is referred to with a generalizing singular form (see Hakulinen et al., 2004; Vilkuna 1992). The generality of the claim is further underlined by the use of present tense (here: *on vieraslaji* ‘is an alien species’; *tappaa* ‘kills’; see Hakulinen et al. 2004).

The second-most common animal group is the common raccoon dog. Originally from Asia, the species was introduced to the European side of the Soviet Union during the first half of the twentieth century, and it started invading Eastern Europe (Kauhala & Kowalczyk, 2011). In the following comment, the writer defines the common raccoon dog as an alien species:

2. *Supikoira ei muuten ole söpö pieni eläin, vaan aika tuholainen ja tosiaan vieraslaji, kantaa riittää.*

‘A common raccoon dog is actually not a small and cute animal; it is quite a pest and certainly an alien species, and there is a big population.’

The linguistic formulation in (2) is rather similar to that in (1): the characteristics of *supikoira* ‘common raccoon dog’ are described with a predicative clause, which, in this case, is negatively formulated (*ei muuten ole söpö pieni eläin* ‘is not a small and cute animal’). By describing what the common raccoon dog is not, the writer proves that certain (positive) prejudices of the alien species in question are wrong and adds a more accurate description, initiated with the conjunction *vaan* ‘instead,’ which indicates a contrast. At the end of the sentence, there is an inserted existential clause *kantaa riittää* ‘there is a big population,’ which further strengthens the argument of the common raccoon dog as an invasive alien species.

White-tailed deer and American mink each had more than 10 mentions in the discussions. The American mink was brought to Nordic countries for fur farming in the late 1920s, and it started to spread in nature immediately. White-tailed deer were introduced to Finland in 1934 when Minnesota Finns shipped a few of them from North America. They were taken to the lands of the Laukko mansion in the Pirkanmaa region, but they escaped from the property and started to spread (Bevanger & Henriksen, 1995; Nummi, 1985.) The common raccoon dog, white-tailed deer, and American mink belong on the official Finnish list of alien species. Common raccoon dogs and American minks are mentioned to be pernicious. White-tailed deer are mainly harmful to farmers. In the next two comments, the writers demonstrate their attitudes toward white-tailed deer and American minks, respectively, as alien species:

3. *Suurinta haittaa täälläpäin aiheuttavat valkohäntäpeurat joka eivät kuulu Suomen luontoon ensinkään, vaan ovat joidenkin idiottien tänne siirtämä vieraslaji.*

‘The biggest damage over here is caused by white-tailed deer, which do not belong to the Finnish nature in the first place, but are an alien species transported here by some idiots.’

4. *Koska minkki ei alkuperältään kuulu suomen luontoon, se on vieraslaji ja se on myös syrjäyttänyt vesikon suomen luonnosta.*

‘Because American mink does not originally belong to Finnish nature, it is an alien species and it has also supplanted European mink in Finnish nature.’

Unlike in (1) and (2), in (3) the alien species to which the expression *vieraslaji* refers is in plural form: *valkohäntäpeurat* ‘white-tailed deer.’ In (4) the mentioned alien species – *minkki* ‘American mink’ – is in singular form, as is typical for our data. In (4), *minkki* is contrasted with another – native – species, *vesikko* ‘European mink.’

It was not nearly as common for participants to use *vieraslaji* to refer to plants; *vieraslaji* refers to plants in only 9.8% of instances (N=35). Table 3 presents the different plant species mentioned, as well as the number of references to them.

Species	N of references	Listed as alien species by Finnish Natural Resources Institute
Garden lupine	10	yes
Generic plant species	6	
Himalayan balsam	3	yes
Potato	3	no
Giant hogweed	3	yes
Cowbane	3	no
Cannabis	1	no
Beach rose	1	yes
Eastern crack-willow	1	no
Giant knotweed	1	no
Blue globe onion	1	no
Low June berry	1	yes
Unidentified plant	1	
Total	35	

Table 3. References to plants in the data

The lupine was the most common topic of conversation with 10 comments; this flower was recently in the news, and its harmfulness to native species can now be considered common knowledge. It is officially a pernicious species. In Finland, it was first recorded as escaping cultivation in the late nineteenth century (Fremstad, 2010). The next comment taken from our data demonstrates attitudes toward the lupine as an alien species.

5. *Lupiini on villiintynyt vieraslaji, joka syrjäyttää vanhat suomalaiset perinnekasvit tien ja peltojen vierustoilta.*

‘Lupine is a wild-grown alien species, which supplants old Finnish heritage plants from the sides of roads and fields.’

The linguistic formulation of the comment is, again, very similar to those in the previous examples: a predicative clause followed by a *joka*-initiated relative clause, which provides a further description of the alien species in question.

Other plant species had few mentions. In six cases, people spoke in a general manner about unspecific plants:

6. *Korreitahan ne, luonto ja sen monimuotoisuus siltikin köyhtyy, kun haitallinen vieraslaji valtaa alueita. Torjunta vaikeutuu sitä mukaa, kun vallatut alueet suurenevät.*

‘They are beautiful, but nature and its diversity get poorer, when a harmful alien species takes over new areas. The prevention gets more difficult, when the areas, which have been taken over, get larger.’

There were also many human referents in connection with the term *vieraslaji*. In Table 1, these references are categorized into two groups: “humans (hate speech)” (N=112) and “humans as animals” (N=8). In the context of hate speech, *vieraslaji* is used in a metaphorical way, and it has a clear xenophobic, even racist, connotation; it is used especially in discussions concerning immigration (cf. Määttä et al., 2020, 2021). We analyze this usage in the next subsection. In the category “humans as animals,” in contrast, the discourse can take an ecological point of view in which all humans are equally seen as an alien species in their current territory, causing harm to it. Thus, this category is comparable to the other categories referring to 1) nonhuman animals and 2) plants.

In example (7), the expression *vieraslaji* refers to *nykyihminen* ‘modern human’ or *homo sapiens teknologiensis* as the writer playfully names “the species.” According to the writer, modern humans are the “worst alien species” (*pahin vieraslaji*). In this example, the writer contrasts *nykyihminen* with *kani* ‘rabbit’

and *lupiini* ‘lupine,’ indicating that the writer also understands the latter as alien species, even if they are not directly referred to with the lexical item *vieraslaji*.

7. *Pahin vieraslaji on "nykyihminen", "homo sapiens teknologiensis", joka on ainakin miljoona kertaa suurempi uhka luonnolle kuin kanit tai lupiinit, joilla on selviä positiivisiäkin vaikutuksia luontoon: kanilla petojen riistaeläimenä ja lupiinilla maanparannuskasvina.*

‘The worst alien species is “modern human,” “homo sapiens teknologiensis,” who is at least a million times bigger threat to the nature than rabbits or lupines, which have also clear positive effects on nature: rabbit as a bait for carnivores and lupine as a soil improving crop.’

Together, the European Union’s list and Finland’s national list of alien species include close to 100 animals and plants. Comparing the list of alien species in online discussions to the official lists of alien species of the EU and Finland, we see that people – with a few exceptions – mostly speak about official alien species. Thus, it seems that the general Finnish public has somewhat accurate information on which species are alien.

The species most talked about clearly have an established status in Finnish nature or society: the cat, common raccoon dog, white-tailed deer, and American mink. All have inhabited Finland for a relatively long time. Some species clearly divided the participants such that they did not have a mutual understanding of whether they were alien; these species were the wolf, European hedgehog, wild boar, and cowbane. Also, the only mention of the European badger states that it is not an alien species. None of these species are listed as alien to Finland.

Discursive Features of Online Discussions on Alien Species

In our data, the lexical item *vieraslaji* is used in affective contexts, which clearly reflects the fact that discussion on alien species is emotionally laden, as Larson (2008) notes. According to Larson, the biological discourse on alien species (what Larson terms *invasive species*) is characterized by three metaphorical elements: fears of invasion, an emphasis on competition, and prevalent militarism. Although Larson studies the scientific discourse used by biologists, the same features can be found in mundane online discourses.

In particular, fear of invasion and heightened competition between alien and local species are recurring themes in our data. In approximately 13% (N=46) of all the cases in the data, alien species are described as “outsiders” that do not belong to Finland and may displace local species and, eventually, destroy the local ecosystem. This kind of argumentation is demonstrated by example (8):

8. *Pahinta kuitenkin on se ettei minkki kuulu Suomen alkuperäisiin eläimiin, vaan on vieraslaji joka hävittää Suomen alkuperäislajeja ja on jo hävittänyt esim. vesikon.*

‘The worst thing is that American mink is not a part of native animals of Finland but is instead an invasive species that obliterates the native species in Finland and has already obliterated the European mink, for example.’

In (8), the writer uses *minkki* ‘American mink’ as an example of an alien species. Minks have been presented as a threat to endemic species, such as the European mink (*vesikko*), which the writer of the comment explicitly presents as the direct object of the obliteration performed by the American mink. For the obliteration of the European mink, the process is presented as already completed (although still relevant at present, as the present perfect tense expression *on jo hävittänyt* ‘has already obliterated’ indicates), but for the other unspecified ‘native species in Finland’ (*Suomen alkuperäislajeja*), obliteration is presented as a still ongoing threat. In the example, the different stages of obliteration are also expressed through the choice of the object case: *Suomen alkuperäislajeja* is in the partitive case, indicating an unfinished, ongoing process, whereas *vesikon* is in the genitive case, expressing that the process is complete.

In many comments, alien species are presented explicitly as a problem. This is also reflected in the fact that in our data, a very common collocate of the word *vieraslaji* ‘alien species’ is *haitallinen* ‘harmful, damaging, pernicious,’ forming an expression *haitallinen vieraslaji* ‘pernicious alien species.’ This collocation has 64 occurrences, i.e., it is used in 18% of the overall data (see, e.g., examples (9) and (10) below). The expression

haitallinen vieraslaji refers to a type of alien species that threatens the biodiversity of its new habitat. The frequency of this collocation indicates that harmfulness is often considered a central feature of alien species. In addition to being pernicious, alien species were also described as being harmful in other ways: 15% (N=52) of the comments contain a lexical item indicating that alien species are a problem. Consider example (9):

9. *Villisika on Suomen luonnossa vieraslaji, tuholainen.*

‘Wild boar is an alien species in Finnish nature, a pest.’

The fact that the wild boar is a problem is indicated by calling it *tuholainen* ‘a pest.’ In Finnish, *tuholainen* can refer to a species that is deemed to be detrimental (‘a pest’), but it can also be used more metaphorically, referring to a saboteur; the expression *tuholainen* contains the stem *tuh* ‘destruction, damage.’ In (9), thus, the problem with the wild boar is, on the one hand, that it is a pest animal that causes a nuisance to its surroundings, and, on the other, that it destroys Finnish nature.

Moreover, 26 comments (7%) contain suggestions on how the existence of alien species in Finnish nature should be dealt with. In most cases, the tone of the comment is rather aggressive, as can be seen in examples (10)–(13) below. The comments were written by different writers in different discussion threads; the writers present cats (10), great cormorants (11), dogwolves (12), and alpacas⁶ (13) as (pernicious) alien species.

10. *Lisäksi, kissa on suomen luonnossa haitallinen vieraslaji, joten se on syytä poistaa sieltä välittömästi.*

‘In addition, a cat is a pernicious invasive species in Finnish nature, so it should be removed there immediately.’

11. *KAIKKI merimetsot on tapettava. NE ei kuulu suomen luontoon. Se on saastuttava vieraslaji.*

‘ALL great cormorants have to be killed. THEY do not belong to the Finnish nature. It is a pollutant-invasive species.’

12. *Kaikki sudet pitäis tutkia, oikeasti puolueettoman tahon puolelta, ja poistaa saastunut materiaali luonnosta kokonaan. Vaikka se poistaminen hävittäisikin ne nelijalkaiset joita susiksi harhaan johtavasti kutsumme. Koirasusi on haitallinen vieraslaji, ja se pitäisi tajuta luonnosta poistaa.*

‘All the wolves should be inspected, by a truly impartial party, and fully remove the tainted material from nature. Even if the removal would obliterate the quadruped, that we misleadingly call wolves. Wolfdog is a pernicious invasive species, and one should realize to remove it from nature.’

13. *Alpakka on vieraslaji SUomessa siinä missä supikoirakin, Kaikki alpakat pitäisi laittaa lihoiksi ja alpakon omistajat tuomita vieraslajin hallussa pidosta.*

‘Alpaca is an invasive species in Finland as much as the raccoon dog. All alpacas should be butchered, and the owners of alpacas should be convicted of possession of an invasive species.’

In all these comments, the mentioned species are defined as pernicious alien species that do not belong to the local (Finnish) nature; each of the writers has an opinion on what kind of action should be taken to stop the existence of such species. The writers explicitly or implicitly suggest that the alien species should be killed. In (11), the writer directly talks about ‘killing’ (*tappaa*); in (13), the idea of killing is referred to with a more figurative verbal expression, *laittaa lihoiksi* ‘to butcher,’ literally ‘to put to pieces of meat.’ In (10) and (12), the writers use the more abstract verb *poistaa*, literally ‘to remove,’ which leaves open how the removal should happen. However, it is clear that dogwolves, for example, cannot just be transported from Finnish nature to somewhere else, so the expression *poista* could also be translated as ‘eliminate.’ The totality of the suggested action is further highlighted in examples (11) and (12) with the use of the total quantifier *kaikki* ‘all; every,’ expressing that the action should be targeted to every single representative of the alien species.

Linguistically, it is interesting that the writers do not mention who should perform the suggested action: In the examples, the identity of the agent, that is, the one who performs the action, is left open. Instead, the

writers use the necessive verb *pitää* in conditional (*pitä-isi*) and necessive constructions, which express necessity and obligation (see Hakulinen et al., 2004): *se [kissa] on syytä poistaa* ‘it [cat] should be removed’ (10); *merimetsot on tapettava* ‘cormorants should be killed’ (11); *sudet pitäisi tutkia* ‘wolves should be inspected’ and *se pitäisi tajuta luonnosta poistaa* ‘one should realize to remove it from nature’ (12); and *alpakat pitäisi laittaa lihoiksi ja alpakkan omistajat tuomita* ‘alpacas should be butchered and the owners of alpacas should be convicted’ (13). The linguistic formulation in these examples places the focus on the action and the target of the action, which, in this case, is the mentioned alien species; only in (12) is some kind of agent – though a rather nonspecific one – mentioned, when the writer states that the action should be performed “by a truly impartial party.” Although the writers of the posts express their own opinions, their choice to use necessive constructions indicates that the described action is necessary and that somebody is obligated to do something about the described state of affairs. The fact that the identity of the agent is left open further creates a certain mutuality of point of view, allowing the writer of the post to present their suggestion as potentially shared by all interactants (cf. Määttä et al., 2021).

In the examples presented above and in our data in general, we can also see a topos in which Finnish nature is seen as “pure” and “untainted” and to which invasive species pose a threat. In (11) and (12), the writers use the participles *saastuttava* and *saastunut* to describe invasive species. Both expressions are derived from the verb *saastua*, which means ‘to become contaminated,’ ‘polluted,’ or ‘tainted.’ The use of these expressions implicitly conveys the idea that there is some kind of a “pure” state for Finnish nature that should be conserved and protected. The idea of the “purity” of Finnish nature is related to the semantics of belonging, that is, to the idea of what does or does not *belong* to a specific area. In the examples, alien species not belonging to Finnish nature are explicitly mentioned in (3) and (4) (in the previous subsection) as well as in (8) and (11) (in this subsection). Actually, though, the semantics of not belonging is present as such in the term *vieraslaji* ‘alien species’; the Finnish word *vieras* can, in addition to ‘alien,’ be translated by adjectives such as ‘foreign,’ ‘strange,’ and ‘unfamiliar,’ and as a substantive it means ‘a guest’ or ‘a visitor’ – all words that semantically indicate not belonging. The topos of belonging is also present in the following examples, which present the mentioned alien species as foreign and thus unsuitable for the Finnish environment. (14) is taken from a thread that deals with raccoon dogs (*supikoira*), and the expression *vieraslaji* in the comment refers to the topic of the thread, whereas in (15), brown rats (*isorotta*) are mentioned as a pernicious alien species.

14. *Ei ole oikein tervetullut Suomi-neidon luontoon tämäkään vieraslaji.*

‘This invasive species is not quite welcome to the nature of the Finnish Maiden.’⁷

15. *Isorotta muuten on Suomessa haitallinen vieraslaji joka ei tšekäläiseen luontoon kuuluu, kuten ei myöskään esimerkiksi minkit, kaniinit ja supikoirat.*

‘Brown rats are, by the way, in Finland a pernicious invasive species that doesn’t belong to the local nature, as do not, for example, minks, rabbits, and raccoon dogs.’

Both examples present the mentioned alien species as not belonging to Finland or Finnish nature. In (14), the writer states, referring to raccoon dogs, that ‘this invasive species’ is not ‘quite welcome’ (*oikein tervetullut*) to Finnish nature. In the comment, Finland is personified as “Finnish Maiden,” a national romantic symbol used since the nineteenth century. In (13), when discussing the presence of brown rats in Finland, Finnish nature is referred to with the expression *täköläinen*, which can be translated as ‘local,’ but which grammatically also shows an indexical connection between the writer and the Finnish nature being referred to.⁸

In general, how alien species are discussed in our data has – to a large extent – a very nationalistic tone, and, in some cases, it can even be seen as promoting xenophobia. In these cases, the invasion of biogeographic regions and natural landscapes (by alien species) is blended with the idea of the invasion of a projected nation. Larson (2008) notes the same tendency in his data, showing that it is possible to map between the concept of a human invader and that of a biological one. According to him, the fact that alien species are treated as “invaders” personifies alien species, giving them human qualities and ascribing a certain purposiveness to their movement, as if the species could have malicious intent (pp. 178–179).

In fact, the linguistic and discursive features of our data show similarities with anti-immigration hate speech,

as presented by Määttä et al. (2020, 2021). They show that anti-immigration hate speech is based on linguistically and discursively construed membership categories built on the idea of the so-called in-group, that is, native-born Finns, and the out-group, non-native “foreigners” who do not have a legitimate right to reside in the country and who are typically perceived as intruders. Similarly, the “non-Finnish” alien species in our data can be seen to form the out-group: non-native intruders that should not be allowed to exist in Finnish nature and cannot be considered as obtaining the same status as endemic species.

As Table 1 shows, the second-most common usage of the term *vieraslaji* referred to humans in hate-speech contexts (N=112), and the majority (N=97) of these cases contain racist or hate speech. In these comments, the expression *vieraslaji* is used to refer to certain ethnic or religious groups, foreigners living in Finland, or non-native-born Finnish citizens. Most comments concern immigrants and, more precisely, non-Western immigrants. Many of these comments contain highly offensive and hateful language with stereotyping and derogatory expressions which we do not wish to reproduce in this article. However, we present the next example to demonstrate use of the expression *vieraslaji* in racist discourse; we do not endorse the view represented by the comment. The comment is taken from a thread dealing with accepting multiculturalism in Finland. The comment itself is relatively long, so we have marked the sentence containing the expression *vieraslaji* with bold both in the original and in the translation:

16. *Aloittaja on väärässä! Suomessa patistellaan taistelemaan vieraslajeja vastaan koska ne valtaavat alaa kotimaisilta lajeilta. Tappajaetanat, jättiputket ja lupiinit ovat karsittavien listalla. Mikä onkaan haitallisempi vieraslaji kuin Välimeren eteläpuolinen väestö, joka vyöryy hallitsemattomasti Eurooppaan ja valtaa itselleen alaa alkuperäiseltä väestöltä? Suomen tulee ottaa esimerkkiä Unkarista ja rakentaa tälle hyökyaallolle riittävän pitävää lainsäädännölliset sekä konkreettiset turvamuurit.*

‘The first writer is mistaken! In Finland, people are encouraged to fight the alien species because they take space from endemic species. Spanish slugs, hogweeds and lupines are on the elimination list. **What is a more pernicious alien species than the population south of the Mediterranean which flocks uncontrollably to Europe and takes space from the native population?** Finland should follow Hungary’s example and build firm enough legislative and concrete barriers to protect from this surge.’

In the beginning of the comment, the writer mentions organisms (Spanish slugs, hogweeds, and lupines) considered alien species and describes how they take space from endemic, or ‘native,’ species (*kotimaisilta lajeilta*). After this, the writer draws an analogy between these species and people living ‘south of the Mediterranean,’ claiming them to be the most pernicious alien species of all; the claim is formulated as a rhetorical question. The people in question are referred to with the singular collective noun *väestö* ‘population,’ and they are described to ‘flock uncontrollably’ (*vyöryy hallitsemattomasti*) to Europe,⁹ taking space from the native population. Although the writer of the comment is talking about humans, the argumentation is very similar to that in comments referring to nonhuman animals or plants as alien species: The “alien species” in question is described as not belonging to a certain area (in (16), Europe) and is claimed to take space from the native, “endemic” population. After describing the “alien species,” the writer also provides a suggestion of how the “problem” should be dealt with (cf. (10)–(13), in which the writers also suggest a potential solution to what they see as a problem).

When the expression *vieraslaji* is used in hate speech to refer to a group of people, it is a *metaphorical* use of the term. In Lakoff and Johnson’s (1980) terms, it is a *conceptual metaphor*, in which one conceptual domain (immigration) is understood in terms of another (conservation biology and the transportation of species). In addition, the fact that people are referred to as “alien species” represents the topos of *dehumanization*, and, as such, seems to function as a powerful tool in racist anti-immigration discourse.

In addition to anti-immigration hate speech, *vieraslaji* is used in a metaphorical way in other hate-speech contexts: in political hate speech (N=10) and in individual hostile or mocking comments that refer to humans (N=5). Also in these cases, the writers often make use of biological discourse (cf. (16)), thus indicating that they know the scientific origin of the expression *vieraslaji* and use this term playfully. Below is an example of political hate speech. The writer mentions *punaharakka* ‘red magpie’ as an example of an alien species. The comment is taken from a conversation thread dealing with political decision-making.

17. *Minä olen taas pahoillani että suomen luontoon on pesiytynyt vieraslaji eli punaharakka.*

‘As for me, I am sorry that an alien species, that is, red magpie, has settled (lit. ‘made a nest’) in Finnish nature.’

The “alien species” identified in (17) is *punaharakka* ‘red magpie,’ which is not a real species, but, as the larger context of the conversation thread shows, a mocking way to refer to a Finnish politician called Timo Harakka, whose last name (*Harakka*) means ‘magpie.’ He is a representative of the Social Democratic Party of Finland, which is considered a “red” party in Finland; thus the specifying component *puna-* ‘red.’ Also, the verb *pesiytyä* ‘to settle’ (in the present perfect form *on pesiytynyt*) has a connotation to nature: the stem *pesä* means ‘a nest,’ and *pesiytyä* could literally be translated into ‘make a nest.’ Although (17) refers to a politician, it is similar to other examples presented in this section in that it highlights the mentioned “alien species” as not belonging to Finnish nature and presents the existence of the “alien species” as negative (*Minä taas olen pahoillani* ‘As for me, I am sorry’).

In addition to alien species being construed as a problem, we also had some cases in which a species was acknowledged to be alien but was not considered a problem, or the writer was uncertain if the species causes problems or not. There were 14 such mentions; example (18) illustrates these cases (a passage from a longer message):

18. *Kanadanmajava on Suomeen tarkoituksella tuotu vieraslaji joka ei kuitenkaan sinänsä valtaa alaa euroopanmajavalta*

‘North American beaver is an alien species, which was brought to Finland intentionally but which does not as such conquer space from the European beaver’

In (18), the reason North American beaver is not construed as a problem despite its status as an alien species is that it does not take space from the European beaver. Linguistically interesting in (18) is the adverb *sinänsä* ‘per se, as such,’ which in this context functions to slightly downgrade the positive claim of the comment.

Although an affective tone is present in the majority of the comments in our data, some commenters mention alien species in a relatively neutral tone: In 37 sentences, people simply note that a species is alien, but the comment does not include more specific or significantly affective thoughts. The following example illustrates this:

19. *Metsästä suoraan marjoja syötynä. Mustikkaa, puolukkaa, karpaloa ja lakkaa. Purosta vettä perään. Vattu taitaa olla vieraslaji.*

‘Eating berries straight from the forest. Bilberry, lingonberry, cranberry and cloudberry. Raspberry is probably an alien species.’

Finally, in 11 sentences, people noted that the species in question is not alien. (20) is a passage from a longer message:

20. *Mäyrä on hyötyeläin ei vieraslaji.*

‘European badger is a useful animal, not an alien species.’

In example (20), a contrast is made between useful animals and alien species, further reifying the idea that alien species are undesirable.

Concluding Discussion

We have provided an empirical description of how participants in a Finnish online discussion forum talk about alien species and how their attitudes toward these species are shared and transmitted in everyday online conversations.

Our analysis indicates that the prototypical example of an alien species in these data is a nonhuman animal (for comparison, see Nentwig et al., 2018), and that animals are more typical topics than plants in conversations dealing with alien species. This indicates that, in these data, the nature discourse related to alien species is somewhat animal-centered. There are some species that dominate discussion, with cats being the most common.

Our findings largely mirror those of a recent report that The Finnish Environment Institute published based on a survey of citizen knowledge about alien species in Finland (Nyberg et al., 2021). According to the report, generally well-recognized alien species were, for example, the common raccoon dog (210/475 repliers), American mink (159), white-tailed deer (63), and garden lupine (386). Interestingly, the cat had only 16 mentions (Nyberg et al., 2021). This is contradictory to our findings because, in our data, the cat is the most frequently mentioned alien species.

The key findings of the report are that a significant number of participants said that they knew several alien species well. Most participants said that they were aware of the alien flora in their region, and three out of four participants said that they were aware of the alien fauna in their region. Only a bit more than half said that they were interested in aquatic alien species. The results in the report suggest that people know more about terrestrial than aquatic alien species. In addition, people may consider some animals alien even if they are not officially alien species (though plants do not seem to cause similar confusion). However, these false recognitions of alien species are relatively rare. The most common sources of information about alien species were online information portals, social and local media, and people's close social circles.

Our analysis further shows that discussions on alien species are emotionally laden; this is reflected in the fact that the collocation *haitallinen vieraslaji* 'pernicious alien species' occurs relatively often in our data. The general attitude toward alien species is hostile: Fear of invasion and heightened competition between the alien and endemic species are recurring themes in the online discussions, and in many comments, alien species are presented as a problem that should be fixed.

Both the linguistic and discursive features of online discussions on alien species show similarities with online anti-immigration hate-speech discourse. In both cases, participants base their opinions on the topic ("alien species"/"immigrants") on linguistically and discursively construed membership categories built on the idea of the so-called in-group, that is, "the native group," and the out-group, "non-natives," who are typically perceived as intruders. In both discourses, we find a topos in which Finland is seen as "pure" and "untainted" and to which "outsiders" pose a threat. The connection between racist, xenophobic discourse and discourse on alien species should be investigated more thoroughly in future studies.

Although the results show that the participants in the online discussions had relatively correct ideas about which species are alien in Finland, more diverse discussions in terms of both species and solutions to the problems they pose are needed. To reach this goal, we need various research perspectives – including that of linguistics, as we have suggested in this study. With our study, we aim to raise awareness of the communicative everyday practices in which attitudes toward alien species are construed and negotiated, because we believe that, in explaining the social aspects related to our understanding of environmental issues, everyday language and the way "ordinary" people talk about environmental phenomena play a key role.

Our study has focused on how alien species are perceived in a Finnish context. The geographical limitations of these types of studies may have a more pragmatic goal: the results of a specific study may be applied in politics, economics, or environmental protection by decision makers who often work locally or regionally. However, more international research is needed on this matter because biodiversity changes caused by alien species take place throughout the world. It would be interesting to see whether (digital) discourse on alien species has specific national features – does a nation's relation to nature, for example, affect attitudes toward alien species?

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Notes

1. For a list of the numerous terms that are used interchangeably with *alien*, see, e.g., Colautti and MacIsaac (2004). For the connotations that these different terms have, see Rotherdam and Lambert (2011).
2. We translate the Finnish expression *vieraslaji* as 'alien species.' We are aware that the expression *alien species* has been criticized for its possible xenophobic connotations (see Coates, 2007; Cooper, 2020). Whether the negative attitudes toward alien species could be considered xenophobia has also been discussed (McNeely, 2011). In the study, we identified several cases in which the expression *vieraslaji* is used in connection with (human-focused) xenophobic and racist discourse; we discuss these cases later.
3. Emmi Lahti (2022) examines this briefly from data written by experts.
4. <http://urn.fi/urn:nbn:fi:lb-2020021803>
5. Suomi24 discussion forum has a predetermined list of general topics. When a user of the discussion forum starts a new discussion thread, they need to choose a topic in which the thread is posted.
6. It is worth noting that alpacas are farm animals; they do not live in the wild in Finland.
7. Finnish Maiden (in Finnish, *Suomi-neito*) is the national romantic personification of Finland. The name may refer both to Finnish women and to the country. The borders of Finland preceding World War II had the shape of a woman wearing a dress.
8. The adjective *täkäläinen* contains the same stem *tä-* as the demonstrative locative *täällä* 'here,' the use of which implies that the speaker considers something to be within their own (socially defined) sphere (see, e.g., Laury, 1996). The expression *täkäläinen*, which could be translated as 'local here,' can also be juxtaposed with the expression *sikälinen* 'local there' (*siellä* can be roughly translated as 'there').
9. On the use of natural disaster vocabulary and especially the verb *vyöryä* 'to roll, surge' in Finnish online discussions concerning immigration, see Lahti (2019).

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