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Effective Chinese-to-English biotic interpretation in ecotourism destinations: a corpus-based interdisciplinary study

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ABSTRACT

Ecotourism interpretation pertains to vital public education regarding environmental conservation. At present, there is no professional standard or system for interpretation in this domain, which potentially hinders the goals of geoheritage, and species preservation. To address this shortcoming, two categories of ecotourism (flora and fauna), are selected and broken down into the three main interpretation issues: common biotic names, local Chinese biotic terms, and ecological processes. Effective Chinese-to-English interpretation is identified through analysis of interpreted texts and their originals, on the basis of which a taxonomy of reliable interpretation strategies is proposed. The main difficulties confronted were scientific terminology, sentence structure, and culture. This analysis presented adopts a corpus-based approach that systematically investigates the interpretation language used in geoparks, providing representative and comprehensive views into ecotourism interpretation. We found that, generally, literal interpretation can be used. However, other strategies are essential for achieving effective interpretations, particularly regarding textual representations of flora and fauna processes. Informed by Hu's Eco-Translatology, a taxonomy of effective strategies is developed and recommended for use by ecotourism translators and interpreters.

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Ecotourism; ecotourism interpretation; interpretation strategies; Eco-Translatology; corpus-based method

Introduction

Geotourism is emerging as a global phenomenon and an important tool for conservation and regional development. In 2015, the Geological Society of Australia (GSA) defined the three aims of geotourism as: (1) better understanding and appreciation of the Earth; (2) conservation (and more specifically, geoconservation); and (3) better livelihoods for local communities (Li, Wu, et al., 2022). Geotourism focuses on abiotic (A) elements of geology and landscape, biotic (B) elements of flora (plants) and fauna (animals), and cultural (C) elements such as past and present human lifestyle (Dowling, 2013; Geological Society of Australia [GSA], 2015). Geotourism is closely related to ecotourism in its concern for natural areas and the welfare of local people. Dowling (2013) identifies their close relationship by pointing out that ecotourism is embedded in geotourism with a focus on the B element. The overlap of the two fields can be seen in the Ecotourism

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Australia's (1994) definition of ecotourism as *"ecologically sustainable tourism with a primary focus on experiencing natural areas that foster environmental and cultural understanding, appreciation and conservation."*

The development of ecotourism has been accompanied by a demand for quality interpretation in recent years, especially in geoparks. Geoparks are a primary location for many geotourism activities (Dowling, 2013; Li, Ng, et al., 2022). The United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2023) defined a geopark as "*a nationally protected area that contains a number of geological heritage sites of particular importance, rarity of aesthetic appeal, and is one element in an integrated concept of protection, education and sustainable development.*" Li et al. (Li, Ng, et al., 2022) claim that although China's first UNESCO geoparks (UGGps) opened in 2004, they currently lack systematic and effective interpretation of geotourism. This creates the distinct possibility that geological, biotical, and cultural information presented within these sites is not being interpreted as effectively as it should be (Li, Ng, et al., 2022). Thus, an investigation of the current issues hindering Chinese-to-English ecotourism interpretation, as well as the identification of solutions to these, is necessary.

Chinese-to-English ecotourism interpretation can be considered to comprise three aspects: linguistics, culture and communication. These dimensions are detailed in Hu's (2003) Eco-Translatology, which is the theoretical framework we adopted in this study to assist in identifying the problems and finding solutions in geotourism interpretation. At the linguistic level, the Latin names of plants and animals present difficulty for geotourists because they are scientific, technical, and often difficult to pronounce and recall. Moreover, syntactical and structural differences between Chinese and English could also make it difficult to interpret descriptions of ecological processes. Taken together, these obstacles may prevent *S*emantic, *S*tyle, and *C*ultural information equivalence (i.e., SSC equivalence). In regard to culture, the numerous local Chinese names for various species of flora and fauna can also present a challenge to foreign tourists. Li et al. (Li, Zhu, et al., 2022) note that these local Chinese flora/fauna terms could contain vernacular language which reflects and relies upon a significant amount of cultural knowledge. For example, the appropriate interpretation of the flora term "睡莲" is "water lily." Yet, without proper knowledge or guidance from an interpretation framework, which is Eco-Translatology in this study, this term could be easily interpreted into "sleepy flower," which is the literal word-by-word translation of the Chinese characters. Li et al. (Li, Zhu, et al., 2022) also point out that there is an additional possibility that interpreters themselves may not have the necessary ecological cultural background to appropriately interpret these local names. The linguistic and cultural aspects of interpretation are foundations for communication, which can be achieved ultimately when linguistic and cultural transformation dimensions are considered for accuracy of information and effective communication (Hu, 2003).

The goal of this study, with the aid of a rigorous theoretical framework of Hu's (2003) Eco-Translatology, is to provide an overview of strategies that address the aforementioned linguistic, cultural, and communicative challenges facing Chinese-to-English ecotourism interpretation. This study avails the systematic analytical advantages of a corpus-based method. Corpus linguistics means using a large digital collection of empirical data as a resource for translation (Baker & Zhu, 2019). One of the most significant benefits of using corpus-based method is that a corpus provides ample authentic linguistic evidence to support any investigation of a linguistic phenomenon, which, in our case, is the interpretation of flora and fauna related expressions in geoparks. Thus, this method fits the objective and professional standards necessary for the study. Therefore, in our study, we composed a Chinese-to-English Parallel Ecotourism Corpus (PEC) with 63,248 words containing corresponding Chinese and English expressions related to flora and fauna from interpretative panels, signs, brochures, and geological museum displays in two Chinese UGGps—Wudalianchi and Jiuhuashan. We quantitatively and qualitatively analysed to identify effective strategies of ecotourism interpretation in Chinese-to-English PEC. Hu's (2003) Eco-Translatology, the theoretical framework for the analysis, also

provides a professional standard of criteria to assess the ecotourism interpretation. Thus, strategies will be recommended to overcome Chinese-to-English interpretation challenges in interpreting common biotic names, local Chinese biotic terms, and ecological processes. Then, on the basis of the analysis, a taxonomy of ecotourism interpretation strategies based on Hu's Eco-Translatology was developed to optimise interpretation.

Literature background

This section provides relevant literature of research on ecotourism translation and interpretation. In addition to ecotourism interpretation studies, this section also reviews studies that use literature or other sources for the investigation of interpretation strategies of plant and animal names, paving the ground of the strategies identified in this study. This section aims to point to a gap in ecotourism studies that calls for linguistic methods for systematic interpretation of expressions of flora and fauna in geoparks. To continue the threads of recent debate, only literature published within the last five years is considered.

Previous ecotourism interpretation studies

Dowling (2020) was the first to point out the overlap between ecotourism and geotourism; that is, that ecotourism focuses on the Biotic (B) element in the ABC elements of geotourism. He points out that geotourism mainly focuses on geology and geomorphology, while ecotourism is primarily concerned with the natural environment and biodiversity (Dowling, 2020). In other words, ecotourism is embedded in geotourism and focuses on plants and animals. Due to high public demand for ecotourism interpretation (Beall et al., 2021; Garrod & Fennell, 2023), there are already many independent studies on this topic (e.g., Coghlan, 2021; Freeman et al., 2023; Klitsounova, 2020; Lee et al., 2021; Moscardo & Hughes, 2023).

For example, Klitsounova (2020), in the field of ecotourism in Belarus, concludes that interpretive ecotourism products (i.e., wildlife conservation workshops and science popularisation activities in natural reserves) can increase people's concern for the environment, assist them in discovering their own connections to nature and cultural resources, and enhance the value of sustainable development. Lee et al. (2021) examine the relationship between interpreting services and reflective engagement. Reflective engagement refers to "the cognitive and emotional involvement of tourists in the learning and interpreting process during their visit to ecotourism destinations." These authors use systematic sampling to find that there is a positively significant and direct relationship between interpreting and reflective engagement. They conclude that to increase reflective engagement, other ecotourism programmes should enhance the quality of their interpretation. Coghlan (2021) investigates the influence of ecotourism interpretation on coral protective behaviours. This author uses virtual reality games (digital interpretation and VR gaming) to immerse tourists in a real-world setting and establish connections with Australia's Great Barrier Reef. The findings illustrate that effective interpretation provides visitors with increased awareness of the Great Barrier Reef, and strengthens their emotional connection with it, ultimately having a positive impact on coral conservation. However, although Klitsounova (2020), Lee et al. (2021), and Coghlan (2021) conduct research on ecotourism interpretation, none of their studies focuses specifically on ecotourism interpretation using linguistic approaches.

Translation of biotic expressions in the literature

Complementing prior literature on ecotourism interpretations without employing linguistic methods, an extant body of research demonstrated the application of using linguistic methods

to study the Chinese-to-English translation of flora and fauna names. Many of these studies focused on literature texts such as the famous first anthology of verse in China—*The Book of Songs* (e.g., Chen, 2019; Jin, 2021, 2022). From the standpoint of Hu's (2003) Eco-Translatology (elaborated in Section "Theoretical framework"), Chen (2019) investigates the English translation of animal and plant names in seven translated versions of *The Book of Songs*. According to her analysis, the primary issues with the English translation of animal and plant names are: (1) overgeneralisation, (2) incongruity, and (3) mistranslation. In contrast to Chen (2019), Jin (2021, 2022), through the lens of cognitive linguistics, systematically explores the translation strategies of plant and animal names in the most recent English-translated version of *The Book of Songs* (Xu, 2019). Jin's studies reveal how English translations of flora and fauna names are guided by principles in conceptual metaphor (Lakoff, 1993), which emphasises how certain abstract concepts share properties with more tangible objects, and therefore can be described using the same language. For example, the concept of "bride" in one verse of *The Book of Songs* was translated using language that is typical for describing peach trees (for details, see Jin, 2021, p. 52). Jin's discussion provides references for future translators in rendering similar literary texts.

Apart from studies using language data from literature such as *The Book of Songs*, Ren (2020) publishes a discussion of the translation strategies of flora names using the method of inductive reasoning. He asserts that the occurrence of synonyms and homonyms is widespread and that this poses significant challenges to the translation of plant names. Ren (2020) concludes that when translating plant names into Latin, the translator should use official botanical names, such as the scientific names given to plants according to the rules and guidelines set by the International Code of Nomenclature for algae, fungi, and plants (ICN, 2018). Ren (2020) points out that these names follow standardised conventions and are used to ensure accuracy and consistency in the identification and classification of flora species. He advises that the translator of plant names into English must differentiate between translations with and without a counterpart in the target language. In other words, if a Chinese term does not have an equivalent word in English, the translator must then select appropriate translation strategies (Ren, 2020). For example, in translating the culturally specific Chinese flora name "喜树," it is advised for the translator to use the creative translation strategy and translate the name of this species into "happy tree," which addresses the connotation of the Chinese name—a tree that brings auspiciousness and happiness (Ren, 2020).

In another study, Cao and Xu (2022) investigate syntactical translation in plant physiology. Merging numerous English texts to analyse syntactic features of the Chinese-to-English translation, the authors found that complex sentences in Chinese are often translated into simple sentences in English. Additionally, they observed a tendency for active voice sentences in Chinese to be transformed into English passive voice sentences. Based on the differences in language style between English and Chinese, Cao and Xu (2022) recommend relevant translation methods, such as shift and division, for increasing the accuracy of plant physiology in English.

The aforementioned studies provide rich information for understanding the significance and processes of ecotourism interpretation. Inspired by prior literature, Li et al. (Li, Wu, et al., 2022; Li, Zhu, et al., 2022) employ linguistics methods to address the need for a high-quality interpretation system for eco- and geo-tourism. In order to meaningfully add to previous literature on the Chinese-to-English interpretation of language used in geoparks, Li et al. (Li, Wu, et al., 2022) combine corpus linguistics with Eco-Translatology to develop a taxonomy for effective interpretation strategies of Abiotic (i.e. A element in geotourism) and Cultural (i.e. C element in geotourism) aspects, while Li et al. (Li, Zhu, et al., 2022) explore the interpretive quality of ABC elements. What is missing, in Li et al.'s studies, is a systematic exploration of the B element. As mentioned earlier, there is a high demand for effective ecotourism (i.e. B element) interpretation, yet no previous empirical research focused on it with a systematic linguistic approach. Therefore, the current study aims to fill this gap by providing a comprehensive account of how the use of the corpus-based method elucidates the Chinese-to-English interpretation processes

for expressions related to flora and fauna. Based on this, we systematically explored the following research questions (RQ):

> **RQ1:** What effective interpretation strategies can be identified from linguistic expressions related to flora and fauna in the two Chinese UGGps?
>
> **RQ2:** How could effective interpretation strategies inform the revision or improvement of ineffectively interpreted linguistic expressions related to flora and fauna?

In these research questions, the term "linguistic expressions" was used to avoid limiting the linguistic units to the lexical or phrasal level. As detailed in the following sections, this study analysed both lexical and syntactical interpretation patterns, using the corpus-based method and Hu's theoretical framework of Eco-Translatology, which is introduced in Section "Theoretical framework". The data and methodological approach are presented in Section "Corpus and methods".

Theoretical framework

As a theoretical framework, this study is guided by Hu's (2003) Eco-Translatology, due to its ability to account for all the factors that are likely to influence the effectiveness (or otherwise) of the interpretation of ecotourism information. Eco-Translatology incorporates Darwinian ideas of "natural selection and adaptation" and ancient Chinese philosophical ideas of "human focus" and "harmony between nature and humanity." This, Hu (2003) points out, is because of translation's adaptive nature as a process; translators need to choose effective translation strategies based on the characteristics of the text, as well as linguistic and cultural differences between the source language and the target language. Similar to the way organisms make choices to adapt to their environment, then, translators select between "adapting" to the source language and the target language in order to create the most appropriate translation for target readers. Moreover, Hu (2003) states that effective translation strategies depend on the translator's selection of accurate vocabulary and syntactic structure according to the needs of the target audience. Thus, this is another way in which the translator needs to be able to both adapt and select during the process of translating (Hu, 2003). Translation, from this view, operates like a holistic, systematic, and harmonious ecosystem. Hu (2003) highlights that in this system, the primary objective of translation is to cater to people's comprehension and to facilitate the transmission of information. Through this system, Hu (2003) argues that the messages of environmental protection, ecological balance, and sustainable development, can all be effectively transmitted through translation, thus promoting the harmonious coexistence between humanity and nature. Thus, Eco-Translatology and ecotourism interpretation share the same objective of seeking a balance between the ecology of the source and target language. Hu (2008) recommends a primary focus on three areas: linguistic, cultural, and communicative dimensions. He further explains that "ecology of the source and target language" means translators must strive to identify accurate words and expressions in the target language that closely correspond to the ecological terms in the source language. This ensures that ecological information remains intact during the translation process and facilitates linguistic accuracy, cultural transparency, and communicative efficiency.

Hu (2008) asserts that at the linguistic level, through accurate word choice, grammatical structure, syntactic logic, and language style, the translator can achieve a successful delivery of information based on a thorough comprehension of the source material. The cultural dimension, meanwhile, requires the translator to mainly focus on the cultural connotations of both the source and target languages, aiming to avoid misinterpretation of the source text (ST) from the perspective of the target culture (Hu, 2011). Finally, at the communicative level, the author urges that translators place emphasis on the communicative intention of the ST to make sure

this is reflected in the translation. Therefore, the degree of "three-dimensional transformations" (i.e., linguistic, cultural, and communicative dimensions) is one of the most essential measures of translation quality. According to Hu (2011), the degree of holistic adaptation and selection in translation is determined by the extent to which translators engage in adaptation and selection across linguistic, cultural, and communicative dimensions. In other words, the greater the number of dimensions that the translator adapts to during the translation process, the higher the degree of holistic adaptation and selection that can be achieved. This means that the concept of "multi-dimensional adaptation" and "adaptive selection" proposed by Hu (2011) in his Eco-Translatology can ensure a higher quality of translation.

In the present research, Hu's Eco-Translatology (2003) provides a framework for identifying the quality of ST interpretation. By using Hu's three-dimensional transformations (i.e., language, culture, and communication), ineffective interpretation can be optimised in ecotourism contexts. Many of the specific instances of inaccurate, confusing, and inconsistent interpretations of information about flora and fauna on interpretive panels in Chinese UGGps, as identified by Li et al. (Li, Zhu, et al., 2022), can be understood through an Eco-Translatology lens, and indeed might therefore be remedied through the application of an approach guided by the framework. For example, in Taishan UGGp, without the guidance of Eco-Translatology, the flora name "青檀" is unhelpfully only interpreted into Latin "*Pteroceltis tatarinowii*." This results in semantic inequivalence, since using only the Latin interpretation of biotic names will make it difficult for geotourists to pronounce and, likely, remember those names. According to the linguistic and communicative dimensions of Eco-Translatology, it is recommended that both English and Latin are used to interpret biotic names to achieve semantic equivalence (Li, Zhu, et al., 2022). Hence, "青檀" should be rendered into "*Pteroceltis tatarinowii* (Blue sandalwood). During the process of interpretation, because "Blue sandalwood" already exists in the English-speaking world, it could helpfully be used to correspond to "青檀." Moreover, complicated ecological processes in the original Chinese texts may result in English style inequivalence without the guidance of Eco-Translatology. For example, the habits and characteristics of "*Anas crecca* (Eurasian teal)" in Leiqiong UGGp, "这些鸟一年换羽两次;雄性在繁殖季节会产生鲜艳的羽毛, 羽毛会褪色;幼雏身上有明显的绒羽;雌性通过"逗引"来吸引配偶。" was translated into "These birds moult twice a year; the male will produce bright feathers in breeding season, and the feathers will fade; young chicks have obvious plumage; females attract their mates by dancing." According to Li et al. (Li, Zhu, et al., 2022), ST resulted in a sentence which might be considered inappropriately long for English. To achieve style equivalence, the ST could instead be translated to "These birds moult twice a year and males produce a bright plumage during the breeding season which then fades. The chicks have a clearly marked coat of down feathers. The females perform a dance to attract a mate." A further example comes from Yandangshan UGGp in China, where "娃娃鱼" was ineffectively translated into the local Chinese biotic name, "baby fish," which would be misunderstood by geotourists as newly hatched fish. In alignment with "three-dimensional" transformations (linguistic, cultural, and communicative) of Eco-Translatology, Li et al. (Li, Zhu, et al., 2022) recommend translating local Chinese biotic terms into the official names recognised by the International Code of Zoological Nomenclature (ICZN, 2022). "娃娃鱼" is a local dialect term mainly used in the Jiangsu and Zhejiang regions of China. The Chinese official name for this amphibian species is "大鲵," which corresponds to "Chinese giant salamander" in English. Additionally, Li et al. (Li, Zhu, et al., 2022) emphasise that this transformation also achieves the shift from the local dialect in the original language to an acceptable target language. Through this transformation of linguistic and cultural dimensions, Eco-Translatology can facilitate the transmission and equivalence of ecological information. Thus, "娃娃鱼" is interpreted into "Chinese giant salamander," achieving semantic and cultural equivalence.

Therefore, through the processes of Eco-Translatology, it is possible that the language, culture, and communication issues faced by ecotourism interpretation can be addressed, suggesting the suitability of Eco-Translatology as a theoretical framework for the present study.

Corpus and methods

This section provides a detailed overview of the research data and analytical methods. In terms of research data, details relating to access to Geopark data text, data processing, and the process of building the Chinese-to-English PEC are elaborated. Regarding the research method, we describe the corpus-based method to analyse the ecotourism data using a corpus linguistics analysis tool Sketch Engine (text analysis software developed by Lexical Computing Limited since 2003).

Data collection procedure

As mentioned in the introduction section, geoparks serve as ideal destinations for geotourism activities (Dowling, 2013; Li, Ng, et al., 2022; Li, Zhu, et al., 2022). Thus, the data analysed in this paper came from two prominent Chinese UNESCO-approved geoparks: Wudalianchi UGGp and Jiuhuashan UGGp. These two geoparks were selected on the basis of the following practical considerations: (1) their status as global geoparks means that their interpretations have been updated recently (i.e., since 2016); and (2) gathering data from these two UGGps was comparatively simpler than from others, as the managers of the geoparks were willing to provide us with all the available Chinese-to-English interpretations used within the parks. This meant that accessing data from these locations did not require the payment of funds or involve any complex procedures to address copyright issues. The parallel Chinese-to-English raw data was provided in the form of Word documents, and included the text from the geoparks' interpretative panels, signs, brochures, and geological museum displays. Because these documents contain information other than texts needed for this research, upon receiving the data, further data processing was performed, which is described below. The purpose of this paper is to explore the effective strategies of ecotourism interpretation which concern with flora and fauna (Dowling, 2013). Thus, during the data cleaning process, all passages identified as relating to other elements, such as the abiotic element (geological features and processes), the cultural element (local human lifestyle), and the geoparks' safety regulations, were removed. The resulting dataset therefore contains only the biotic element (i.e., original and interpreted passages relating to flora and fauna). Once the data processing was completed, all documents were consolidated into a single Word file. In this file, the text written in Chinese and English was separated and aligned for analysis. The corresponding Chinese and English passages were presented in alternating paragraphs, with the original Chinese text appearing first, followed by the corresponding English interpretation. The resulting dataset (Chinese-to-English PEC), includes a total of 63,248 words, comprising 23,230 Chinese characters and 40,018 English words.

Analytical procedure

Data organisation and data coding

After the Chinese-to-English PEC was composed, the analytical procedure of the data involved data organisation and data coding. For data organisation, the generated single Word document was imported into a tool called Tmxmall (https://www.tmxmall.com/aligner/home). This is an online language analysis interface that allows the users to upload, align, and view two (or more) languages of the same content simultaneously in a parallel format. The "alignment" is needed before any further dealing with the language data. It is a procedure to ensure that the language data (in our case, the Chinese corpus and the English corpus) are matched by paragraphs. This procedure is the foundation of the identification of interpretation strategies later. After the manual alignment, our next step is to make the language data searchable. To achieve this, we developed a 4-element coding scheme that includes both details regarding ecotourism

categories and nuanced categories of interpretation strategies or problems (Appendix B). In linguistic analysis, coding refers to the process of identifying and annotating language data using tags that capture the objectives of the language analysis. In our case, we wanted to identify four elements of language data:

Element 1 in this coding scheme represents the general ecotourism categories—flora (FL) or fauna (FA). For easy conceptualisation, this element should be considered together with Element 3, which includes six sub-types of ecotourism categories, according to Dowling (2013): (1) common flora names (CPN); (2) common fauna names (CAN); (3) local Chinese flora terms (CCPN); (4) local Chinese fauna terms (CCAN); (5) flora processes (FLP); and (6) fauna processes (FAP). Element 2 represents the researcher-identified effective interpretation strategies (IS) or interpretation problems (IP). The identification of IS or IP was based on the three-dimensional transformations of Eco-Translatology (2003). Interpretation problems were identified at this step so that they could be analysed later for potential optimisation. Element 2 could be considered together with Element 4, which includes the specific types of interpretation strategies or problems. Using Tmxmall, effective interpretations were tagged according to type of interpretation strategy, which included: Latin and English strategy (LE); Literal interpretation (LI); Creative Interpretation (CI); Foreignisation; Division; Shift; Division and Shift (DS); Combination; and Restructuring the Word Order (RWO). Interpretation problems were annotated as: Not Interpreted (NI); Misinterpreted; Use Chinese Pinyin (Chinese Phonetic Alphabet) to Replace English Words (UCPREW); and Incongruent Interpretation for Same Name (IISN). Appendix A provides brief definitions and examples of the specific interpretation strategies (see Appendix Table A1) and interpretation problems (Appendix Table A2). The annotations (i.e., tags) applied to the data are presented in Appendix B.

To maximise replicability, the following sections describe the steps taken to annotate the corpus data, illustrated by examples. In Tmxmall, tags were enclosed within diamond brackets so that the annotation did not interfere with the corpus analysis. As shown in Appendix B, each tag includes four general elements separated by commas, and within each element, multiple tags can be applied to a single effective interpretation. For instance, for the interpretation of "红松" into "*Pinus koraiensis* Sieb. Et Zucc. (Korean Pine)," the interpreter maintained scientific accuracy and effectively communicated a common plant name to the target audience *via* the Latin and English strategy. This single effective interpretation was tagged with "*koraiensis* Sieb. Et Zucc. (Korean Pine) <FL, IS, CPN, LE>," where "FL" stands for "flora" (as opposed to FA for fauna). "IS" represents effective interpretation strategies (as opposed to interpretation problems). "CPN" represents "common plant name" which is one category of flora (CPN, CAN, and FLP). Finally, "LE" stands for Latin and English strategy, which is a specific interpretation strategy used to interpret common flora names. Similarly, if the interpretation of a common flora name is identified as an interpretation problem instead of an effective interpretation strategy, it will be reflected in the second element of the tag (see Table 3). For example, when the interpreter only used Latin to interpret a common flora like "睡莲" into "*Nymphaea* L.," it led to "Not Interpreted (NI)" status in English, because only using the Latin interpretation is likely to make it difficult for geotourists to pronounce and remember it (Li, Ng, et al., 2022). Thus, the corresponding tag would be "*Nymphaea* L<FL, IP, CPN, NI>," where "IP" stands for interpretation problems, and NI represents "Not Interpreted," which signifies a specific interpretation problem of common plant names created by ineffective interpretation. This annotation system enables the retrieval of both effective and ineffective interpretations of flora and fauna across the six subcategories (CPN, CAN, FLP, FAP, CCPN, and CCAN). The tagging method for the five other subcategories of ecotourism (CAN, FLP, FAP, CCPN, and CCAN) follows the same approach as that for common plant names (CPN), described above.

Analysis of coded data

Following the manual coding process, the data were exported from Tmxmall and then imported into Sketch Engine for corpus-based quantitative and qualitative analysis. Sketch Engine is a

text analysis software that allows for accurate and rapid extraction of tagged data. By extracting all tagged data by categories (examples provided below), we were able to quantitatively and qualitatively analyse the interpretation cases of the different types of biotic elements.

The first step of the quantitative analysis focuses on effective interpretation strategies. The aim of this quantitative analysis is to ascertain the interpretation norms which characterise the genre of ecotouristic texts. We first retrieved all incidences of the six ecotourism subcategories of effective interpretation strategies (CPN, CAN, FLP, FAP, CCPN, and CCAN). To do this, we: 1) Selected Parallel Concordance on the DASHBOARD page; 2) Selected ADVANCE on the PARALLEL CONCORDANCE page; and 3) Selected English in "Search in," and then selected Corpus Query Language (CQL) in Query type. The CQL is a special code or query language used in Sketch Engine to search for complex grammatical or lexical patterns or to use search criteria which cannot be set using the standard user interface.

Then, we counted the frequencies and calculated the proportions of the specific interpretation strategies (i.e., literal interpretation, Latin and English strategy, creative interpretation, and shift) within each ecotourism subcategory (CPN, CAN, FLP, FAP, CCPN, and CCAN). The following function formula was entered into the PARALLEL CONCORDANCE page of Sketch Engine (see Figure C1 in Appendix C). Finally, we derived the descriptive statistical data (i.e., frequency and proportion) for the interpretation strategies within each ecotourism subcategory obtained from the Chinese-to-English PEC.

After the quantitative analysis, we zoomed in on each individual occurrence of the interpretation strategies data. Our qualitative analysis focused on how the same types of interpretation strategies are used within each ecotourism subcategory. The parallel concordance in the Chinese-to-English PEC allows us to clearly demonstrate the commonalities and particularities of translations (Bernardini & Kenny, 2020; Laviosa, 2002). To achieve this, we once again used the advanced filtering function of CQL in Sketch Engine, based on the tags, to look at all examples of each type of interpretation strategy employed within each ecotourism subcategory.

After analysing the effective interpretation, the above process was then repeated for cases of interpretation problems. To count the frequencies and calculate the proportions of the specific interpretation problems (UCPREW, NI, Misinterpreted, and IISN) within each ecotourism subcategory (CPN, CAN, FLP, FAP, CCPN, and CCAN), the following function formula was entered into the PARALLEL CONCORDANCE page of Sketch Engine (see Appendix Figure C2).

We then obtained statistical information (frequency and proportion) regarding the types of interpretation problems that were identified within each ecotourism subcategory from the Chinese-to-English PEC. Appendix Figure C2 shows the formula used to retrieve the tagged interpretation problems in the data. As we can see, the difference in this formula is where IP (interpretation problem) was used instead of IS (interpretation strategy).

The overall purpose of our analysis was, as noted, to demonstrate which kinds of interpretation strategies and problems were prevalent within the data, and on the basis of follow-up qualitative analysis to then determine how ineffective interpretations might be optimised using effective interpretation strategies to achieve semantic, style and cultural equivalence. In section "Results and discussion", we report the quantitative and qualitative analysis of the interpretation strategies and problems within six ecotourism subcategories (CPN, CAN, FLP, FAP, CCPN, and CCAN). Then, based on the analysis, we establish a taxonomy of ecotourism interpretation strategies based on Eco-Translatology (Hu, 2003).

Results and discussion

This section presents the various strategies found in the interpretation of common biotic names, local Chinese biotic names, and ecological processes. Each of these strategies is

discussed in detail with the support of examples from the PEC. Appendix D provides a total of 66 examples of effective and ineffective ecotourism interpretations. These examples are referred to using their *Text No.* in the following section. For example, ***ST 1*** refers to the "Source text" of Text No.1 (in Appendix Table D1). ***TT 13*** refers to the "Target text" of Text No.13 (in Appendix Table D2).

Interpretation of common biotic names

Effective interpretation

To analyse the corpus (Chinese-to-English PEC) for strategies of naming or interpreting flora and fauna, we employed the CQL functions [word="FL"] [word="."] [word="IS"] [word="."] [word="CPN"] [word="."] [word="Specific IS"] and [word="FA"] [word="."] [word="IS"] [word="."] [word="CAN"] [word="."] [word="Specific IS"]. The four strategies found are: Latin and English strategy (LE), literal interpretation (LI), creative interpretation (CI) and foreignisation. For the last item in the search function above, "Specific IS" can be replaced by "LE," "LI," "CI" and "Foreignisation" to determine the frequency of these strategies. The resulting statistical data is illustrated below in Figure 1. The results demonstrate that literal interpretation is the most frequently used strategy, while creative interpretation and foreignisation are relatively less common for the interpretation of these names. Literal interpretation is used more often when translating the names of flora than it is for fauna, whereas creative interpretation is used more often for flora. The literal interpretation indicates that there are existing names in English to refer to species needing translation, whereas the need for creative interpretation indicates a lack of existing names in English referring to the species in question. The adoption of different interpretation strategies reflects the diversity and complexity of different types of biotic species. The greater use of literal interpretation for common fauna names, along with the fewer cases of creative interpretation strategies, underlines that plants are more complex and diverse than animals (Li, Zhu, et al., 2022; Ren, 2020). Unsurprisingly, the Latin and English strategy is common, reflecting adherence to international naming conventions (ICN, 2018; ICZN, 2022).

	Common Flora Names		Common Fauna Names	
Interpretation Strategies	Frequency	Percentage	Frequency	Percentage
Latin and English	166	32.86%	73	17.89%
Literal Interpretation	219	43.37%	163	76.96%
Creative Interpretation	98	19.41%	5	3.43%
Foreignisation	22	4.36%	13	1.72%
Total Number	**505**		**408**	

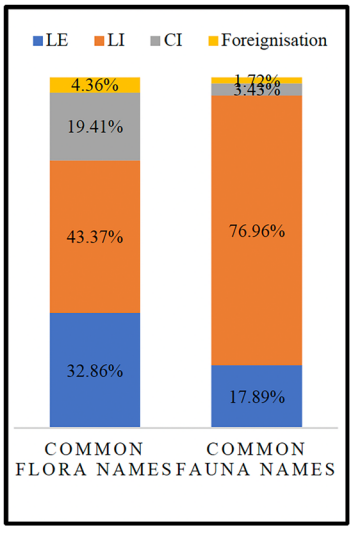

Figure 1. Frequency of interpretation strategies for common biotic names in Chinese-to-English PEC.

The following discussion of qualitative results elaborates on how our findings illustrate the use of two of Hu's Eco-Translatology (i.e., linguistic and communicative transformations) to achieve semantic equivalence in the SSC model. For Latin and English strategy, the examples mainly focus on English interpretations, because the ICZN (2022) and the latest International Code of Nomenclature for algae, fungi, and plants (ICN, 2018) have respectively provided unique Latin scientific names for fauna and flora. Analysis of the PEC revealed that the English interpretation of flora and fauna names can be divided into two main categories: literal and creative names. The explanation for the distinction between these two classifications pertains to the presence or absence of an English counterpart. Firstly, there are English counterparts available to effectively interpret common biotic names. For example, the flora name "石竹 (ST 1)" was literally interpreted into "*Dianthus chinensis* L. (Chinese pink)" and the fauna name "鸳鸯 (ST 8)" was interpreted into "*Axi galericulata* (Mandarin duck)" by the interpreter.

If the creative interpretation strategy is used for English interpretation, there are two principles found in the PEC that guide the generation of such interpretations: (1) directly interpreting according to their shape or connotation; and (2) borrowing their scientific names. Firstly, the flora name "青钱柳 (ST 2)" was creatively interpreted into "Money Willow" according to their shape. The fruit of "青钱柳" bears a resemblance to copper coins and shows a green, willow-esque physical appearance. Thus, direct interpretation of the literal descriptive meaning can achieve semantic equivalence. A similar example of this interpretation strategy being used for fauna could not be found in the PEC. This could potentially be attributed to the greater complexity and diversity of plant species in comparison to their animal counterparts (Li, Zhu, et al., 2022).

The other creative strategy for English interpretation is using Latin scientific names as a bridge. For instance, the plant name "黑龙江百里香 (ST 3)" was creatively interpreted into "Heilongjiang Thyme shrub." The Latin name of this plant is "*Thymus amurensis* Klokov." The Latin "*amurensis*" is related to the original location of the plant, Heilongjiang. The Latin "*Thymus*" is the herb "Thyme" in English. While the term "Klokov" signifies the person who assigned the name to the flora. According to the English interpretation, this plant belongs to the shrub genus. Thus, "黑龙江百里香" can be interpreted into "*Thymus amurensis* Klokov" (Heilongjiang Thyme Shrub). Similarly, creatively using the scientific name, the English fauna name of "乌苏里蝮 (ST 9)" can be interpreted into "Ussuri viper" *via* creatively borrowing its Latin name "*Gloydius ussuriensis*." The specific epithet "*ussuriensis*" corresponds to "Ussuri" and the genus "*Gloydius*" means "viper" in English. It can also be noted in passing that "Ussuri" is another location (border river in northern China).

Analysis based on the PEC also revealed that if the term appeared in the main text of an interpretative board, then for the purposes of quick access or fluidity, the common plant and animal names occur only in English and a parallel Latin term was not used. This makes the interpretative boards more concise (Li, Zhu, et al., 2022). For instance, the interpreter employed the literal interpretation to render the flora name "睡莲 (ST 4)" as "water lily," and the fauna name "长耳鸮 (ST 10)" as "long eagle-owl," achieving semantic equivalence.

In addition to literal interpretation, creative interpretation is found for common biotic names such as creative physical interpretation used for the endemic Chinese tree "凤凰松 (ST 5)." Due to the plant's resemblance to a phoenix spreading its wings, its name was directly interpreted into "phoenix pine," a designation that could hold visual appeal for geotourists. A similar interpretation strategy for fauna cannot be found in the PEC. The orchid flora name "独蒜兰 (*Pleione bulbocodioides* (Franch.) Rolfe)" in ST 6 and the fauna name "乌苏里貉 (*Nyctereutes procyonoides*)" in ST 11, originating in China, were creatively interpreted into "Chinese Pleione orchid" and "Chinese raccoon dog" through borrowing from and translating their scientific names, respectively. According to Pridgeon et al. (2006), *Pleione* is "a small genus of predominantly terrestrial but sometimes epiphytic or lithophytic, miniature orchid." The interpreted name of this plant uses an English equivalent directly borrowed from the Latin, "Pleione." Also note, incorporating

the term "orchid" can facilitate the comprehension of plant taxonomy among ecotourists. English interpretation of "Chinese raccoon dog" relies on the semantics of the genus (*Nyctereutes*) in its scientific name. Wozencraft (2005) points out that the taxonomic classification of *Nyctereutes* denotes a group of canids commonly referred to as raccoon dogs. Therefore, "raccoon dog" was used by the interpreter. The term "Chinese" was incorporated into both species interpretations as a means of identifying the unique characteristics and of elucidating its provenance.

The above examples illustrate the effective use of linguistic and communicative transformations of Eco-Translatology to achieve semantic equivalence. Similarly, the following examples used all three-dimensional transformations of Eco-Translatology to achieve both semantic and cultural equivalence in the SSC model. The final effective interpretation strategy for interpreting common biotic names is the less frequent, but still at times necessary, foreignisation. The scientific names of species originating in China may contain affixes indicating foreign countries such as "*japoni-*" or foreigners who discovered these species. In this case, whether the species is the title or in the main text of the interpretive boards, only English is used. As Ren (2020) explains, the nation of origin has a voice in the translation of species names. For instance, the flora "枇杷 (*Eriobotrya japonica* (Thunb.) Lindl.)" in ST 7 was interpreted into "loquats," and the fauna "丹顶鹤 (*Grus japonensis*)" in ST 12 was rendered into "Red-crowned crane." Frequently, these are also termed in English, "Japanese plum" and "Japanese crane" which would mistakenly indicate the origin as Japan rather than China. Therefore, to effectively convey Chinese ecological culture to geotourists, "loquats" and "Red-crowned crane" were chosen and reference to Japan removed.

In conclusion, it was found that Latin and English strategy, literal interpretation, creative interpretation and foreignisation could be used to effectively interpret common biotic names. Using Eco-Translatology, the interpreter can specifically ensure scientific accuracy and semantic equivalence in the use of common biotic terms. The interpreter can preserve the cultural aspects of common biotic names in the source language by using creative interpretation and foreignisation. These interpretation strategies, moreover, provide a point of reference for optimising the interpretation problems of common biotic names. The following sections illustrate how interpretation strategies can be used to optimise interpretation problems found in the ecotourism data.

Interpretation problems

The problems regarding the interpretation of common biotic names are specifically: Not Interpreted (NI); Misinterpreted; Incongruent Interpretation for Same Name (IISN); and Using Chinese Pinyin Replace English Words (UCPREW). We respectively retrieved these by searching for [word="FL"] [word="/"] [word="IP"] [word="/"] [word= "CPN"] [word="/"] [word="Specific IP"] and [word="FA"] [word="/"] [word="IP"] [word="/"] [word= "CAN"] [word="/"] [word="Specific IP"] in the PEC. The "Specific IP" in the last tag can be substituted with "NI," Misinterpreted, IISN, and UCPREW. As can be seen from Figure 2, the most common type of interpretation problem is "Misinterpreted," followed by cases where names are not interpreted at all, and then IISN. The use of Chinese Pinyin to replace English words was relatively infrequent.

Using the interpretation strategies discussed above, the following examples illustrate how linguistic and communicative transformations of Eco-Translatology can be used to achieve semantic equivalence within the SSC model. The category of Not Interpreted can be divided into "Latin-interpretations only" and "English-interpretations only." According to Eco-Translatology (Hu, 2003), the ultimate goal of translation is communication. If the interpretations only use Latin, the target audience may not have ready knowledge of the Latin language, or even though they do, it is difficult to use the Latin names in spoken language. Therefore, only using Latin to interpret biotic names is unhelpful in this regard. Examples solely interpreted in Latin are the flora name "皖杜鹃 (ST 13)" and the fauna name "画眉 (ST 20)," respectively interpreted into their Latin names "*Rhododendron anhweiense* E.H.Wilson" and "*Garrulax canorus*" by the

	Common Flora Names		Common Fauna Names	
Interpretation Problems	Frequency	Percentage	Frequency	Percentage
Not Interpreted	129	32.74%	93	32.40%
Misinterpreted	171	43.41%	106	36.93%
Incongruent Interpretation for Same Name	85	21.57%	61	21.25%
Use Chinese Pinyin to Replace English Words	9	2.28%	27	9.42%
Total Number	**394**		**287**	

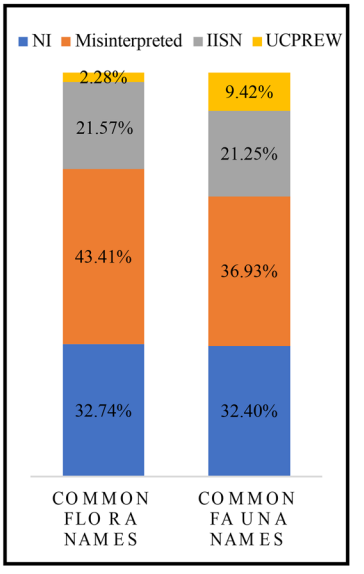

Figure 2. Frequency of interpretation problems for common biotic names in Chinese-to-English PEC.

interpreter. The fauna name "画眉" happens to match a bird with an existing English name called "Chinese Hwamei." Thus, the fauna name "画眉" can be interpreted into "Chinese Hwamei" in English as well as "*Garrulax canorus*" in Latin. Unlike "画眉," there is no existing equivalent term in English to correspond to "皖杜鹃" that distinguishes it. Therefore, its Latin scientific name "*Rhododendron anhweiense* E.H.Wilson" can be used as a bridge to establish its English name. The species epithet "*anhweiense*" refers to the Chinese location "Anhui" and the genus "*Rhododendron*" conveys the same meaning as "rhododendron" in English. Therefore, "皖杜鹃" can be creatively interpreted as "*Rhododendron anhweiense* E.H.Wilson (Anhui rhododendron)."

In terms of the "English-interpretation only" problem in the category of Not Interpreted, according to Li et al. (Li, Zhu, et al., 2022), if only the English interpretation is used, this does not conform to the ICN (2018) or the ICZN (2022) and limits effective communication, such as the interpretations of a plant (马尾松: ST 14) and an animal (猕猴: ST 21). To establish a scientific standard for ecotourism interpretation in accordance with the latest ICN (2018) and ICZN (2022), the Latin scientific name of "马尾松" was identified as "*Pinus massoniana* Lamb," and the Latin scientific name of "猕猴" was designated as "*Macaca mulatta*." As both "马尾松" and "猕猴" serve as titles of the interpretative panel, we optimised the interpretations of "马尾松" as "*Pinus massoniana* Lamb (Chinese red pine) and "猕猴" as "*Macaca mulatta* (Macaque)." These optimised versions, guided by linguistic and communicative transformations of Eco-Translaotogy, ensure semantic equivalence.

Another category of interpretation problems is misinterpretation, which can be the result of incorrect interpretation of English or Latin scientific names of common biotic names. For example, the English flora name for "蜻蜓兰 (ST 23)" was ineffectively interpreted into "dragon orchid," where in fact it should be optimised to "dragonfly orchid," native to Wudalianchi UGGp and named after the flower's visual resemblance to a dragonfly. Similarly, the fauna name "狗獾 (ST 23)" is misinterpreted in English as "Meles," but it should be "European badger." These revised interpretations were aligned with the kinds of linguistic and communicative transformations advocated by Eco-Translatology in order to achieve semantic equivalence. In terms of incorrect interpretation of Latin scientific names, the scientific name of the flora "黄山玉兰 (ST 15)" should be accurately interpreted as "*Magnolia cylindrica* E.H.Wilson" rather than "*Yulania cylindrica* (E.H.Wilson) D.L.Fu." The scientific name of the Chinese bamboo partridge, "竹鸡 (ST 22)" should

be "*Bambusicola thoracicus*," not "*Bambusicola thoracica*." It is pertinent here to recall that, generally, in regard to the main text on interpretative boards, the rule is that only English is used. Therefore, in such cases, it is of great importance that the translation given is accurate, since it is the only translation available.

Another problem is interpretation inconsistency; in other words, some of the same Latin scientific and English names of common biotic names are interpreted using different terms. For example, the flora scientific name of "毛红椿 (ST 17)" occurs in three different versions: *Toona* ciliate, *Toona ciliata* Roem. var. pubescens, and *Toona sureni* var. pubescens. The flora scientific name of "毛红椿" should be "*Toona ciliata* M.Roem." Also, the fauna scientific name, "短尾猴 (ST 24)" appears with two Latin versions which are *Macaca thibetana*, and *Macaca arctoides*. Although these two scientific names can be found in ICZN (2022), they belong to two different species. In Jiuhuashan UGGp, the scientific name of "短尾猴 (ST 24)" is "*Macaca arctoides*." Since these species appear alone or as the title on the interpretative boards, they need to be optimised in both Latin and English. To achieve semantic equivalence, in English, "毛红椿 (ST 24)" can be rendered into "red cedar" and "短尾猴 (ST 24)" can be translated as "stump-tailed macaque" *via* literal interpretation. Thus, the flora name "毛红椿" can be clearly rendered into "*Toona ciliata* M.Roem (red cedar)" and the fauna name "短尾猴" can be fully translated as "*Macaca arctoides* (stump-tailed macaque)." Another example is "铁线蕨 (ST 18)," which is inconsistently interpreted into both "Southern maidenhair fern" and "Adiantum." "青头潜鸭 (ST 25)" is interpreted into three versions: green-headed pochard, blue-headed pochard, and pochard. In English, ST 18 should be optimised into "Southern maidenhair fern" and ST 25 can be revised as "Baer's pochard" by literal interpretation. Since these final two examples are present in the main text of the interpretative boards, they only need to be interpreted into English. Guided by linguistic and communicative transformation according to the principles of Eco-Translatology, these revised interpretations of common biotic names achieve scientific accuracy and semantic equivalence.

The smallest frequency of problems is found in UCPREW. For example, Pinyin was used to render the flora name "山丹花 (ST 19)" into "Shandanhua." Similarly using Pinyin, the fauna name "鹌鹑 (ST 26)" was interpreted into "Chinese anchun." In both of these interpretations, there is a loss of meaning. Guided by linguistic and communicative transformations of Eco-Translatology, "山丹花" can be literally interpreted into "Coral Lily," and the fauna name "鹌鹑" should be interpreted into the English, "quail," achieving semantic equivalence.

Table 1 below summarises patterns of usage for four interpretation strategies employed for common biotic names informed by the principles of three-dimensional transformations in Eco-Translatology (Hu, 2003).

Interpretation of local Chinese biotic terms

Effective interpretation

The use of local Chinese biotic terms is similarly examined to determine effective strategies and categories of problems that occur. The interpretation of local Chinese biotic terms, similar to the interpretation of common biotic names, is also an important element embedded into the ecotourism interpretation system. In contrast to common biotic names, the interpretation of local Chinese biotic terms incorporates ecological culture, including local dialects. In this case study, we selected Wudalianchi and Jiuhuashan UGGps. This means the specific dialects of the geopark locations were taken into consideration. Wudalianchi UGGp, situated in Heihe City, Heilongjiang Province, China, includes the use of Northeast dialect and Manchu language (one of the important national languages in the Northeast of China). On the other hand, Jiuhuashan UGGp, located in Chizhou City, Anhui Province, China, involves the use of Hui dialect. To

Table 1. Taxonomy of interpretation strategies for common biotic names.

Interpretation strategies	Patterns of usage for interpretation strategies for common flora names	Patterns of usage for interpretation strategies for common fauna names
Common biotic names appear as the title or stand alone on the interpretative boards.		
Latin and English strategy	The International Code of Nomenclature for algae, fungi, and plants (ICN, 2018) provided the unique Latin scientific name of flora, with the genus and species epithet being italicised. English name: 1. Literal interpretation: Flora names can be found in English equivalents. 2. Creative interpretation: a. There is no English equivalent for endemic Chinese flora. According to their features or connotations, direct interpretation can be widely accepted. b. The native flora of China lacks an English equivalent. In such cases, borrowing the English meaning of their Latin scientific name (genus and species epithet) is used as an alternative strategy.	The International Code of Zoological Nomenclature (ICZN, 2022) provided the unique Latin scientific name of fauna, with the genus and species epithet being italicised. This is similar to interpreting English common flora names. However, the rule of "a" in creative interpretation is not found in the PEC and needs further research.
Foreignisation	If a species originates from China and its scientific name contains affixes indicating foreign countries rather than China, or foreigners who discovered the species, English will be used exclusively.	
Common biotic names in the main text of interpretative boards		
Literal Interpretation/Creative Interpretation	These two interpretation strategies correspond to the English part of the Latin and English strategy.	

effectively interpret local Chinese biotic terms, the interpreter employed three interpretation strategies: Latin and English strategy (LE); literal interpretation (LI); and creative interpretation (CI).

In analysing the PEC for evidence of these three interpretation strategies, we searched for: [word="FL"] [word="/"] [word="IS"] [word="/"] [word="CCPN"] [word="/"] [word="Specific IS"] for local Chinese flora names, and [word="FA"] [word="/"] [word="IS"] [word="/"] [word="CCAN"] [word="/"] [word="Specific IS"], for local Chinese fauna names. The last tag "Specific IS" can be replaced by "LE," "LI" and "CI." The results show and can be seen in Figure 3, the Latin and English strategy is the most prevalent for both local Chinese flora and fauna terms, indicating the importance of adhering to the principles of geotourism interpretation: scientificity and accuracy (Li, Zhu, et al., 2022). Moreover, literal interpretation is more commonly employed when interpreting local Chinese fauna terms compared to flora terms, whereas creative interpretation is more frequently used for local Chinese flora names than fauna names. This is due to the diversity and complexity of plant species (Li, Zhu, et al., 2022; Ren, 2020).

The following qualitative analysis demonstrates how specific examples align with three-dimensional (linguistic, cultural, and communicative) transformations to achieve both semantic and cultural equivalence in the SSC model. Firstly, when local Chinese biotic names are used as the title, or stand alone on the interpretative boards, Latin and English can be used. Note that for the purposes of professionalism, when local Chinese biotic names are interpreted, they should be transformed into Chinese official (common) names (Li, Zhu, et al., 2022; Ren, 2020). For example, the local Chinese flora name "拖盼儿 (ST 27)" was scientifically and effectively interpreted into "*Rubus corchorifolius* L.f. (Raspberry)." The term "拖盼儿" is derived from the Manchu language, and it refers to "山莓." The Latin scientific name of "山莓" is "*Rubus corchorifolius* L.f.." Its English name can be literally rendered into "Raspberry" which can be identified in English. Similarly, the

	Local Chinese Flora Terms		Local Chinese Fauna Terms	
Interpretation Strategies	Frequency	Percentage	Frequency	Percentage
Latin and English	24	58.54%	14	45.17%
Literal Interpretation	5	12.19%	11	35.48%
Creative Interpretation	12	29.27%	6	19.35%
Total Number	41	100%	31	100%

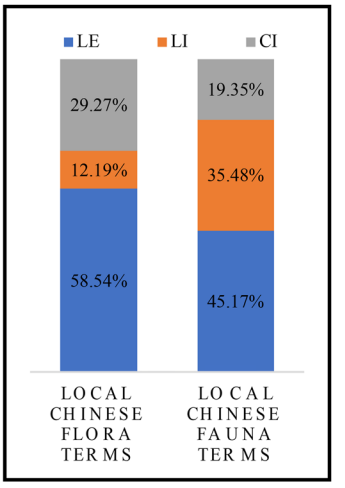

Figure 3. Frequency of interpretation strategies for local Chinese biotic names in Chinese-to-English PEC.

local Chinese fauna name "斐耶楞古 (ST 31)" was effectively interpreted into "*Tetrastes bonasia* (Hazel grouse)" by the interpreter. In Manchu, locals refer to "花尾榛鸡" as "斐耶楞古." The Latin scientific name of "花尾榛鸡" is "*Tetrastes bonasia*." There is an English term "Hazel grouse" corresponding to it. Other examples are the local Chinese flora terms "老鸭糊 (ST 28)," which is scientifically and effectively interpreted into "*Callicarpa cathayana* C.H.Chang (Chinese beautyberry)" and the local Chinese fauna name, "臭迷子 (ST 32)" is "*Rana amurensis* (Heilongjiang frog)." These examples, in contrast to the above species, are native to China and lack a direct English equivalent. Therefore, a creative method is required to achieve semantic equivalence (Li, Zhu, et al., 2022). The botanical term "老鸭糊" originates from the Chizhou dialect (closely related to Hui dialect) and refers to the flora known as "华紫珠." The scientific name of "华紫珠" is "*Callicarpa cathayana* C.H.Chang." The specific epithet "*cathayana*" is used in botanical names to refer to plants that are native to or found in China and interpreted into "Chinese." The genus "*Callicarpa*" means "beautyberry" in English which corresponds to "紫珠." Thus, the English name of "华紫珠" can be creatively interpreted into "Chinese beautyberry" *via* using its Latin name. Similarly, the fauna name "臭迷子," in the Northeast dialect, refers to "黑龙江林蛙" whose scientific name is "*Rana amurensis*." In Latin, the specific "*amurensis*" can refer to "Heilongjiang" and the genus "*Rana*" means "frog" in English. Hence, the English name of "臭迷子" can also be creatively interpreted into "Heilongjiang frog," borrowing from its scientific name.

When local Chinese biotic terms are embedded in the main text of interpretative boards, it is preferred by the interpreter to only use English names to communicate a large amount of information. Literal and creative interpretation strategies can be used to interpret them by the interpreter. For example, in the Chizhou dialect, there is a local flora name, "楼上楼 (ST 29)," which refers to the plant "重楼." In English, "重楼" can be literally translated as "Paris root." Similarly, in Northeast dialect, there is a fauna name "随鹅 (ST 33)" which refers to the bird "鸿雁." In English, "鸿雁" can be literally interpreted into "swan goose." However, when the local Chinese biotic name lacks an English equivalent, a creative interpretation is needed. The foundation of the creative change is based on borrowing their scientific names. For instance, in Chizhou dialect, "马褂衣 (ST 30)" refers to the plant "鹅掌楸 (*Liriodendron chinense* (Hemsl.) Sarg.)." "*Liriodendron*" is the genus and means "tulip tree," and "*chinense*" means "Chinese," so "马褂衣" is "Chinese tulip tree." Similarly, in the Northeast dialect, "鲤拐子 (ST 34)" is used to denote the species "黑龙江鲤 (*Cyprinus carpio* haematopterus)" whose English name was interpreted into "Heilongjiang coloured carp." The term "Heilongjiang" in this context refers to a specific place in China. In Latin, the specific epithet "*carpio*" means "carp" in English. The subspecies of carp, "haematopterus," indicates that the fish's

skin can incorporate multiple hues, such as tawny, grayish white, and golden yellow. Thus "*Cyprinus carpio* haematopaterus" is "Heilongjiang coloured carp."

The above examples of interpreting local Chinese biotic terms are in line with the three-dimensional transformations of Eco-Translatology. The translator facilitates the transition from local dialect to official or scientific terminology through precise word selection. This transformation process enables a broader audience, such as non-expert tourists, including people from different linguistic and cultural backgrounds, to understand and recognise these flora and fauna. Such interpretation strategies informed by the three-dimensional transformations of Eco-Translatology not only facilitates effective communication but promotes cross-cultural understanding by making the information accessible. Therefore, three effective interpretation strategies (Latin and English, literal interpretation, and creative interpretation) will serve as a reference for optimising the interpretation of local Chinese biotic names in the following part.

Interpretation problems

For local Chinese biotic terms, we collected data on interpretation problems by employing the CQL function formula [word="FL"] [word="/"] [word="IP"] [word="/"] [word="CCPN"] [word="/"] [word="Specific IP"] and [word="FA"] [word="/"] [word="IP"] [word="/"] [word="CCAN"] [word="/"] [word="Specific IP"]. This search located the use of the four interpretation problems (NI, Misinterpreted, IISN, and UCPREW) in the PEC. Then the tag "Specific IP" can be replaced by the aforementioned four interpretation strategies. In Figure 4, the tabulation of the resulting data suggests that the two major problems in the interpretation of local Chinese biotic terms are Misinterpreted and Not Interpreted, and the remaining problems, IISN and UCPREW, are less common. The proportion of Misinterpretation in local Chinese flora and fauna terms is clearly dominant. IISN includes inconsistent work where the rules are not followed for the same term. UCPREW may be caused by the interpreter's lack of ecological cultural background in the local dialect (Li, Zhu, et al., 2022). All these problems cause a failure to effectively convey Chinese ecological culture and ensure accurate communication of biotic information.

Informed by the principles of three-dimensional transformations in Eco-Translatology, we employed the above-described effective interpretation strategies to amend a series of examples of ineffective interpretation in local Chinese biotic names, with the aim of attaining

	Local Chinese Flora Terms		Local Chinese Fauna Terms	
Translation Problems	Frequency	Percentage	Frequency	Percentage
Not Interpreted	54	33.13%	29	31.18%
Misinterpreted	85	52.15%	38	40.86%
Incongruent Interpretation for Same Name	16	9.82%	19	20.43%
Use Chinese Pinyin to Replace English Words	8	4.91%	7	7.53%
Total Number	**163**		**93**	

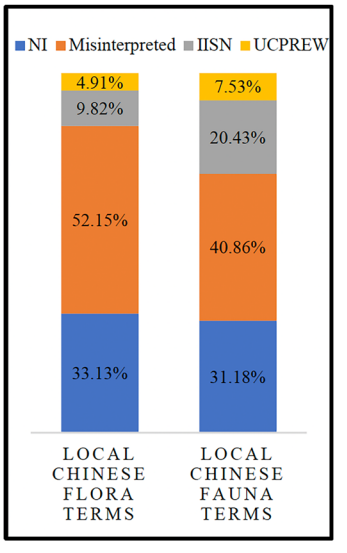

Figure 4. Frequency of interpretation problems for local Chinese biotic names in Chinese-to-English PEC.

semantic and cultural equivalence within the SSC model. Firstly, local Chinese biotic names failed to be interpreted in both Latin and English but were instead interpreted in either only one or the other, resulting in NI. For example, the Chinese local flora term "阿尔蒙 (ST 35)" in the Manchu language and the Chinese local fauna term "山和尚 (ST 41)" in the Northeast dialect were only interpreted into Latin as "*Phellodendron chinense* C.K.Schneid (TT 35)" and "*Garrulus glandarius* (TT 41)," respectively. Simply using Latin causes a semantic barrier for ecotourists (Li, Zhu, et al., 2022). Therefore, the English counterparts should ideally be added to the target text. According to Li et al. (Li, Zhu, et al., 2022), when interpreting local Chinese biotic names into English, the first step is to transform these into Chinese official (common) names. The English interpretation of ST 35 should be "Chinese cork tree" because its official Chinese plant name is "黄檗." The official Chinese fauna name of "山和尚 (ST 41)" is "松鸦," which should be interpreted as "Eurasian jay" in English. Since these two local Chinese biotic names appear as titles on the interpretative board, both Latin and English were used. Thus, ST 35 should be interpreted as "*Phellodendron chinense* C.K.Schneid (Chinese cork tree)" and ST 41 should be "*Garrulus glandarius* (Eurasian jay)." Additionally, there are two examples where the scientific name has been omitted but should be included to comply with the principles of scientific interpretation of ecotourism (Li, Zhu, et al., 2022): the Chinese local (Chizhou dialect) flora name "水鳖梨 (ST 36)" and Chinese local (Northeastern dialect) fauna name "山马蛇子 (ST 42)." The official Chinese flora name of "蓝果树" is "水鳖梨 (ST 36)" and locals refer to "黑龙江草蜥" as "山马蛇子 (ST 42)." The Latin scientific name of "蓝果树" and "黑龙江草蜥" are respectively "*Nyssa sinensis* Oliv." and "*Takydromus amurensis*," which should be added in their target text.

Secondly, examples of Misinterpreted cases can also be found in the PEC, which can be optimised using the literal interpretation to achieve both semantic and cultural equivalence, guided by Eco-Translatology. For instance, in the main text of an interpretative board, the local Chinese flora name "八棱 (ST 37)" was inaccurately rendered into "octagonal tree." In the Chizhou dialect, it is a common practice for locals to use the term "八棱" as a substitute for the botanical name "银杏," also known as "Gingko." Similarly, in the Northeast language, the local Chinese fauna name "水耗子" in ST 43, which is officially known as "水獭," can be interpreted into "otter" instead of the literal Chinese meaning of "water rat."

Thirdly, IISN causes semantic and cultural inequivalence. For example, in the Northeast dialect, the local flora term, "鱼鳞松 (ST 38)," was ineffectively interpreted into two different versions: fish-scale pine and fish-scale spruce. However, local people refer to it as "鱼鳞云杉." Therefore, it should be consistently interpreted into "dark-bark spruce" by its literal interpretation. Similarly, in the Northeast dialect, the local Chinese fauna term "柴狗 (ST 44)" was inconsistently interpreted into "Chaigou" and "Dholes." However, local people refer to it as "豺." Therefore, it is best that "Dholes" be used all the time, as in English "Dhole" can correspond to "豺" and this term (and also the previous inconsistently used term) appears as the main text of the interpretive boards which are only interpreted into English (Li, Zhu, et al., 2022).

Finally, UCPREW can lead to a loss of meaning and create/maintain cultural barriers. For example, in terms of interpretations of titles, the local Chinese flora name "八本条 (ST 39)" was rendered into "Babentiao" and the Chinese local fauna name "勒付 (ST 45)" was interpreted into "Lefu." In the Northeast dialect, locals use the term "八本条" as a substitute for "珍珠梅," whose Latin name and English name of "珍珠梅" is "*Sorbaria sorbifolia* (L.) A.Braun" and "false spiraea," respectively. Therefore, "八本条" should be interpreted into "*Sorbaria sorbifolia* (L.) A.Braun (false spiraea)." In the Manchu language, locals use the term "勒付," which refers to the fauna "黑熊." The scientific name of "黑熊" is "*Ursus thibetanus*" and its English name is "Asian black bear." Thus, "勒付" should be interpreted into "*Ursus thibetanus* (Asian black bear)." Another set of examples involves the interpretations of the main text in interpretive boards, where the local Chinese biotic names were interpreted in Pinyin while they should be interpreted in English. For example, the local Chinese flora name of "翼朴 (ST 40)" is what the Northeast dialect used

to refer to "青檀," which has an English name of "blue sandalwood." However, it was interpreted using the Pinyin "Yipu." In a similar example, the local Chinese fauna name of "五道眉 (ST 46)" is commonly known and referred to as "花鼠," which has an English counterpart of "chipmunk." However, it was interpreted using its Pinyin form as "Wudaomei."

The above analysis clearly demonstrates that inaccurate interpretation of local Chinese biotic terms can cause semantic and cultural inequivalence, creating communication barriers and likely resulting in cases of cross-cultural misunderstanding. To achieve semantic and cultural equivalence, the inaccurate interpretation has been optimised under the guidance of three-dimensional transformations within Eco-Translatology. Informed by the principles of three-dimensional transformations in Eco-Translatology, the taxonomy of interpretation strategies of local Chinese biotic names can be adopted by the broader taxonomy of interpretation strategies of common biotic names already established in *section "*Interpretation problems" (see Table 1).

Interpretation of ecological processes

Effective interpretation

To identify the translations of terms denoting ecological processes, rather than biotic names, we used the following CQL function formulas: [word="FL"] [word="."] [word="IS"] [word="."] [word="FLP"] [word="."] [word="Special IS"] and [word="FA"] [word="."] [word="IS"] [word="."] [word="FAP"] [word="."] [word="Special IS"]. From the results, we then generated frequency information regarding each of the six interpretation strategies of ecological processes. These are: literal interpretation (LI), division, shift, division and shift (DS), combination, and restructuring the word order (RWO). Thereafter in the search, the "Specific IS" in the square brackets can be replaced by "LI," Division, Shift, "DS," Combination and "RWO." The results were tabulated comparatively in Figure 5 which shows that literal interpretation, division, and combination are the three most frequently used strategies for interpreting ecological processes. The results for the remaining interpretation categories of shift, division and shift, and restructuring the word order were much less significant (all less than 10%). Li et al. (Li, Zhu, et al., 2022) pointed out that since most ecological processes are related to flora and fauna characteristics, active mood simple

	Flora Processes		Fauna Processes	
Interpretation Strategies	Frequency	Percentage	Frequency	Percentage
Literal Interpretation	94	25.13%	64	23.79%
Division	116	31.02%	79	29.37%
Shift	26	6.95%	24	8.92%
Division and Shift	37	9.89 %	26	9.67%
Combination	71	18.98%	57	21.19%
Restructuring the Word Order	30	8.03%	19	7.06%
Total Number	**374**		**269**	

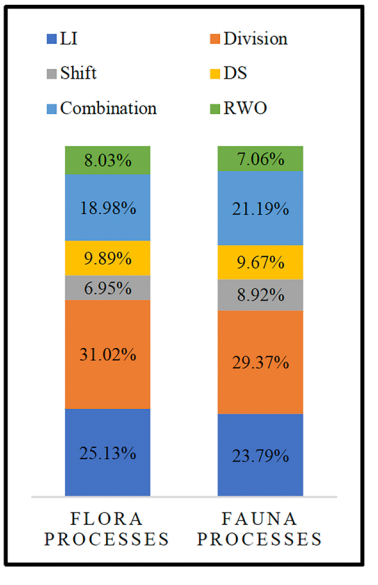

Figure 5. Frequency of interpretation strategies for ecological processes in Chinese-to-English PEC.

possessive, and describer verbs, such as "具有/有 (have)" and "是 (is/are)," can be expected in the Chinese ST. This means that the interpreter more often opts for literal interpretation and division strategies (Li, Zhu, et al., 2022).

The following examples, readily available from the PEC, demonstrate how these instances of interpreting ecological processes were mapped onto linguistic and communicative transformations of Eco-Translatology to achieve style equivalence in the SSC model. Firstly, the interpreter employed literal interpretation to interpret ecological processes described in simple, active Chinese sentences. To achieve style equivalence, the interpreter literally interpreted the characteristics of the "Korean pine (ST 47)" and the "Compton Tortoiseshell (ST 55)" into active English sentences of similar length, such as TT 47 and TT 55.

However, if the characteristics of flora or fauna are in complex Chinese sentences that contain multiple subjects and clauses, the interpreter employed the division strategy to separate them into individual English sentences that fit the English syntax while maintaining the same level of information expressed in the original Chinese sentence. For example, the features of "Chinese ring-cupped oak (ST 48)" and "stripe-backed pheasant (ST 56)" were both originally described in one long Chinese sentence. In order to achieve style equivalence during the process of interpretation, the interpreter broke the long Chinese sentence down into multiple short English sentences in TT 48 and TT 56.

Conversely, to match style equivalence, multiple Chinese sentences that share the same subject (either by using the same noun phrase or using a pronoun) can be combined into one English sentence using conjunctions or adjoint adverbials. For example, when describing the characteristics of the "Chinese tassel tree (ST 49)," the original Chinese text was in two separate sentences, with the "Chinese tassel tree" being the subject in both sentences. When interpreted into English, the interpreter combined the two sentences using the conjunction "which" while maintaining the same meaning. A similar example can be found for the interpretation of the fauna features of "clouded leopard (ST 57)." The interpreter conveyed the meaning in one English sentence, using the adjoint adverbial "growing to" to link what was originally expressed in two different Chinese sentences. This strategy yields a more succinct English interpretation (Baker, 2018; Li, Zhu, et al., 2022).

Although shift, division and shift, and restructuring the word order strategies are less frequently used (each accounting for less than 10% of usage) in interpreting ecological processes, they are important strategies in interpreting ecological processes. The first of these strategies, shift, is necessary when dealing with explicit and implicit passive Chinese words that are embedded in describing simple ecological processes. According to Chu (1973) and Xiao et al. (2006), interpreting or translating passive-voice Chinese sentences into passive-voice English sentences is called equivalence shift. For example, in the interpretation of ecological processes for the "Chinese yew (ST 50)" and the "lynx (ST 58)," the structures "被视为" and "被认为" were used. The Chinese character "被" is an explicit passive marker, as seen at the beginning of the two phrases. In the interpretation of these two examples, the passive verb form, "be+done" was used in English, and because both "视为" and "认为" can be interpreted as "regard," the two phrases "被视为" and "被认为" were interpreted as the passive "be regarded as" in TT 50 and TT 58.

It is worth noting that there is a particular case of passive voice in Chinese—the implicit passive voice, where the verb used seems to be in an active syntax structure, but in fact the semantic meaning behind the use is passive (Li, Zhu, et al., 2022; Ren, 2020; Xiao et al., 2006). In other words, contrary to the previous example where an explicit passive marker can be identified in the Chinese sentence (i.e., "被"), in implicit passive sentences, the passive voice is identified by meaning. For example, the Chinese verb "入" is a common implicit passive word (e.g., in interpreting the characteristics of the "Manchurian ash," ST 51). Literally, the word "入" should be interpreted as an active verb, but considering the

context, it was rendered into "be used as" in TT 51 to reflect its actual semantic reference in the description. Similarly, in the interpretation of the features of the female "stripe-backed pheasant (ST 59), the verbs "缀 (cover)" and "具 (decorate)" were respectively interpreted into "be covered with" and "be decorated with" in TT 59. Thus, passive voice achieves style equivalence.

The strategy "division and shift" combines two strategies (the strategy shift, and the strategy division) to achieve style equivalence, as the name suggests. It is used to interpret Chinese ST that has long and complex sentences with the need to convert the voice of the verb. For example, the features of the "golden birch (ST 52)" and the "western capercaillie (ST 60)." The interpreter not only broke down the long sentences into two short ones, but also employed the passive: "be + done" instead of "被" marker. Besides, "散生 (ST 53)" and "布满 (ST 61)" are implicit passive characters embedded in long sentences that interprets the features of the "purple Nanmu" and the "silver pheasant," respectively. In TT 53, "散生" was rendered into the passive, "is scattered in" and "布满" in TT 61 was translated into "covered with" by the interpreter. As we can see from these examples, the interpreter aligned with linguistic and communicative transformations of Eco-Translatology to attain style equivalence.

The last strategy, restructuring the word order, is needed in interpreting text where the theme of the sentence and its supporting details need to be rearranged to make sense in English sentences. More specifically, in English, the theme of a sentence typically appears at the outset of the sentence as opposed to Chinese (Baker, 2018; Li, Zhu, et al., 2022). For example, in the case of ST 54, where the characteristics of the Chinese sassafras are being interpreted, the phrase "树形挺拔 (upright tree)" originally appeared at the end of the sentence. However, in English, "upright tree" is the major category description. Thus, in TT 54, the interpreter reordered the sentence to place "upright tree" at the beginning to achieve style equivalence. Similarly, in ST 62, "自然界的清洁工 (Nature's cleaner)" was initially located at the end of the sentence as the nomenclature of the crow. In TT 62, to achieve style equivalence, the interpreter also rearranged the English sentence by placing "Nature's cleaner" at the beginning because of its pivotal role in the context.

The above examples effectively demonstrate how the different interpretation strategies help with achieving style equivalence in interpreting ecological processes given the language differences between English and Chinese. Through the lens of Eco-Translatology, particularly the transformations of linguistic and communicative dimensions, six interpretation strategies (literal interpretation, division, shift, division and shift, combination and restructuring the word order) are observed to accurately convey the meaning of the ST into effective TT for the geotourists, and thus achieved meaningful cross-cultural communication. These six strategies will serve as general guidance for the suggestions developed in the next section regarding how ineffective interpretations of ecological processes might be improved.

Interpretation problems

To identify existing interpretation faults in ecological processes, we used the specific formula patterns, [word="FL"] [word=""] [word="IP"] [word=""] [word="FLP"] [word=""] [word="Specific IP"] and [word="FA"] [word=""] [word="IP"] [word=""] [word="FAP"] [word=""] [word="Specific IP"], to search, respectively, for two interpretation problems (Misinterpreted and Not Interpreted) relating to the communication of flora and fauna processes in the PEC (see Figure 6). Misinterpretation was almost always the problem in concerning ineffective translation of passages about biotic processes. Notably, the proportion of ineffective translations caused by misinterpretation is 10% higher for flora processes (83.26%) compared to fauna processes (70.97%). Li et al. (Li, Zhu, et al., 2022) provided an explanation for this phenomenon, stating that plant features and plant morphology are more complex than those of the fauna; therefore,

	Flora Processes		Fauna Processes	
Interpretation Problems	Frequency	Percentage	Frequency	Percentage
Misinterpreted	199	83.26%	132	70.97%
NI	40	16.74%	54	29.03%
Total Number	**239**		**186**	

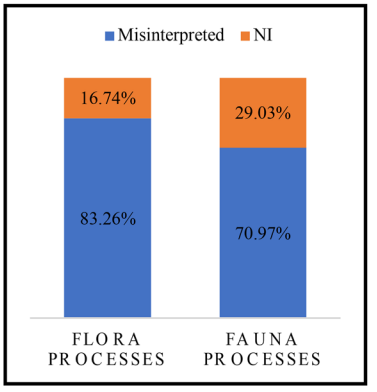

Figure 6. Frequency of interpretation problems for ecological processes in Chinese-to-English PEC.

the interpretation of ecological processes associated with flora are prone to more variations, which increases the chance of misinterpretation.

Guided by linguistic and communicative dimensions within Eco-Translatology, the following optimised examples of (otherwise) ineffective interpretations of ecological processes demonstrate how semantic and style equivalence might have been better achieved through the application of the interpretation strategies discussed above. Most misinterpreted passages fail to communicate information to the English-speaking geotourists at the geopark. A failed interpretation cannot accurately convey the flora and fauna characteristics. For example, in ST 63 where the wild soybean was interpreted from Chinese to English, the interpreter's incorrect use of words and language style leads to semantic and style inequivalence. "叶片锥形" is interpreted "bracts lanceolate," "裂片锥尖形" is "lobes triangular-lanceolate," "内花瓣" is "corolla," and "外花瓣" is "flag petals." Moreover, the long and complex sentence is not interpreted into passive form. Guided by Hu's Eco-Translatology in its linguistic and communicative dimensions, "叶片锥形" can be translated into "leaves are tapered," "裂片锥尖形" can become "tapered lobes," "内花瓣" can be rendered into "inside petals," and "外花瓣" can become "underneath petals." Similarly, the implicit "密生" and "状" can be rendered into "be densely clustered" and "状 (呈…状)" into "is…shaped with." Thus, we employed the division and shift strategy to optimise ST 63 as TT 63:

> Racemes are small plants whose tiny flowers *are densely clustered* on yellow stalks. Its decorative *leaves are tapered*, and the calyx *is* bell *shaped with tapered lobes*. The *inside petals* are a pale reddish purple or white and the *underneath petals* are round. The pods [inside the flower] are oblong. The seeds [inside pod] are slightly flattened oval shapes. This plant flowers in July-August and fruits in August-October [Northern Hemisphere].

Similarly, in ST 65, when interpreting the features of the stone morok, "吻" was incorrectly rendered into "muzzle," and "须 " was inaccurately interpreted into "whiskers." According to the Oxford English Dictionary (https://www.oed.com/view/Entry/124409?rskey=Ns6OBu&result=1#eid0), "muzzle" is the projecting part of the face, including the nose and mouth, of an animal such as a horse and dog. Thus, the fish does not have a "muzzle," but instead has a "snout." The English Thesaurus Dictionary (https://thesaurus.plus/related/barbel/whisker) shows the synonym of "whisker" is "barbel" for fish. According to its definition, "whisker" is a long stiff hair growing from the snout or brow of most mammals as e.g., a cat; and "barbel" refers to a slender tactile feeler on the jaws of a fish. Thus, "barbel" is accurate. Moreover, the two Chinese sentences can be rendered into one (combination), because of the common subject. Therefore, we improved ST 65 by using the combination strategy, resulting in the following interpretation: "The snout of the stone moroko is slightly pointed and prominent, with large eyes and thin lips but no barbels.," achieving both semantic and style equivalence.

Table 2. Taxonomy of interpretation strategies in ecological processes.

Interpretation strategies	Patterns of usage for interpretation strategies within ecological processes
Literal Interpretation	Interpreting short Chinese ecological processes that are written in active voice directly into active-voice English sentences of similar length, such as in Texts 47 and 55. *using and interpreting of passive voice is categorised as "Shift," which is explained below.
Division	When the Chinese ecological processes are described in active, complex sentences, these sentences are broken down into shorter active sentences in English, such as Texts 48 and 56.
Combination	When there is a close logical relationship between two consecutive Chinese sentences describing ecological processes (e.g., the subject of the two sentences is the same), the use of conjunctions or adjoint adverbials can be used to make them into one complex English sentence that retains all the information in the Chinese sentences, such as in Texts 49 and 57.
Shift	When the ecological processes are described using passive structures in the Chinese sentence, passive voice was used in interpreting ecological processes into English, such as in Texts 50, 51, 58 and 59.
Division and Shift	When ecological processes are described in long Chinese sentences, they were interpreted into several simple and short English sentences. When passive structure is embedded into ecological processes, passive voice should be used in the TT, such as in Texts 52, 53, 60, and 61.
Restructuring the Word Order	Important information, such as a category or generality of ecological processes, should be placed first in the sentence, followed by supporting details when interpreting ecological processes, such as Texts 54 and 62.

Although less frequent, NI may prevent tourists from fully understanding the characteristics of a particular flora or fauna. For instance, in ST 64, "具黑褐色膜质" and "末端渐细" are features of the southern maidenhair fern that were mentioned in the source text but failed to get interpreted into English. Furthermore, in the same example, ST 64, "具…保护" in Chinese constitutes an implicit passive structure, which should be interpreted as the passive voice "protected by." However, in TT 64 this structure was not interpreted at all. Guided by linguistic and communicative dimensions of transformations (Hu, 2003), we used the shift strategy to amend ST 64 as "The rhizome is short and upward pointing, protected by a dense amount of small dark brown scales that are smooth skinned and tapering at the end.," thus achieving both semantic and style equivalence. Similarly, in ST 66, the features of silver pheasants, "密布黑纹" and "羽冠近黑色" were not interpreted in TT 66. Also, "密布" the implicit passive should be converted to "be covered with" (see section "Interpretation of ecological processes"). Therefore, according to Hu's Eco-Translatology dimensions, we employed the division and shift strategy to optimise ST 66 as TT 66:

> Male and female silver pheasants exhibit sexual dimorphism. The males are brightly colored, with white feathers on the upper body, and are *densely covered with black stripes*. They also have a black-blue hair-like crest on the head, bare crimson skin on the face, black-blue lower body, and red feet. In contrast, the females have a brown body *and a nearly black crest*.

After further study of the results through a qualitative analysis guided by the framework of Hu's Eco-Translatology, six interpretation strategies can be identified, and added to the taxonomy of ecotourism interpretation. Table 2 displays the patterns and examples of the six strategies for interpreting ecological processes.

Conclusions

The present paper has found that due to the diversity of flora, the interpretations of common flora names and local Chinese flora names are more complicated than those of fauna. In other words, the complexity and diversity of flora make it more difficult to interpret texts describing their processes. This is due to the large number of plant-specific terms included in the description

of plant characteristics, such as leaf morphology, root characteristics, and flower structure. However, many of the interpretation challenges posed by such ecological complexity can be addressed more effectively through the taxonomy of ecotourism strategies. At the common biotic names level, the taxonomy includes using Latin and English, literal interpretation, creative interpretation, and foreignisation strategies. The interpretation of local Chinese biotic terms uses the same strategies as the interpretation of common biotic names. In addition, we found six strategies in interpreting the various ecological processes written in Chinese: literal interpretation, division, shift, division and shift, combination, and restructuring the word order strategies.

This project has meaningful practical and theoretical implications. Practically, this paper established a systematic approach to Chinese-to-English ecotourism interpretation and demonstrated how ineffective interpretations can be optimised by establishing a standardised basis of interpretation. This will deliver a previously unavailable standard of quality interpretation. Thus, ecotourism interpretation of Chinese UGGps will be able to apply a professional standard to interpretation to undergird sustainable tourism. For example, the taxonomy of ecotourism interpretation strategies discussed in this paper can help with systematic training of geopark interpreters and translators to provide high-quality interpretation for geotourists. In this way, geotourists can better understand the ecological heritage and culture of China.

Theoretically, the findings reported in this paper conform with previous literature that Hu's Eco-Translatology is transferable to the field of ecotourism interpretation research (Li, Ng, et al., 2022). Li et al. (Li, Ng, et al., 2022) have explored and tested A (Abiotic) and C (Cultural) elements in the field of geotourism which means those results can be used to corroborate the current findings on the B (Biotic) element. According to the criteria of the three-dimensional transformations in Eco-Translatology, translators can identify effective and ineffective ecotourism interpretations in Chinese UGGps, and optimise ineffective interpretations into those more appropriate for geotourists. From a perspective of continual research, this paper widens the scope of systematic research on Chinese-to-English interpretation of the biotic element of geotourism.

Nevertheless, the limitations of this paper should be addressed. The ecotourism data has been selected from a specific area and time, thereby naturally limiting the scope of data selection in terms of randomisation. We endeavoured to mitigate this by obtaining data from renowned and well-established geoparks, using a variety of flora and fauna characteristics, and by selecting quantitatively representative examples from the Chinese Wudalianchi and Jiuhuashan UGGps. The limitation on sample size has the potential to result in some erroneous assumptions in the analysis of patterns or an inadequate representation of the broad scope of interpretation difficulties. Therefore, the proposed new taxonomy of ecotourism interpretation strategies may require further research and refinement through application to other data from other Chinese UGGps.

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Authors' contributions

Qiang (Jason) Li is the corresponding author and Author 1. He collected, processed, and annotated the data and shaped the Chinese-to-English PEC. He also wrote the paper. As an expert in his fields, Dr. Young Ng provided

essential background knowledge on ecotourism and data from Chinese UGGps, along with suggestions for addressing reviewers' comments.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Baker, M. (2018). *In other words: A coursebook on translation* (3rd ed.). Routledge. https://doi.org/10.4324/9781315619187

Baker, M., & Zhu, Y. F. (2019). Chapter 3 – Corpus-based translation studies: The challenges that lie ahead. In K. H. Kim (Ed.), *Researching translation in the age of technology and global conflict: Selected works of Mona Baker*. Routledge. https://doi.org/10.4324/9780429024221

Beall, J., Boley, B., Landon, A., & Woosnam, K. (2021). What drives ecotourism: Environmental values or symbolic conspicuous consumption. *Journal of Sustainable Tourism*, *29*(8), 1215–1234. https://doi.org/10.1080/09669582.2020.1825458

Bernardini, S., & Kenny, D. (2020). Corpora. In M. Baker & G. Saldanha (Eds.), *Routledge encyclopedia of translation studies* (pp. 110–115). Routledge. https://doi.org/10.4324/9781315678627

Cao, X., & Xu, C. (2022). 植物生理学英语词句特征及翻译研究 [Lexical and syntactic features and translation in plant physiology].《中国科技翻译》[Chinese Science & Technology Translations Journal], *35*(4), 17–20. [https://doi.org/10.16024/j.cnki.issn1002-0489.2022.04.004]

Chen, J. (2019).《生态翻译观照下<诗经>动、植物名称英译研究》[A study on the English translation of animal and plant names in Shi Jing from the perspective of Eco-Translatology] [Master's thesis]. Northwest A&F University.

Chu, C. (1973). The passive construction: Chinese and English. *Journal of Chinese Linguistics*, *1*(3), 437–470. https://www.jstor.org/stable/23752862

Coghlan, A. (2021). Can ecotourism interpretation influence reef protectivebehaviours? Findings from a quasi-experimentalfieldstudy involving a virtual reality game. *Journal of Ecotourism*, *21*(2), 187–196. https://doi.org/10.1080/14724049.2021.1971240

Dowling, R. (2013). Global geotourism—an emerging form of sustainable tourism. *Czech Journal of Tourism*, *2*(2), 57–79. https://doi.org/10.2478/cjot-2013-0004

Dowling, R. (2020). Chapter 11: Interpreting geological and mining heritage. In B. N. Sadry (Ed.), *The geotourism Industry in the 21st Century: The origin, principles, and futuristic approach*. Routledge Taylor & Francis Group. https://doi.org/10.1201/9780429292798-14

Ecotourism Australia. (1994). Retrieved from https://www.tropicaltours.com.au/about-tonys-tropical- tours/advanced-eco-accreditation/#:~:text=%E2%80%9DEcotourism%20is%20ecologically%20sustainable%20tourism,understanding%2C%20appreciation%20and%20conservation%E2%80%9D.

Freeman, S., Taff, B. D., Lawhon, B., Benfield, J. A., Kreye, M., Newton, J., Miller, L., & Newman, P. (2023). The impact of message framing on wildlife approach during ungulate viewing experiences in the Greater Yellowstone Ecosystem. *Journal of Interpretation Research*, *28*(1), 7–24. https://doi.org/10.1177/10925872231157596

Garrod, B., & Fennell, D. A. (2023). Strategic approaches to accessible ecotourism: Small steps, the domino effect and not paving paradise. *Journal of Sustainable Tourism*, *31*(3), 760–777. https://doi.org/10.1080/09669582.2021.2016778

Geological Society of Australia (GSA). (2015). Retrieved from https://www.gsa.org.au/Public/Geotourism/Public/Geotourism/Geotourism%20and%20Geotrails.aspx? hkey=754eb036-9266-452e-95b8-e135a1db04d1.

Hu, G. (2003). Translation as adaptation and selection. *Perspectives*, *11*(4), 283–291.

Hu, G. (2008). 生态翻译学解读 [Eco-Translatology: A primer].《中国翻译》[Chinese Translators Journal], *29*(6), 11–15. Retrieved from http://www.doc88.com/p-9733331059085.html.

Hu, G. (2011). 关于"译者中心"问题的回应 [A response to the problem of 'translator-centredness'].《上海翻译》[Shanghai Journal of Translators], *4*, 7–9. doi: CNKI:SUN:SHKF.0.2011-04-002.

International Code of Nomenclature for algae, fungi, and plants (ICN). (2018). https://www.iapt-taxon.org/nomen/main.php

International Commission on Zoological Nomenclature (ICZN). (2022). https://www.iczn.org/

Jin, H. (2022).《诗经》动物名称翻译策略探析 [Translation strategies of animal names in *The Book of Poetry*].《中国科技翻译》[Chinese Science & Technology Translators Journal], *35*(1), 46–48. https://doi.org/10.16024/j.cnki.issn1002-0489.2022.01.001

Jin, H. (2021).《诗经》植物名称翻译策略刍议 [On translation strategies of plant names in *The Book of Poetry*].《中国科技翻译》[Chinese Science & Technology Translators Journal], *34*(1), 50–53. [https://doi.org/10.16024/j.cnki.issn1002-0489.2021.01.014

Klitsounova, V. (2020). *Interpretation as an important component of ecotourism* (pp. 59–69). https://elib.bsu.by/bitstream/123456789/257947/1/59-69.pdf

Lakoff, G. (1993). The contemporary theory of metaphor. In A. Ortony (Ed.), *Metaphor and thought* (2nd ed., pp. 202–251). Cambridge University Press.

Laviosa, S. (2002). *Corpus-based translation studies: Theory, findings, application*. Rodopi.

Lee, T. H., Fen-Hauh, J., & Chen, J.-C. (2021). Influence analysis of interpretation services on ecotourism behavior for wildlife tourists. *Journal of Sustainable Tourism*, *31*(5), 1233–1251. https://doi.org/10.1080/09669582.2021.1949016

Li, Q., Ng, Y., & Wu, R. (2022). Strategies and problems in geotourism interpretation: A comprehensive literature review of an interdisciplinary Chinese to English translation. *International Journal of Geoheritage and Parks*, *10*(1), 27–46. https://doi.org/10.1016/j.ijgeop.2022.02.001

Li, Q., Wu, R., & Ng, Y. (2022). Developing culturally effective strategies for Chinese to English geotourism translation by corpus-based interdisciplinary translation analysis. *Geoheritage*, *14*(1), 1–24. https://doi.org/10.1007/s12371-021-00616-1

Li, Q., Zhu, F., & Ng, Y. (2022). Benchmarking the quality of Chinese to English Geotourism interpretation: The SSC model based on. *Eco-Translatology. Geoheritage*, *14*(3), 1–20. https://doi.org/10.1007/s12371-022-00725-5

Moscardo, G., & Hughes, K. (2023). Rethinking interpretation to support sustainable tourist experiences in protected natural areas. *Journal of Interpretation Research*, *28*(1), 76–94. https://doi.org/10.1177/10925872231158988

Pridgeon, A., Cribb, P., Chase, M., & Rasmussen, F. (2006). *Genera Orchidacearum volume 4: Epidendroideae (part 1)*. Oxford University Press.

Ren, K. (2020). 植物名称的因类制宜翻译法探索 [Exploring the taxonomic adaptation translation strategies for plant names].《中国翻译》[Chinese Translators Journal], *41*(5), 145–153. doi:CNKI:SUN:ZGFY.0.2020-05-019.

The United Nations Educational, Scientific and Cultural Organisation (UNESCO). (2023). Retrieved from https://www.unesco.org/en/iggp/geoparks/about#:~:text=UNESCO%20Global%20Geopark-,What%20 is%20a%20 UNESCO%20Global%20Geopark%3F,protection%2C%20education%20and%20sustainab le%20development.

Venuti, L. (1994). *The translator's invisibility: A history of translation* (1st ed.). Routledge. https://doi.org/10.4324/9780203360064

Wang, X. (2018).《生态翻译学视角下的中英公共标志翻译: 以织金洞世界地质公园和梵净山国家地质公园为例》[On Chinese-to-English translation of public signs in terms of Eco-Translatology—take Zhijin Cave Global Geopark and Mount Fanjing National Geopark for Examples]. [Master's thesis]. China University of Geosciences.

Wozencraft, W. (2005). Genus Nyctereutes. In D. Wilson & D. M. Reeder (Eds.), *Mammal species of the world: A taxonomic and geographic reference* (3rd ed., pp. 532–628). Johns Hopkins University Press.

Xiao, R., McEnery, T., & Qian, Y. (2006). Passive constructions in English and Chinese: A corpus-based contrastive study. *Languages in Contrast*, *6*(1), 109–149. https://doi.org/10.1075/lic.6.1.05xia

Xu, Y. (2019).《画说诗经》[The book of poetry in paintings]. China Translation & Publishing House.

Appendices

Appendix A. Interpretation strategies and problems

Table A1. Definitions and examples of interpretation strategies.

Interpretation strategies	Definition	Example
Latin and English Strategy	The translation strategy for interpreting common biotic names when they appear as the title or stand alone on interpretive boards in (geo) parks (Li, Ng, et al., 2022; Ren, 2020).	The translator interpreted the fauna name "小嘴乌鸦" into "*Corvus corone* (carrion crow)," with the Latin name written in italics.
Literal Interpretation	The translation strategy of rendering the text word-by-word or using equivalent words or phrases in target language. This strategy aims to maintain the form and structure of the source text (Baker, 2018).	The translator literally translated the flora process "灯台树的属于落叶乔木, 高 12-20 米" into "The wedding cake tree is deciduous tree growing to 12-20 metres." Additionally, in this sentence, the flora name "灯台树" was directly interpreted into "wedding cake tree," as it has an equivalent term in English.
Creative Interpretation	During the interpretation process, translator may encounter situations where there is no direct equivalence word or phrase in target language for a particular term or concept. In such cases, the translator often employs creative strategy to effectively convey the intended meaning (Ren, 2020)	According to the intended flora connotation, the translator creatively rendered the native flora "喜树" as "happy tree," since there is no direct English counterpart available.
Foreignisation	The translation strategy that emphasises the preservation of the source language's cultural and linguistic characteristics in the target language (Venuti, 1994).	The translator solely used English and omitted the Latin translation for the unique flora species "山茶" found in China, which is translated into "Camellia," because the Latin term for "Camellia" is "*Camellia japonica*." In Latin, "japonica" means "Japanese."
Division	The interpretation strategy which divides the long sentence into several small parts, each sharing a connected meaning (Baker, 2018). This strategy aims to enhance clarity and readability by breaking down complex sentences into smaller, more manageable units (Li, Ng, et al., 2022; Li, Zhu, et al., 2022).	When rendering the flora process, it is common to divide a long Chinese sentence into simpler and shorter sentences to achieve style equivalence (Li, Zhu, et al., 2022). For example, the translator divided the growth habits of Moutan penoy "牡丹喜欢温暖湿润的气候, 适宜生长在阳光充足、排水良好的土壤中。" into two sentences: "Moutan penoy prefers warm and humid climatic conditions. It thrives in well-draining soil with ample sunlight." This strategy helps to maintain a similar style and ensures better readability in English (Li, Zhu, et al., 2022).
Shift	The interpretation strategy that involves using change of word/s, grammatical structure, or voice of the source text (Baker, 2018).	The flora process "向日葵的花朵在夏季盛开, 吸引了许多蜜蜂和蝴蝶来采蜜。" was interpreted by the translator as "Many bees and butterflies are attracted by blooming flowers of the sunflower in summer" by translator. In this sentence, the term "吸引" was translated into the form of "be + done" (be attracted).
Division and Shift	A compound interpretation strategy that combines two strategies, namely division and shift (Baker, 2018; Li, Ng, et al., 2022).	The translator accurately interpreted the flora process "肉桂的树皮呈黑色, 香气浓郁, 用作芳香调味品, 此外还可提取桂皮油, 为食品工业之重要香料, 亦入药。" into "The bark of Chinese cassia is black and fragrant, thus used as an aromatic spice or to extract cinnamon oil, which is an important spice in the food industry. It is also used as medicine." The translator divided the long Chinese sentence into two simpler English sentences to improve readability. Moreover, the use of passive voice "be used" accurately conveys the meaning of "用" and "入."
Combination	During the translation process, when there is logical connection between two or more sentences, a combination strategy can be applied to merge them together (Baker, 2018). The purpose of this strategy is to ensure coherence between the sentences, maintain consistent style, and effectively convey the intended meaning of the original text (Baker, 2018; Li, Zhu, et al., 2022; Ren 2020).	To achieve conciseness, reduce redundancy, and improve overall coherence in English interpretations of ecological processes, the translator often employs the combination strategy (Li, Zhu, et al., 2022). For instance, the fauna process "红嘴相思鸟的额、头顶及后颈等均为带黄的橄榄绿色。它的嘴呈赤红色。" was interpreted into "The top of the red-billed leiothrix's head, forehead and nape are dull olive green, and it has a bright red bill."
Restructuring the Word Order	The translation strategy that involves altering the order of words or phrases in the target language to achieve a more natural and grammatically correct sentence structure (Baker, 2018).	In English, it is common to place important information at the beginning to allow readers to quickly grasp the main point (Li, Zhu, et al., 2022). Thus, to achieve style equivalence, the translator rendered "环颈雉是一种以谷类浆果、种子及昆虫为食的动物, 主要栖息于林中和灌丛中 o " into "The ring-necked pheasant primarily lives in forests and low woods, where it feeds on grains, berries, plant seeds and insects." through changing word order.

Table A2. Definitions and examples of interpretation problems.

Interpretation Problems	Definition	Example
Misinterpreted	Incorrect interpretation of the intended meaning during interpretation (Wang, 2018).	The flora name "栀子花 (gardenia)" was interpreted into " 月季 (rose)" by the translator.
Not interpreted	A failure to provide any interpretation for a particular word, phrase, or segment of text (Wang, 2018).	The translator rendered the flora process "山柿属落叶乔木, 树冠钝圆锥形, 树皮淡灰褐色, 叶浓绿 。" into "The persimmon" is a deciduous tree with obtuse conical crowns, light greyish-brown barks." However, "叶浓绿 (dense green leaves)" was not interpreted in English.
Using Chinese Pinyin to replace English Words	The translator uses the phonetic representation of the Chinese characters instead of translating the English words in the target language (Wang, 2018).	The fauna name "布谷鸟" was interpreted into "bugu" rather than "cuckoo."
Incongruent Interpretation for Same Name	Instances where different interpretations are given for the same name or term, resulting in inconsistencies or discrepancies (Wang, 2018).	The fauna name "香鼬" was interpreted into two English versions "ferret" and "mustela" by the translator.

Appendix B.

Tags applied to the English targets in Chinese-to-English Pec

Label elements				
Element 1	Element 2	Element 3	Element 4	Label Example
Flora <FL>	Interpretation Strategies <IS>	Common Plant Names <CPN>	Latin and English < LE>	<FL, IS, CPN, LE>
			Literal Interpretation < LI>	<FL, IS, CPN, LI>
			Creative Interpretation < CI>	<FL, IS, CPN, CI>
			Foreignisation < Foreignisation>	<FL, IS, CPN, Foreignisation>
		Chinese Cultural Plant Names <CCPN>	Latin and English < LE>	<FL, IS, CCPN, LE>
			Literal Interpretation < LI>	<FL, IS, CCPN, LI>
			Creative Interpretation < CI>	<FL, IS, CCPN, CI>
		Flora Processes <FLP>	Literal Interpretation < LI>	<FL, IS, FLP, Division>
			Division < Division>	<FL, IS, FLP, Shift>
			Shift < Shift>	<FL, IS, FLP, DS>
			Division and Shift < DS>	<FL, IS, FLP, DS>
			Combination < Combination>	<FL, IS, FLP, Combination>
			Restructuring the Word Order <RWO>	<FL, IS, FLP, RWO>
	Interpretation Problems <IP>	Common Plant Names <CPN>	Not Interpreted < NI>	<FL, IP, CPN, NI>
			Misinterpreted < Misinterpreted>	<FL, IP, CPN, Misinterpreted>
			Incongruent Interpretation for Same Name < IISN>	<FL, IP, CPN, IISN>
			Use Chinese Pinyin to Replace English Words < UCPREW>	<FL, IP, CPN, UCPREW>
		Chinese Cultural Plant Names <CCPN>	Not Interpreted < NI>	<FL, IP, CCPN, NI>
			Misinterpreted < Misinterpreted>	<FL, IP, CCPN, Misinterpreted>
			Incongruent Interpretation for Same Name < IISN>	<FL, IP, CCPN, IISN>
			Use Chinese Pinyin to Replace English Words < UCPREW>	<FL, IP, CCPN, UCPREW>
		Flora Processes <FLP>	Not Interpreted < NI>	<FL, IP, FLP, NI>
			Misinterpreted < Misinterpreted>	<FL, IP, FLP, Misinterpreted>
Fauna <FA>	Interpretation Strategies <IS>	Common Animal Names <CAN>	Latin and English < LE>	<FA, IS, CAN, LE>
			Literal Interpretation < LI>	<FA, IS, CAN, LI>
			Creative Interpretation < CI>	<FA, IS, CAN, CI>
			Foreignisation < Foreignisation>	<FA, IS, CAN, Foreignisation>
		Chinese Cultural Animal Names <CCPN>	Latin and English < LE>	<FA, IS, CCPN, LE>
			Literal Interpretation < LI>	<FA, IS, CCPN, LI>
			Creative Interpretation < CI>	<FA, IS, CCPN, CI>
		Fauna Processes <FAP>	Literal Interpretation < LI>	<FA, IS, FAP, LI>
			Division < Division>	<FA, IS, FAP, Division>
			Shift < Shift>	<FA, IS, FAP, Shift>
			Division and Shift < DS>	<FA, IS, FAP, DS>
			Combination < Combination>	<FA, IS, FAP, Combination>
			Restructuring the Word Order <RWO>	<FA, IS, FAP, RWO>
	Interpretation Problems <IP>	Common Animal Names <CAN>	Not Interpreted < NI>	<FA, IP, CAN, NI>
			Misinterpreted < Misinterpreted>	<FA, IP, CAN, Misinterpreted>
			Incongruent Interpretation for Same Name < IISN>	<FA, IP, CAN, IISN>
			Use Chinese Pinyin to Replace English Words < UCPREEW>	<FA, IP, CAN, UCPREW>
		Chinese Cultural Animal Names <CCPN>	Not Interpreted < NI>	<FA, IP, CCPN, NI>
			Misinterpreted < Misinterpreted>	<FA, IP, CCPN, Misinterpreted>
			Incongruent Interpretation for Same Name < IISN>	<FA, IP, CCPN, IISN>
			Use Chinese Pinyin to Replace English Words < UCPREW>	<FA, IP, CCPN, UCPREW>
		Fauna Processes <FAP>	Not Interpreted < NI>	<FA, IP, FAP, NI>
			Misinterpreted < Misinterpreted>	<FA, IP, FAP, Misinterpreted>

Appendix C. *Sketch engine formula*

Search in

English

Query type

CQL

CQL

[word="one of two categories of ecotourism"] [word="‚"] [word="IS"] [word="‚"] [word="one of six subcategories' name"] [word="‚"] [word="Specific IS"]

Default attribute: word

Subcorpus: non (the whole corpus)

Figure C1. Sketch Engine Formula Used to Retrieve Effective Interpretation Strategies.

Search in

English

Query type

CQL

CQL

[word="one of two categories of ecotourism"] [word="‚"] [word="IP"] [word="‚"] [word="one of six subcategories' name"] [word="‚"] [word=" Specific IP"]

Default attribute: word

Subcorpus: non (the whole corpus)

Figure C2. Sketch Engine Formula Used to Retrieve Interpretation Problems.

Appendix D. *Examples of effective and ineffective interpretations*

Table D1. Effective interpretation of common biotic names.

Categories	Text No.	Source Text (ST)	Target Text (TT)	Interpretation strategies
Common Flora Names	1	石竹	*Dianthus chinensis* L. (Chinese pink)	Latin and English
	2	青钱柳	*Cyclocarya paliurus* (Batalin) Iljinsk. (Money Willow)	
	3	黑龙江百里香	*Thymus amurensis* Klokov (Heilongjiang Thyme Shrub)	
	4	睡莲是多年水生草木, 根状茎肥厚。	The *water lily* is a perennial aquatic plant with thick rhizomes.	Literal Interpretation
	5	凤凰松的树龄约 1400 年, 其造型奇特让人联想到凤凰展翅。	The *Phoenix pine*, estimated to be approximately 1,400 years old, exhibits a unique shape reminiscent of a phoenix spreading its wings.	Creative Interpretation
	6	独蒜兰属于半附生草本植物, 喜凉爽且较耐寒。	The *Chinese Pleione orchid* belongs to a semi-epiphytic herbaceous family that can grow in a cooler climate showing a higher tolerance of cold.	
	7	枇杷	Loquat	Foreignisation
Common Fauna Names	8	鸳鸯	*Axi galericulata* (Mandarin duck)	Latin and English
	9	乌苏里蝮	*Gloydius ussuriensis* (Ussuri viper)	
	10	长耳鸮叫声深沉。	The *long eagle-owl* has a deep call.	Literal interpretation
	11	乌苏里貉背部毛色较深, 呈青灰色。	The dorsal fur of the *Chinese raccoon dog* exhibits a dark and bluish grey hue.	Creative Interpretation
	12	丹顶鹤	Red-crowned crane	Foreignisation

Table D2. Ineffective interpretation of common biotic names.

Categories	Text No.	Source Text (ST)	Target Text (TT)	Interpretation problems
Common Flora Names	13	皖杜鹃	*Rhododendron anhweiense* E.H.Wilson	NI
	14	马尾松	Chinese red pine	
	15	黄山玉兰	*Yulania cylindrica* (E.H.Wilson) D.L.Fu (Huangshan magnolia)	Misinterpreted
	16	蜻蜓兰的植株高 20–60 厘米。	The plant of *Dragon orchid* stands 20–60 cm.	
	17	毛红椿	*Toona ciliata* *Toona ciliata* Roem. var. pubescens *Toona sureni* var. pubescens	IISN
	18	铁线蕨具有两羽状到三羽状的复叶, 刚硬纤细的茎轴。这些茎轴明显呈拱形至下垂状态。	*Southern maidenhair fern* features bipinnate to tripinnate fronds with wiry, black stems that are distinctively arching to pendent.	
		铁线蕨属陆生中小型蕨类植物。	*Adiantum* is a terrestrial medium and small fern.	
	19	山丹花是一种多年生百草本球茎植物, 茎叶多, 高约15–60 厘米。	*Shandanhua* is a herbaceous perennial bulbiferous plant that produces a stem with leaves, reaching a height of about 15–60 cm.	UCPREW
Common Fauna Names	20	画眉	*Garrulax canorus*	NI
	21	猕猴	Macaque	
	22	竹鸡	*Bambusicola thoracica* (Chinese bamboo-partridge)	Misinterpreted
	23	狗獾是一种鼬科哺乳动物。	*Meles* is a species of mammals in the Mustelidae family.	
	24	短尾猴	*Macaca thibetana* *Macaca arctoides*	IISN
	25	青头潜鸭是雁形目鸭科潜鸭属的鸟类。	*Green-headed Pochard* is a bird of the genus Pochard of the Anatidae family.	
		2021 年 2 月 14 日下午, 观鸟爱好者在腾冲北海湿地进行观鸟拍摄时, 发现一只类似青头潜鸭的鸟。	On the afternoon of 14 February 2021, bird watching enthusiasts spotted a bird resembling a *blue-headed pochard* while taking a birdwatching photo in the Beihai Wetland of Tengchong.	
		青头潜鸭为全球及危物种, 数量不足1000只。	*Pochard* is a critically endangered species across the world, with a population of less than 1,000.	
	26	鹌鹑体长 18 厘米, 体小而滚圆。	The *Chinese Anchun* is characterised by a small and round body reaching 18 cm in length.	UCPREW

Table D3. Effective interpretation of local Chinese biotic terms.

Categories	Text No.	Source Text (ST)	Target Text (TT)	Interpretation strategies
Local Chinese Flora Terms	27	拖盼儿	*Rubus corchorifolius* L.f. (Raspberry)	Latin and English
	28	老鸭糊	*Callicarpa cathayana* C.H.Chang (Chinese beautyberry)	
	29	楼上楼味苦, 性微寒, 常用于蛇虫咬伤和咽喉肿痛。	*Paris root* is characterised by a bitter taste and has a cooling effect and is frequently employed in the treatment of snake and insect bites as well as sore throats.	Literal Interpretation
	30	马褂衣生长快, 耐寒, 对病虫害抗性极强。	*Chinese tulip tree* grows fast, tolerates drought, and is extremely resistant to pests and diseases.	Creative Interpretation
Local Chinese Fauna Terms	31	斐耶楞古	*Tetrastes bonasia* (Hazel grouse)	Latin and English
	32	臭迷子	*Rana amurensis* (Heilongjiang frog)	
	33	随鹅的体长 90 厘米左右,体重2.8-5千克。	The *swan goose* is about 90 cm long and weighs 2.8–5 kg.	Literal Interpretation
	34	鲤拐子属于底层鱼类, 喜欢活动在水体的下层。	*Heilongjiang coloured carp* is a demersal fish, active in the lower levels of water.	Creative Interpretation

Table D4. Ineffective interpretation of local Chinese biotic terms.

Categories	Text No.	Source Text (ST)	Target Text (TT)	Interpretation problems
Local Chinese Flora Terms	35	阿尔蒙	*Phellodendron chinense* C.K.Schneid	NI
	36	水鳖梨	Chinese tupelo	
	37	八棱是第四纪冰川遗留的 最古老的裸子植物之一, 植物界的"活化石", 世界珍贵树种。	The *octagonal tree* is one of the oldest gymnosperms surviving from the Quaternary glacier, and as a rare species is hailed as "Living Fossil" in the plant kingdom.	Misinterpreted
	38	鱼鳞松树皮细腻而汕亮, 枝条滑腻富有弹性。	The bark of *the fish-scale pine* is delicate and shiny, and its branches are smooth and flexible.	IISN
		鱼鳞松生于海拔 600-1800 气候温寒和凉润的地带。	*Fish-scale spruces* germinate 600-1800 metres above sea level in warm and cool climates.	
	39	八本条	Babentiao	UCPREW
	40	翼朴为中国特有的单种 属。	*Yipu* is a monotypic genus endemic to China.	
Local Chinese Fauna Terms	41	山和尚	*Garrulus glandarius*	NI
	42	山马蛇子	Heilongjiang grass lizard	
	43	水耗子主要栖息于河流和湖泊一带, 尤其喜欢生活在林木繁茂的溪河地带。	The *water rat* mainly inhabits rivers and lakes, especially likes to live in lush forests on both sides of the rivers and rivers.	Misinterpreted
	44	柴狗全身多呈赤棕色, 背中部毛尖黑色。	*Chaigou* is mostly reddish brown in colour with black hackles.	IISN
		柴狗捕食各种哺乳动物, 一群通常 30 只。	*Dholes* hunt a variety of animals, typically in packs of up to 30 individuals.	
	45	勒付	Lefu	UCPREW
	46	五道眉因体背有数条明暗 相间的平行纵纹而得名。	*Wudaomei* is named for several light and dark parallel vertical stripes on its back.	

Table D5. Effective interpretation of ecological processes.

Categories	Text No.	Source Text (ST)	Target Text (TT)	Interpretation strategies
	47	红松的树干通直结实, 树冠呈圆锥形。	The truck of the Korean pine is straight and stout, and its crown is conical in shape.	Literal Interpretation
	48	细叶青冈属常绿乔木, 叶互生, 卵状披针形, 长圆状披针形, 顶端渐尖, 叶基楔 形, 叶上半部有浅锯齿, 叶柄细。	Chinese ring-cupped oak is an evergreen tree with alternate leaves. Leaves are ovate-lanceolate to oblong-lanceolate, with an acuminate apex and a cuneate base. The upper margin is serrulate and petiole slender.	Division
	49	香果树属于茜草科落叶大乔木, 古老子遗植物。它是中国特有单种属珍稀树种。	The Chinese tassel tree is a large, deciduous tree in the family Rubiaceae, which is a unispecific ancient relict species native to China.	Combination
	50	红豆杉被视为优良的建筑、桥梁、家具和器材的用材。	The Chinese yew *is regarded as* Excellent material for house, bridges, furniture, and tools.	
Flora Processes	51	水曲柳的树皮可入药, 是传统的治疗结核、外伤的药物, 还可作为驱虫剂。	The bark of the Manchurian ash *is used as* traditional medicine for tuberculosis and traumatic injuries, and as an insect repellent.	Shift
	52	枝条红褐色, 无毛;幼枝暗绿色, 密被长柔毛, 稍有树脂腺体; 芽鳞密被白色绒毛。	Its branches are reddish brown, without tomentum. Its newly grown branches *are densely covered with* dark-green villous twigs with resinous glands. The bud scales are densely covered with white tomentum.	Division and Shift
	53	紫楠木高 8-10 米, 喜温暖湿润的气候且有一定的耐寒性, 一般散生在九华山海拔900 米以下阴湿的山谷中。	The purple Nanmu stands 8 to 10 metres. It prefers a warm and humid climate and has a certain degree of cold tolerance. This plant *is usually scattered in* shady, wet valleys below 900 m on Mount Jiuhua.	
	54	檫木高约 10 米, 胸径 20-30 厘米, 枝繁叶茂, 树形挺拔。	The Chinese sassafras is upright, heavily branched with a diameter of 20–30 cm at breast height and reaching as high as 10 m.	Restructuring the Word Order
	55	白矩朱蛱蝶为蛱蝶属中等大 小的蝴蝶, 展翅 50-70mm。	The Compton Tortoiseshell Butterfly is a medium-sized butterfly in the Nymphalis genus, with a wingspan of 50–70 mm.	Literal Interpretation
	56	雄鸟头部暗褐色;后颈和侧颈灰白色;颏、喉及前颈黑色;上背和胸栗色, 散有黑 斑;下背和腰黑而闪蓝, 有白色横斑和羽缘。	The male has a dark brown head, a greyish-white nape, and a black chin and throat. It is white on the sides of its neck and black in the front. Upper back and chest are chestnut-brown, lower back is glossy bluish-black, with white horizontal stripes and feathers at the edges.	Division
	57	樟豹为哺乳纲食肉目猫科动物。它的体长 70 ~ 106 厘米, 肩高 60~80 厘米, 尾长70~90 厘米。	The clouded leopard is a feline of the Mammalia class and Carnivora order, growing to 70–106 cm long and 60–80 cm at shoulder height, with a 70–90 cm long tail.	Combination
	58	猞猁耳尖生有黑色耸立簇毛, 被无知的宗教信徒认为是撒旦魔鬼的象征。	The lynx has tufts of black hair on the ear tips which *are regarded as* a symbol of Satan, the Devil, by ignorant religious believers.	
Fauna Processes	59	雌鸟体羽大部棕褐色, 上体满缀以黑斑纹, 背部具白色矢状斑。	The female is largely brown, upperparts *covered with* black stripes and back, *decorated with* white arrow-shaped stripes.	Shift
	60	松鸡体结实, 喙短, 呈圆锥形, 适于啄食植物种子;翼短圆, 不善飞;鼻孔和脚均有被羽, 以适应严寒。	The western capercaillie is stout and has a short conical beak, suitable for picking seeds. Given its short, stubby wings, flying is quite limited. Its nostrils and feet *are covered in* feathers to withstand intense cold.	Division and Shift
	61	白鹇体长约1 米, 体重1.5 公斤, 翅长约 26 厘米, 嘴峰约 3.2 厘米, 雄性上体与两翅均白色, 布满整齐的"V"状黑纹。	It is 1 m long, with a total body mass of 1.5 kg. Its wings are roughly 26cm in length, and it has a culmen about 3.2 cm. Male birds have white upperparts and wings, *covered with* V-shaped black stripes.	
	62	杂食性鸟类不仅取食植物的 种子和果实, 亦以腐肉和垃圾为食, 是自然界的清洁工。	The omnivorous bird is "Nature's cleaner," feeding not only on seeds and fruits but carrion and trash.	Restructuring the Word Order

Table D6. Ineffective interpretation of ecological processes.

Categories	Text No.	Source Text (ST)	Target Text (TT)	Interpretation problems
Flora Processes	63	总状花序通常短, 其小花密生在黄色的花茎上;叶片锥形;花萼钟状, 裂片锥尖形, 内花瓣淡红紫色或白色, 外花瓣近圆形, 花中荚果长方形, 荚果种子椭圆形, 稍扁, 7-8 月开花, 8- 10 月结果。	Racemes are usually small, with tiny flowers, dense yellow stalks; bracts lanceolate; calyx campanulate, lobes triangular-lanceolate, corolla light reddish purple or white, flag petals nearly round, pods oblong. The seeds are slightly constricted, oval, slightly flat, flowering in July–August, fruiting in August–October.	Misinterpreted
	64	根状茎短小, 直立, 先端具黑褐色膜质小鳞片保护, 全缘, 末 端渐细。	The rhizome is short, erect, and the apex is protected by small scales; the scales are entire.	NI
Fauna Processes	65	麦穗鱼的吻略尖而突出。其唇薄 , 无须。	The muzzle of the stone moroko is slightly pointed and prominent. This kind is without whiskers.	Misinterpreted
	66	白鹇雌雄异色;雄鸟羽毛鲜艳, 上体银装素裹, 密布黑纹。头上有状如发丝的蓝黑色羽冠;脸裸露, 赤红色;下体蓝黑色, 脚红色。相比之下, 雌鸟通体褐色, 羽冠近黑色。	Male and female silver pheasants exhibit sexual dimorphism. The males are brightly colored, with white feathers on the upper body. They also have a black-blue hair-like crest on the head, crimson bare skin on the face, black-blue lower body, and red feet. In contrast, the females have a brown body.	NI