Postprint: Classification Study of Thesaurus Associative Relationships Based on Ecological Interspecific Relationships

Authors: Li Yongze, Changchun

Date: 2023-08-26T00:00:00+00:00

Abstract

[Purpose/Significance] Related term relationships in thesauri play a crucial role in indexing and retrieval, and the classification of these relationships along with the definition of their attributes holds significant research importance in information organization.

[Method/Process] This study analyzes the characteristics of ecological interspecific relationships and thesaurus related term relationships, establishes a connection between them, achieves classification of related term relationships into interspecific relationships through the combination of different features, and explores the construction of related term relationships from the perspective of interspecific relationships.

[Results/Conclusion] Related term relationships can be uniquely classified into four categories of interspecific relationships: predation, competition, parasitism, and symbiosis. Different categories of related term relationships exhibit distinct characteristics, which can provide novel insights for the construction of related term relationships.

Full Text

Preamble

A Study on the Classification of Thesaurus Associative Relationships Based on Interspecies Relationships in Ecology

Li Yongze, Chang Chun
Institute of Scientific and Technical Information of China, Beijing 100038

Abstract

[**Purpose/Significance**] Associative relationships in thesauri play a crucial role in indexing and retrieval, and the classification of these relationships along with the definition of their properties holds significant research value in information organization. [**Method/Process**] This paper analyzes the characteristics of interspecies relationships in ecology and thesaurus associative relationships, establishes connections between them, classifies associative relationships into interspecies categories through combinations of different features, and explores the construction of associative relationships from an interspecies perspective. [**Result/Conclusion**] Associative relationships can be uniquely classified into four types of interspecies relationships: predation, competition, parasitism, and symbiosis. Different categories of associative relationships exhibit distinct features, providing new insights for the construction of associative relationships.

Keywords: thesaurus; associative relationship; classification; interspecies relationship; ecology
Classification Number: G254.24
DOI: 10.13266/j.issn.0252-3116.2018.08.016

Associative relationships are important inter-concept relationships in thesauri that serve as bridges connecting different conceptual families. They reveal strong semantic connections between non-hierarchical concepts and can expand approaches to indexing and retrieval. However, the ambiguity in defining associative relationships and the complexity of their properties result in significant human influence during their construction [1]. While associative relationships conveniently indicate connections between concepts, they fail to express specific relational meanings and obscure the characteristics of conceptual relationships. To meet the demands of organizing and retrieving information resources in network environments, it is necessary to further refine the connotation of associative relationships and classify their content.

International standard ISO 25964-1 [2] divides associative relationships into two major categories with 12 relationship types. National standard GB 13190-1991 [3] lists 10 types of associative relationships, while the newly revised GB/T 13190.1-2015 [4] essentially follows the latest international standard, maintaining consistency with ISO 25964-1. Yuan Xu analyzed and summarized associative relationships, dividing them into 4 major categories and 25 subcategories, where the 4 major categories include relationships with the concept itself, relationships with other things, whole-part relationships without established hierarchical relationships, and specific scope relationships [5]. Xue Jianwu et al. refined the inter-concept relationships in thesauri for ontology construction, subdividing associative relationships into 9 types according to the needs of defense domain ontologies [6]. Gu De'nan believed that associative relationships in thesauri manifest as causality, opposition, similarity, permeability, attributes, raw materials, objects, means, methods, applications, equipment, tools, and whole-part relationships [7]. Scholars such as Ren Ruijuan [8], Sun Liang [9], and

Liu Libin [10] have also refined associative relationships from different perspectives. Qiu Jiangnan [11] classified semantic relationships through hierarchical clustering, while Zhou Jiayi [12] classified associative relationships through neural networks, with different algorithms yielding different classification results. Different standards, domains, and algorithms produce varying classifications of associative relationships, resulting in inconsistent granularity of conceptual relationships. The number of associative relationship types and their property features are mostly enumerated without consistent results.

In 2016, Chang Chun's research group introduced ecological thinking into the study of knowledge organization systems, proposing the concept of Knowledge Organization Ecosystem (KOES), where concepts and their literature environment form an inseparable whole within the system. In this framework, concepts correspond to species, and the literature information environment corresponds to the ecological environment. Based on the ecological characteristics of knowledge organization systems, they studied the ecological features of individual concepts, conceptual populations, and conceptual relationships, achieving preliminary results [13-16].

This paper builds upon the knowledge organization ecosystem framework, corresponding interspecies relationships in ecology to associative relationships in thesauri. It attempts to classify associative relationships in international thesaurus standards using interspecies relationships, selecting examples from international standards and the *Chinese Thesaurus (Engineering and Technology Volume)* [17] (hereinafter referred to as the *Han Biao*) to validate classification results, providing reference for the classification and construction of associative relationships.

2. Analysis of Features of Associative Relationships and Interspecies Relationships

Ecological thinking has been widely applied in library and information science, such as in knowledge ecosystems and knowledge ecological chains in knowledge management. Interspecies relationships in ecology are typically divided into predation, competition, parasitism, and symbiosis. Predation refers to one organism consuming all or part of another organism. Competition occurs when two or more organisms utilize the same limited resources, resulting in competitive interactions. In parasitic relationships, parasites reside inside or on the surface of hosts, relying on host nutrients for survival. In symbiotic relationships, broadly defined symbiosis includes proto-cooperation, commensalism, and mutualism, while narrowly defined symbiosis refers to two species that depend on each other and cannot survive normally when separated [18]. Interspecies relationships illustrate interactions between two species, while associative relationships express relationships between two concepts. Interspecies relationships exhibit characteristics such as directionality and dependency, which are also features of associative relationships. This similarity in features between interspecies relationships and associative relationships serves as the foundation for classification.

By analyzing this correspondence and using the aligned features as a basis for classifying associative relationships, we can achieve our classification goals. The specific analysis is as follows.

2.1 Correspondence Analysis Between Semantic Features and Interspecies Relationship Characteristics

The correspondence between conceptual semantic features and interspecies relationship characteristics is shown in Figure 1 [Figure 1: see original paper]. The directionality of associative relationships corresponds to the directionality between species, including unidirectional and bidirectional relationships. Conceptual direction indicates semantic pointing relationships, such as temporal sequence or actor-recipient relationships, and can be unidirectional or bidirectional. Unidirectionality means only one concept can point to another, such as "data" and "data classification"—"data classification" is an operation on "data," with the direction flowing from the classification process to the classified object. Causal relationships can only point from cause to effect. In predation relationships, the direction from predator to prey is unidirectional. In parasitic relationships, the process from parasite to host is unidirectional, such as parasitic wasp larvae living inside stem borers. Bidirectionality means two concepts can point to each other, such as "data warehouse security" and "data warehouse"—a data warehouse necessarily involves security issues, while data warehouse security design concerns data warehouses, making the relationship bidirectional. This conceptual bidirectionality corresponds to the bidirectionality in symbiotic and competitive relationships.

Dependency refers to one concept requiring another as a prerequisite, such as "mass storage" and "mass storage systems." The implementation of "mass storage" requires specific system support, while "mass storage systems" require corresponding mass storage technologies, making the two concepts interdependent. This corresponds to the characteristic of mutualistic symbiosis where two species are mutually dependent and indispensable. Another example is "data warehouse" and "data warehouse quality"—the latter is an evaluation metric for the former, with the quality concept depending on the warehouse concept, showing unidirectional dependency similar to parasitic relationships.

Complementarity means concepts semantically indicate each other and functionally supplement each other, such as "thermostat" and "temperature control." A thermostat has the function of temperature control, while temperature control requires a thermostat for implementation, making the two concepts mutually complementary. This conceptual complementarity corresponds to symbiotic relationships where species provide survival advantages to each other. In complementary concepts, their functions and meanings supplement each other, just as species in symbiotic relationships provide complementary survival advantages.

2.2 Correspondence Analysis Between Literal Matching Features and Matter-Energy Flow

Conceptual literal matching features can be categorized by matching degree into full matching and partial matching, and by matching position into front-matching, rear-matching, etc. In ecosystems, energy and matter flow transfer between different species without differentiation, moving from one species to another. Word morphemes in literal matching correspond to matter and energy. As shown in Figure 2 [Figure 2: see original paper], predation and parasitic relationships involve energy transfer. Predation involving consumption of the entire prey (wolf eating sheep) represents complete energy transfer, corresponding to full conceptual matching. Predators obtaining only part of prey (sheep eating grass) represents partial energy transfer, corresponding to partial conceptual matching. Different predators obtain different parts of the same prey—for example, earthworms eat plant roots and decaying leaves while goats eat leaves. These different predation positions correspond to different literal matching positions such as front-matching and rear-matching.

2.3 Correspondence of Quantity Features

Some concepts can establish associative relationships with multiple other concepts. For example, family header words with broad extensions have relatively more associative relationship concepts, while others have fewer. Here, we define quantity features as "few" for three or fewer associative relationship concepts and "many" for more than three. In ecosystems, omnivores have broad diets, feeding on many different species, corresponding to the quantity feature of "many" for predation and competition relationships. Parasitic and symbiotic relationships represent stable relationships formed through long-term evolution, so the corresponding species are typically few—usually only one—corresponding to the quantity feature of "few."

Through analyzing the correspondence between associative relationships and interspecies relationship features, we establish connections based on attributes such as directionality, literal features, and quantity features. Different features can distinguish different interspecies relationships. For example, parasitic relationships are unidirectional and dependent, while competitive relationships are bidirectional and non-dependent. By combining different features, we can distinguish various interspecies relationships. Similarly, we can use combinations of corresponding features between interspecies and associative relationships to classify associative relationships into interspecies categories.

3. Classification Process for Associative Relationships

International standards divide associative relationships into two major parts. One part refers to pairs of terms with overlapping meanings that can be interchanged in certain contexts but not in others. For example, "ship" and "boat" represent different content with overlapping scopes and can be interchanged under certain semantic conditions, requiring the establishment of associative relationships. The other part comprehensively categorizes 11 other situations requiring associative relationships. By analyzing the features of different types of associative relationships, we classify them and explain the classification using examples from standards and the *Han Biao*.

3.1 Classification of Associative Relationships

3.1.1 Competitive Associative Relationships Species in competitive relationships occupy equal positions, mutually inhibiting each other with bidirectionality. Competitive species lack dependency but exhibit mutual exclusivity. A species may compete with one or multiple species. When concept scopes overlap, the concepts have cross-indication capabilities and require semantic relationships. Two concepts can be interchanged in certain semantic environments, showing symmetry and bidirectionality. However, they lack necessary dependency—each concept can exist independently. These characteristics match competitive relationships. For example, in the phrase "a fisherman in a boat," "boat" and "ship" share the same meaning and can replace each other without dependency. Research on conceptual niches suggests that one concept corresponds to one niche, ensuring preferred terms follow the principle of one term, one meaning [15]. Associative relationships with competitive characteristics involve concepts whose niches overlap in certain states, creating competition. For instance, eagles prey on small animals like snakes and rats when food is abundant, but will also eat carrion when food is scarce, competing with hyenas that also eat carrion. Similarly, concepts with overlapping scopes can only be interchanged in specific contexts, creating competitive relationships. Therefore, terms with overlapping meanings are classified as having competitive relationships.

3.1.2 Predatory Associative Relationships In predatory relationships, predators consume prey, with prey being passive recipients. Matter and energy flow from prey to predator, showing unidirectionality. Two relatively independent species have predators with broad food sources and different feeding options, lacking dependency. The predation process involves energy transfer, with the prey's energy being partially or fully contained by the predator.

For example, the relationship between a research discipline/field and its research objects/phenomena: the subordinate terms of a discipline or field are generally related subdivisions, while specific phenomena or research objects are not within their subordinate concepts. Users need retrieval prompts requiring associative relationships with research objects. A discipline may have multiple research objects or phenomena, showing a one-to-many characteristic. The concept of a discipline has a broad extension, often being a family header word with multiple associative relationship concepts, while different related concepts involve content at different levels. For instance, "library science" has associative relationships with "library," "documentation work," and "information science." Comparing these three concepts: "library" is both a research entity and a building entity; "documentation work" represents specific research content; and "information science" is derived content from library science. These three concepts do not belong to the same semantic level. Through feature analysis corresponding to predatory relationships involving higher-trophic-level omnivores (such as bears that have broad diets including rabbits, sheep, fish, insects, and even plants), we classify discipline concepts as predatory relationships.

Similar associative relationships belonging to predation include: actions and their objects or targets; artifacts and their parts (if not defined as whole-part hierarchical relationships); objects or processes and their counter-agents; and compound terms and their central nouns, indicating that the two lack true equivalence.

3.1.3 Symbiotic Associative Relationships In symbiotic relationships, broadly defined symbiosis includes proto-cooperation, commensalism, and mutualism, while narrowly defined symbiosis refers to two species that depend on each other and cannot survive normally when separated. This paper primarily focuses on the narrow definition. In symbiotic relationships, both species gain survival advantages from each other, showing bidirectionality. Neither can survive without the other, demonstrating dependency that is bidirectional. Symbiotic relationships result from long-term evolution, with relatively stable relationships—symbiotic objects are generally singular.

For example, objects/materials and their defining attributes: the superordinate-subordinate concepts of objects/materials represent subdivisions of material content, while the superordinate-subordinate concepts of attributes represent subdivisions of attribute content. Objects/materials necessarily have certain attributes, while attributes must depend on entities to have meaning, creating a semantic relationship requiring associative relationships. Examples include "poison" and "toxicity," or "magnet" and "magnetism." Poison is the carrier of toxicity, and magnet is the carrier of magnetism—both show bidirectionality and symmetry while being mutually complementary. These characteristics of symmetry and dependency match symbiotic relationships. Magnets have properties beyond magnetism, but thesauri typically only establish associative relationships with concepts representing core attributes. For instance, in the *Han Biao*, "radioactive material" only has an associative relationship with "radioactivity" under the material-attribute category. Material-attribute associative relationships have few related concepts, corresponding to the dependency characteristic of symbiotic relationships. For example, nitrogen-fixing bacteria and leguminous plants supplement each other materially and energetically—the bacteria provide nitrogen compounds to the plants while the plants provide living space for the bacteria. Neither can survive without the other, showing strong mutual dependency. Objects/materials and their defining attributes are classified as symbiotic relationships. Similarly, associative relationships between operations/processes and their actors/tools also exhibit symbiotic characteristics.

3.1.4 Parasitic Associative Relationships In parasitic relationships, parasites reside inside or on the surface of hosts, relying on host nutrients for survival. Hosts are passive recipients, with matter and energy flowing from host to parasite, showing unidirectionality. Parasites can only survive by relying on hosts—without hosts, parasites lack necessary survival conditions including matter and energy. Parasitic relationships are dependent. Generally, host environments are stable and unchanging, making parasite-host relationships relatively stable. One parasite species typically corresponds to only one or two stable hosts, showing a one-to-one characteristic.

For example, concepts and their measurement units: concepts describe inherent attributes of things, while measurement units are indicators measuring the strength of conceptual attributes. Concepts and measurement units have non-hierarchical semantic relationships requiring associative relationships. Concepts have materiality—they exist regardless of whether measurement units exist. Measurement units are artificially defined concepts that depend on measured concepts, creating dependency. The materiality of concepts and the dependency of measurement units create unidirectionality between concepts and units. Dependency and unidirectionality determine that concepts and their measurement units belong to parasitic relationships. For example, "electric current" is a real phenomenon, while its unit "ampere" is artificially defined and only meaningful when associated with actual phenomena. Therefore, "ampere" has a unidirectional dependency on "electric current"—the measurement unit's dependency on the concept is complete dependency, belonging to holoparasitism in parasitic relationships. For instance, dodder not only obtains water and inorganic salts from leguminous plants but also obtains photosynthesis products, while the plants can live normally without dodder. Therefore, concepts and their measurement units are classified as parasitic relationships.

Similarly, other associative relationships belonging to parasitism include: organisms or substances originating from other organisms; concepts connected by causal dependency relationships; and relationships between actions and their products.

3.2 Uniqueness of Classification Results

The uniqueness of classification results means that any pair of associative relationships has one and only one classification result—a single associative relationship cannot simultaneously belong to two interspecies categories. This is an important indicator of classification 合理性. As shown in Table 1 :

Table 1 Classification Result Examples

Feature Combination	Interspecies Relationship	Example Associative Relationships
Unidirectional, Non-dependent, Many quantity features, Morphological changes	Predation	Research discipline/field and its research objects/phenomena
Unidirectional, Non-dependent, Energy transfer	Predation	Action and its object/target; Artifact and its part; Object/process and its counter-agent; Compound term and its central noun
Bidirectional, Non-dependent, Many quantity features	Competition	Concepts with overlapping content
Bidirectional, Non-dependent, Few quantity features	Competition	-
Bidirectional, Dependent, Functional complementarity	Symbiosis	Object/material and its defining attribute; Operation/process and its actor/tool
Bidirectional, Dependent, Morphological changes	Symbiosis	-
Unidirectional, Dependent, Energy transfer	Parasitism	Concept and its measurement unit
Unidirectional, Dependent, Few quantity features	Parasitism	Organism/substance originating from another; Causally dependent concepts; Action and its product

Associative relationship classification is determined by multiple features. Nine corresponding features between interspecies and associative relationships ensure classification uniqueness. Based on this foundation, we explore associative relationship features to ensure their multiple characteristics match only one interspecies relationship, achieving unique classification. For example, the relationship between research discipline/field and research objects/phenomena has features of unidirectionality, non-dependency, many quantity features, and morphological changes, which only predation relationships uniquely match. By classifying associative relationships from international standards and the *Han Biao*, we ensure all can be uniquely classified, demonstrating feasibility. Future research should explore more features connecting associative and interspecies relationships to continuously enrich their connections and ensure classification uniqueness.

Interspecies relationships exhibit certain constraints and connections that allow simple prediction of relationships with other species. From a predator's perspective, its prey often share similarities and may have competitive relationships. Two species in competition 争夺 the same food and living space, occupying identical or similar niches, and may be preyed upon or parasitized by the same species. In knowledge organization ecosystems, one concept occupies one niche [15], and concepts in competitive associative relationships also compete for niches. Therefore, two competitive concepts may share the same predatory or symbiotic concepts. Associative relationships can be developed from competitive relationships to discover potentially related concepts, providing reference for relationship construction. As shown in Table 2 , "video object segmentation" and "video object extraction" have a competitive relationship. Meanwhile, "video object segmentation" has a predatory relationship with "video object." Following the logic that competitive species share characteristics, we can infer that "video object extraction" should also have a predatory relationship with "video object." The *Han Biao* indeed shows an associative relationship between "video object extraction" and "video object," validating this inferential reasoning.

Table 2 Competitive Relationship Concept Expansion

Example	Concept A "Competes with" Concept B	Concept A "Preys on" Concept C	Concept B "Preys on" Concept C
Biological	Wolf competes with Tiger	Wolf preys on Sheep	Tiger preys on Sheep
Thesaurus	Video object segmentation——Video object extraction	Video object segmentation——Video object	Has predatory relationship
Thesaurus	Data warehouse structure——Data warehouse model	Data warehouse structure——Data warehouse	Has predatory relationship

Conversely, if "video data processing" and "video data collection" have a competitive relationship, and "video data collection" has a predatory relationship with "video data," we can infer that "video data processing" should also have a predatory relationship with "video data." While the *Han Biao* does not currently establish this relationship, it can be recommended for consideration during future updates and maintenance. Similarly, we can expand and construct associative relationships through the logic that different hosts of the same parasite share similarities, or that different predators of the same prey may share similarities. As long as the reasoning follows interspecies relationship logic, we can obtain auxiliary inferences for associative relationships. Using classified associative relationships for inferential verification can discover potential relationships, though specific relationship establishment must follow certain rules [19], such as not establishing associative relationships across hierarchical levels. Therefore, using classified associative relationships for relationship verification and expansion serves primarily as an auxiliary recommendation method, with specific relationship establishment requiring comprehensive consideration of various factors.

4. Construction of Associative Relationships from an Interspecies Perspective

Regarding the features of associative relationships and interspecies relationships: conceptual semantic directionality corresponds to interspecies directionality; semantic dependency between concepts corresponds to species dependency; functional complementarity between conceptual entities corresponds to species providing mutual survival advantages; and quantity features of associative relationships correspond to interspecies relationship quantities. Through these corresponding features, we establish connections between associative and interspecies relationships. Different feature combinations distinguish different associative relationships, enabling classification into four types: predation, parasitism, competition, and symbiosis, while ensuring unique classification into one interspecies category. Using examples from international thesaurus standards and interspecies relationships, we explain and validate the classification, demonstrating that associative relationships can be classified through interspecies relationships. Classification results show that different types of associative relationships have distinct features and play different roles in indexing and retrieval. This paper also explores associative relationship construction from an interspecies perspective. The classification results both categorize different associative relationships and emphasize their features. Unlike previous classifications that often focused only on logical features or semantic scope, resulting in complex and variable outcomes, this interspecies-based classification provides a framework that distinguishes different associative relationships with different properties.

This paper primarily discusses associative relationships in international standards. Future research should explore associative relationships in more standards and thesauri to further validate classification feasibility.

References

[1] CHOIS D, WANG Yiding. Developing ontologies using thesauri [J]. Digital Library Forum, 2007(5): 18-23.

[2] International Organization for Standardization. Information and documentation—Thesauri and interoperability with other vocabularies—Part 1: Thesauri for information retrieval: ISO 25964 [S]. Switzerland, 2011:

63-66.

[3] National Technical Committee for Standardization of Documentation Work. Guidelines for the establishment and development of Chinese thesauri: GB 13190-91 [S]. China Standards Press, 1992: 11-12.

[4] Standardization Administration of China. Information and documentation—Thesauri and interoperability with other vocabularies: GB/T 13190.1-2015 [S]. Beijing: China Standards Press, 2015: 51-54.

[5] Yuan Xu. Research on the construction of thesaurus associative relationships in network environments [D]. Beijing: Institute of Scientific and Technical Information of China, 2012.

[6] Xue Jianwu, Zhao Na, Wang Dongna. Research on refinement and application of thesaurus inter-concept relationships for ontology construction [J]. New Technology of Library and Information Service, 2013(3): 14-20.

[7] Gu De'nan. Research on associative relationships in the Metallurgical Industry Thesaurus [J]. Metallurgical Information Review, 2013(1): 63-66.

[8] Ren Ruijuan, Liu Libin, Mi Jia, et al. Research on the transformation of Chinese thesaurus inter-concept relationships and their application in ontology construction [EB/OL]. [2017-03-21]. http://www.chinalibs.net/Upload/Pusfile/2014/1/18/201411810844537.pdf.

[9] Sun Liang. Research on the transformation of Chinese thesaurus inter-concept relationships for ontology construction [D]. Baoding: Hebei University, 2010.

[10] Liu Libin, Ren Ruijuan, Mi Jia, et al. Research on refinement of Chinese thesaurus inter-concept relationships based on thesaurus-based ontology construction [J]. Shandong Library Journal, 2010(1): 73-76.

[11] Qiu Jiangnan, Zhang Bin. Research on a semantic relationship combination classification model based on semantic domains in objective knowledge systems [J]. Journal of the China Society for Scientific and Technical Information, 2012, 31(6): 564-573.

[12] Zhou Jiayi. Research on English semantic relationship classification methods based on tensor recurrent neural networks [J]. Modern Computer (Popular Edition), 2015(11): 43-47.

[13] Chang Chun. Research on knowledge organization ecosystem for thesaurus construction [J]. Library and Information Service, 2016, 60(15): 101-107.

[14] Li Yongze, Chang Chun. Research on word family hierarchical structure based on ecological energy transfer [J]. Journal of Intelligence, 2017, 36(3): 161-164.

[15] Yang Jing, Chang Chun. Research on concept stability based on niche principles [J]. Library and Information Service, 2016, 60(13): 27-32.

[16] Yang Jing, Chang Chun. Research on concept term frequency changes based on Logistic population growth patterns [J]. Information Science, 2017, 35(8): 15-18.

[17] Editorial Board of Chinese Thesaurus (Engineering and Technology Volume). Chinese Thesaurus (Engineering and Technology Volume) [M]. Beijing: Scientific and Technical Documentation Press, 2014.

[18] Lin Wenxiong. Ecology [M]. 2nd ed. Beijing: Science Press, 2013.

[19] Xu Shuo, Qiao Xiaodong, Zhu Lijun. Research on several complex logical error checking algorithms for thesauri [J]. Digital Library Forum, 2010(8): 55-58.

Author Contributions: Li Yongze: Conceptualization, writing; Chang Chun: Research design, revision.

A Study on Classification of Thesaurus Associative Relationships Based on Interspecies Relationships in Ecology

Li Yongze, Chang Chun
Institute of Scientific and Technical Information of China, Beijing 100038

Abstract: [Purpose/significance] Thesaurus associative relationships play an important role in indexing and information retrieval, and the classification of associative relationships along with property definition holds significant research value in information organization. [Method/process] This paper analyzes the characteristics of interspecies relationships in ecology and thesaurus associative relationships, establishes connections between them, classifies associative relationships into interspecies categories through combinations of different features, and discusses the construction of associative relationships from an interspecies perspective. [Result/conclusion] Associative relationships can be uniquely classified into four types of interspecies relationships: predation, competition, parasitism, and symbiosis. Different categories of associative relationships exhibit distinct properties, providing new approaches for associative relationship construction.

Keywords: thesaurus; associative relationship; classification; interspecies relationship; ecology

Note: Figure translations are in progress. See original paper for figures.