

# MODIFICATION IN BOTANICAL NOMENCLATURES: A CONTRASTIVE STUDY OF SEMANTIC TYPES OF MODIFIERS IN ENGLISH AND SLOVAK<sup>1</sup>

*Peter Bojo – Daniel Lančarič*

Faculty of Education, Comenius University in Bratislava  
– Faculty of Arts, Comenius University in Bratislava

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**Abstrakt:** Prevažná väčšina zložených botanických termínov obsahuje typ modifikácie. Modifikátory v botanickej nomenklatúre v jednotlivých jazykoch sa odlišujú sémantickými typmi. Predkladaná štúdia sa zameriava na preskúmanie spoločných znakov a rozdielov medzi sémantickými typmi modifikátorov v botanickej nomenklatúre v anglickom a slovenskom jazyku s cieľom určiť prevažujúci sémantický typ modifikácie v oboch skúmaných jazykoch.

**Kľúčové slová:** botanická nomenklatúra, zložený termín, sémantika, sémantický typ modifikátora, toponymný modifikátor, deskriptívny modifikátor

**Abstract:** A vast majority of botanical complex terms appears to be supplied by a type of modification. Modifiers in botanical nomenclatures across languages differ in their semantic types. This article is aimed at establishing similarities and differences between the semantic types of modifiers in botanical nomenclature, in the English and the Slovak languages, with the aim to identify a prevalent semantic type in each language.

**Keywords:** botanical nomenclature, complex term, semantics, semantic types of modifiers, toponymy modifiers, descriptive modifier

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## 1 TERMS AND TERMINOLOGIES

Throughout the recent history, terms, nomenclatures and terminologies have been reviewed by a number of linguists (Bauer 1983; Cabré 1999; Dolník 2003; Horecký 1960; Manerko 2016; Masár 1991; Panasenko 2007, 2010; Radchenko 2019). The earliest beginnings of perceiving terms linguistically may have been traced as early as in the 19<sup>th</sup> century when physics and biology took dominant position and had an impact on linguistics (Kvapil and Šipošová 2020, 151). However, proper linguistic investigations into terms and terminologies started in mid 20<sup>th</sup> century.

Terms, within frameworks of terminologies have received a reputation of being specific as opposed to the words of common vocabulary. Terminology of a field is a framework into which a term is embedded (Masár 2000, 4). The field is lexically and semantically delimited and the terms from one professional field cannot be freely used in multiple contexts. Moreover, the delimitation and specification of terms as belonging to a branch of terminology is given by the nature and the origin of the word “term” itself. The word “term” is derived from the Greek *τέρμα* (end, boundary). Latin “*terminus*” is often mistakenly taken as the etymon of term (Vakulenko 2014, 2).

Terminologies are defined by a number of principles which underline their uniqueness. Namely, terminology of a field is not isolated, it needs to be researched in relation to other terminologies. It is a trans- and inter-disciplinary field of knowledge. Another principle which identifies terminologies is their belonging to a cultural discourse. The basic aim of terminology is to transfer knowledge at different level of professionalism with their corresponding registers. Quite importantly, the concept of terminology describes both the theory of terms and their practical applications (Picht 2011, 8).

Accordingly, terms, as introduced by Masár (2000, 12) are elements of terminologies, i.e., units which are characterized by precise definition and by belonging to specific sets of professional vocabularies. They are words or collocations that correspond (unambiguously, in ideal) to some concept in social and political life, science, technology and art. A term differs from the usual word by accuracy of semasiological boundaries (Vakulenko 2014, 6).

On semantics of complex terms, it needs to be noted that complex terminological units are often combined with the units of common core vocabulary, which may lead to a semantic shift. Masár (2000, 37–39) introduces two ways of engaging regular vocabulary, namely broadening and narrowing of meaning where the core meaning remains unchanged. Examples of broadening or narrowing of meaning are, for example, the Slovak word *kôra* which carries the non-terminological meaning of bark (part of tree)

and a terminological meaning of a hard surface or crust like in *zemská kôra* (earth crust), or the common English word *natural* (ability or characteristic one was born with) may be contrasted with the terminological usage of the word *natural* in the term *natural science* (a branch of science that deals with physical world, e.g., physics, chemistry, geology). The terminological usage of common words is often the result of applying metaphors; the meaning is shifted based on indirect, metaphorical naming of entities; it is the transfer of inherent features (colour, shape, etc.), for example the *tree* refers to a plant in regular vocabulary, whereas in terminological vocabulary, *tree* in *tree graph* refers to a type of graph in which vertices are connected by one path. A number of terms in this category were created as metonyms or eponyms, for example, the eponym *diesel* (the inventor's name) became a term (referring to the type of engine). (ibid.)

Semantics also plays an important role in the complex terms which were not established as semantic shifts, but their modifiers semantically describe or qualify the other constituents of the term. Semantically, these modifiers are classified into several types.

## 2 TYPES AND SEMANTICS OF MODIFIERS IN COMPLEX TERMS

In complex terms, single lexical units enter multiple combinations, mostly being represented by a super-ordinate (the head) and a sub-ordinate element which modifies the head semantically. Modifiers are typically attributive adjectives. Traditionally, modifiers serve as specifiers of the head nouns they are attached to. They specify nouns, assign nouns certain qualities and are adjacent components of the complex noun phrases. If subjected to further scrutiny, saying that modifiers are represented only by proper adjectives would be far from unambiguous. Mathews elaborates on the types of modification in English and states that, apart from regular adjectives, there are words that are in some sense the same units but are assigned different functions in different parts of speech. One of the examples he introduces is the word *fast* which may well function as an adjective in *fast train* or an adverb in *She drives fast*. (Mathews 2014, 15–17). A parallel may be drawn in identifying the types of modification in collocations like *bus station* where *bus* is a noun, functioning as an adjective rather than being a proper adjective (Quirk et al. 1985, 410–420). Lančarič (2020, 165) presents a slightly different perspective and refers to this type as attributive denominal adjectives. That a modification is very productive in terminologies is clearly proven by the research on terms cited by Masár (2000,

37). He states that the complex terms in Slovak terminologies compose over 70 % of all terminological units.

Modifiers, apart from their structure and positioning, may differ across languages in their semantics. This is true particularly of those complex terms in nomenclatures where the head nouns call for various types of specification, i.e., require different semantic types of modifiers. In botanical nomenclatures, modifiers give their head nouns an additional value and provide additional description, completing the semantic whole of the complex botanical term.

Such semantic relation is thoroughly reviewed in the present article aimed at identifying the prevalent semantic type of modification and establishing similarities and differences in semantic interpretation of modifiers in botanical complex terms in the English and the Slovak languages. The essence of the research draws upon the assumption that English modifiers are prevalingly toponymy-driven whereas Slovak nomenclatures are likely to use descriptive and relational modifiers, the types specified further in the article.

Several semantic classifications of modifiers have been established. Heyvaert (2010, 1309–1313) attempted to establish a hyponym – hypernym classification of adjectival modifiers where the hypernym is a category name for its set of hyponyms. Hyponyms are built on the same or related grounds as their hypernym category. Heyvaert (ibid.) admitted that this type of classification may well be applied to the nouns (e.g. semantic classification of the chain *excitement* – joy – emotion – feeling – state – attribute shows the abstract classes of the lexicon) or verbs (e.g. re-sell – sell – change – transfer).

Heyvaert (ibid.) concluded that the hyponym – hypernym classification cannot be applied to adjectives. Instead, he suggested a classification based on adjectival meaning types; he introduced two broad semantic categories of adjectives: the descriptive and the relational adjectives. The latter are semantically related to a nominal concept, for example, *chemical* has its semantic content related to chemistry. With respect to the category of descriptive adjectives, these are a broad category based on various semantic grounds, though more descriptive than directly related to nominal concepts, e.g. *nice*, *blue*, etc. One of the limitations Heyvaert (ibid.) sets here is potentially arbitrary and subjective placing adjectives into one category or the other category. Bolshakov and Gulbukh (2014, 173) consider collocability of adjectival modifiers, courageously stating that if the majority of modificative collocations combine nouns with adjectivals in a free manner based on their semantics, any classification would be sufficient in linguistic applications. To support their claim, they further provide an extensive semantic – collocational classification of selected words. Giri (2018, 171) elaborates on classification by Dixon (1982) and semantically categorizes adjectives into thirteen semantic types: dimension (e.g., *big*, *small*), age (e.g.,

*new, old*), value (e.g., *good, bad*), colour (e.g., *white, black*), physical property (e.g., *hard, soft*), human propensity (e.g., *happy, kind*), speed (e.g., *fast, slow*), difficulty (e.g., *easy, hard*), similarity (e.g., *similar, different*), qualification (e.g., *true, possible*), quantification (e.g., *all, some*), position (e.g., *high, low*), cardinal numbers (e.g., *one, two*) and also ordinals (e.g., *first, last*).

For the research of the botanical complex names of medicinal herbs, let us revisit the classification proposed by Heyvaert (2010, 1309–1313) since this classification provides enough flexibility for categorizing modifiers in botanical nomenclatures. Yet, we would like to slightly modify the latter subcategory, i.e. relational adjectives and would like to create one more category of relational adjectives, the toponymy adjectives. Toponymy adjectives are considered a subcategory of relational adjectives because their nuclear meaning is closely related to a nominal concept; a geographical place. As a result, three semantic categories of adjective modifiers are established as follows: 1. descriptive adjectives – the adjectives which describe or qualify, 2. relational adjectives – the adjectives directly related to a nominal concept and 3. toponymy adjectives – the ones which are directly related to a nominal concept of a country.

### 3 HYPOTHESES

A pilot research conducted prior to the present analysis encouraged us to the formulation of the following hypotheses on a prevalent semantic type of modifier.

- English and Slovak medicinal plant nomenclatures differ in the prevalence of a semantic type of modifier.
- English nomenclature is marked by a prevalence of the descriptive type of adjectival modifiers whereas the Slovak medicinal plant nomenclature is predominantly toponymy driven.

### 4 THE CORPUS AND METHODOLOGY

The research is carried out as a quantitative corpus analysis of 500 English and 500 Slovak complex botanical terms. The corpus has been extracted from a multilingual glossary of medicinal herbs by Blahuš (2007) *Viacjazyčné Názvoslovie 788 liečivých rastlín*. The distinguishing criterion for extraction was the complex (multiword character) of botanical terms. The extracted complex names of botanical herbs are categorized into the previously introduced semantic categories of descriptive, relational and toponymy modifiers.

**Table 1 Semantic types of English modifiers (sample)**

<b>Descriptive</b>	<b>Relational</b>	<b>Toponymy</b>
Black locust	Venus hair fern	Gum Arabic
Sweet acacia	Candelabra aloe	French marigold
Black cutch	Lemon beebrush	Barbados aloe
Lesser galangal	Bog rosemary	Oriental sweetgum
Great galangal	Female ginseng	Indian berry
Ming aralia	Woodland angelica	Norwegian angelica
Betel palm	Star anise	European black elder
Black chokeberry	Mountain angelica	Scotch pine
Black horehound	Mountain arnica	English ivy
Black ballota	Artichoke thistle	European field elm
Red berried elder	Globe artichoke	English elm
Common elder	Garden asparagus	European white birch
Sweet basil	Balloon flower	European spindletree
Annual mercury	Dwarf elder	American bittersweet
Solidstem burnet saxifrage	Herb mercury	European beech
Greater burnet saxifrage	Anise burnet saxifrage	Atlas cedar
Common betony	Blessed thistle	Welsh onion
Black henbane	Marsh cudweed	English holly
Common henbane	Poison hemlock	Paraguay tea
Lesser celandine	Kidney vetch	Mandarin orange
Common stork's bill	Garlic mustard	Italian cypress
Common borage	Garden onion	Chinese yam
Common juniper	Chick pea	Japanese cornel
Red bilberry	Tea plant	Aleppo oak
Longleaf buchu	Seaport hedgenettle	English oak
Cultivated garlic	Bird cherry	Eastern purple

Wild chives	Rabbit-foot clover	Tasmanian bluegum
Common holly	Rock rose	European chestnut tree
Sour orange	Wool mullein	Eastern teaberry
Bergamot orange	Cornelian cherry	Spanish salsify
Sour orange	Field parsley piert	Japanese hawthorn
Wild chicory	Douglas fir	Russian olive
Wild succory	Garden ginger	American wintergreen
Black hellebore	Garden thyme	Chinese ephedra
Green hellebore	Tonka bean	European mistletoe
Sweet cherry	Threelobe beggarticks	European mountain ash

**Table 2 Semantic types of English modifiers – summary**

<b>Descriptive</b>	<b>Relational</b>	<b>Toponymy</b>	<b>Not categorized</b>
187	151	111	51

The results show that the prevailing semantic type of modifier in the English botanical nomenclature of medicinal plants is the descriptive modifier (187 occurrences) followed by the relational modifier (151 occurrences) and the other two categories of toponymy modifier (111 occurrences) as well as the ones marked as not categorized (51 occurrences).

**Table 3 Semantic types of Slovak modifiers (sample)**

<b>Descriptive</b>	<b>Relational</b>	<b>Toponymy</b>
agát biely	adiant venušin	akácia senegalská
akant mäkký	husia nôžka	ambrovník východný
aksamietnica rozložitá	ženský plášť	angelika čínska
alchemilka žltozelená	aloe stromčekovitá	aralka mandžuská
aloe pravá	alojzia citrónová	balzamovník peruánsky
alpínia liečivá	angelika lesná	bradník japonský
anamirta metlinovitá	aníz hviezdový	bršlen európsky
andromédka sivolistá	aralkovec krovitý	céder atlaský

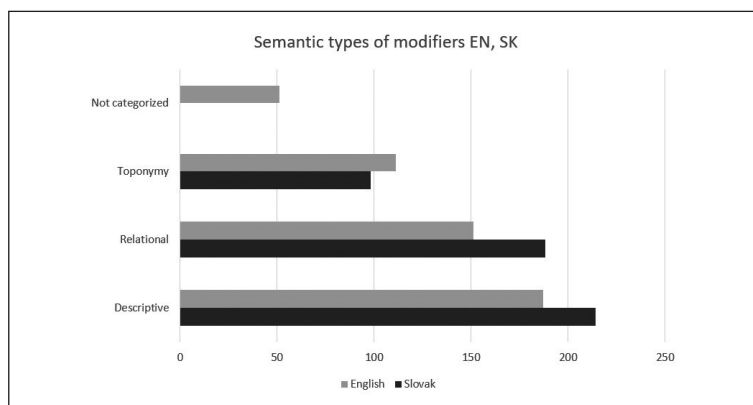
anízovec pravý	archangelika lekárska	céder libanonský
arónia čiernoplodá	anjelsky koreň	cezmína paraguajská
balónovník veľkokvetý	arnika horská	citrónovník mandarinkový
balota čierna	artičoka zeleninová	čajovník čínsky
jablčník čierny	asparágus lekársky	hadomor španielsky
baza červená	psia baza	chvojník čínsky
baza čierna	bažanka ročná	karbinec európsky
bazalka pravá	psia kapusta	kávovník arabský
bazalka planá	bedrovník anízový	kopytník kanadský
bažanka trváca	benedikt lekársky	turecká pšenica
bedrovník lomikameňový	betonika lekárska	leopardovka čínska
bedrovník väčší	bielokvet močiarny	líčidlo americké
červený čistec	bielolistok barinný	lieska turecká
blen čierny	čertova zelina	lotos indický
bocianik rozpukovitý	blyskáč jarný	medovka americká
borievka obyčajná	bolehlav škvrnitý	oliva európska
sosna obyčajná	borák lekársky	rumanček rímsky
ďatelina žltá	borovica horská	pluzgierka islandská
brečan popínavý	borovica lesná	púčikovec madagaskarský
brest hrabolitý	bôľhoj lekársky	schizandra čínska
breza previsnutá	brest vízový	skorocel indický
bršlenec popínavý	brusnica barinná	sofora japonská
brusnica obyčajná	buk lesný	strychnínovník indický
cezmína ostrolistá	buko pílkovité	šišiak bajkalský
citrónovník horký	cesnačka lekárska	škoricovník čínsky
citroník sladký	cesnak cibuľový	štiavec alpský
cyprus vždyzelený	cesnak kuchynský	turanec kanadský



**Table 4 Semantic types of Slovak modifiers – summary**

Descriptive	Relational	Toponymy	Not categorized
214	188	98	0

The calculations on the types of semantic modifiers in the Slovak nomenclature of medicinal plants show the following values: descriptive modifier (214 occurrences) followed by the relational type (188 occurrences) and the two remaining categories of toponymy modifier (98 occurrences) as well as not categorized with 0 occurrences.



**Figure 1**  
Semantic types of modifiers in English and Slovak

The data show that in both languages the prevalent semantic type is the descriptive modifier, the type which describes and specifies the qualities or appearance of the head noun in the complex botanical term. The values of the descriptive modifier type (214 occurrences (SVK) and 187 occurrences (EN)) are followed by the relational type (188 occurrences (SVK) and 151 occurrences (EN)). The lowest number of occurrences represent the toponymy type (98 occurrences (SVK) and 111 occurrences (EN)).

These findings do not provide enough evidence for the acceptance of the earlier-formed hypothesis. In fact, they are contrary to the previously announced assumptions.

Interestingly enough, the cross-lingual comparisons of individual categories show that the two languages are rather similar in the number of occurrences within each category of semantic modifier. These cross-lingual correspondences between the categories in the nomenclatures (descriptive (SVK, EN), relational

(SVK, EN) and toponymy (SVK, EN)) are verified statistically in an attempt to confirm very little or no statistical significance between the categories across the two languages. In order to identify the level of significance between the categories, the Chi-square goodness of fit is used.

**Table 5 Descriptive modifiers, the Chi-square value**

	<i>Observed</i>	<i>Expected</i>	<i>Difference</i>	<i>Difference sq.</i>	<i>Diff. Sq. / ExpFr.</i>
Descriptive English	187	200.5	-13.50	182.25	0.91
Descriptive Slovak	214	200.5	13.50	182.25	0.91
					1.818

The Chi<sup>2</sup> value is 1.818. The *p*-value is .17756. The result is *not* significant at  $p < .05$ .

**Table 6 Relational modifiers, the Chi-square value**

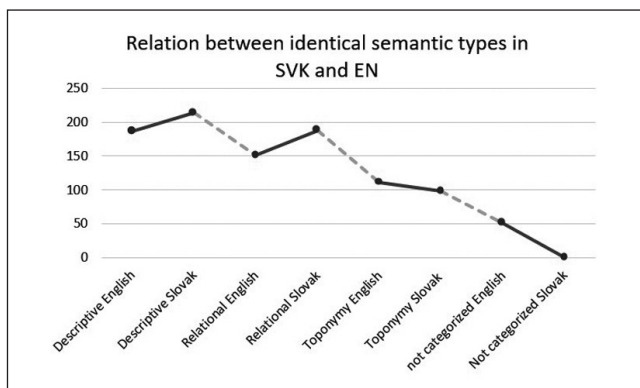
	<i>Observed</i>	<i>Expected</i>	<i>Difference</i>	<i>Difference sq.</i>	<i>Diff. Sq. / ExpFr.</i>
Relational English	151	169.5	-18.50	342.25	2.02
Relational Slovak	188	169.5	18.50	342.25	2.02
					4.038

The Chi<sup>2</sup> value is 4.038. The *p*-value is .04448. The result is significant at  $p < .05$ .

**Table 7 Toponymy modifiers, the Chi-square value**

	<i>Observed</i>	<i>Expected</i>	<i>Difference</i>	<i>Difference sq.</i>	<i>Diff. Sq. / ExpFr.</i>
Toponymy English	111	104.5	6.50	42.25	0.40
Toponymy Slovak	98	104.5	-6.50	42.25	0.40
					0.809

The Chi<sup>2</sup> value is 0.809. The *p*-value is .36853. The result is *not* significant at  $p < .05$ .



*Figure 2*

**Relation between identical semantic types in Slovak and English**

The values (illustrated in the graph above) show no statistically significant difference ( $p < .05$ ) between the number of occurrences in the category of the Slovak and the English descriptive type. Equally, the number of occurrences of the toponymy type in Slovak and English did not prove to be statistically significant ( $p < .05$ ). The only category which was proved to contain a significantly different number of occurrences in Slovak and English was the category of relational type ( $p < .05$ ).

Based on the findings we make a generalisation that there is a remarkable resemblance in the productivity of the investigated semantic types in both languages; the nominal heads of complex names of medicinal plants are, in both languages, predominantly described / qualified by the so-called descriptive semantic type of modifier.

## 5 CONCLUSION

The article was aimed at analysing and identifying the prevalent semantic type of modifier in botanical nomenclature of medicinal plants in English and Slovak. To establish a convenient semantic classification of modifiers for the research, the classification by Heyvaert (2010) was adopted which presents two major semantic types of modifiers, namely the descriptive and the relational modifier. This semantic classification was adopted, and the category of the so-called toponymy modifier was added because it was assumed that in the Slovak botanical nomenclature, the toponymy would be the prevalent type. The findings of the research proved the values contrary to the research

assumptions and hypotheses and did not provide evidence for the acceptance of the hypotheses. Interestingly enough though, the number of occurrences in each category of semantic modifiers was quite similar in both English and Slovak. We extended the research and verified the significance of these similarities. The findings lead us to make a generalisation that English and Slovak nomenclatures of medicinal plants employ similar types of the semantic modifier; both languages are marked by a clear dominance of the descriptive semantic type of modifier, the one which describes or qualifies the head of the complex term. The information presented in the article might be useful for pre-service teachers studying educational linguistics and preparing for teaching scientific disciplines (Šipošová and Hankerová 2020) as well as for translators dealing with this scientific topic.

## 6 RESUMÉ

Článok skúma sémantické typy modifikátorov v zložených termínoch v anglickej a slovenskej botanickej nomenklatúre s cieľom poukázať na príbuznosť a rozdiely medzi nimi. Vychádzali sme z existujúcej sémantickej klasifikácie modifikátorov, ktorú sme prispôbili pre potreby výskumu, a pridali typ, ktorý sme nazvali toponymný modifikátor. Vyslovili sme predpoklad, že v anglických viacslovných názvoch liečivých rastlín budú dominovať deskriptívne a relačné modifikátory, zatiaľ čo slovenskú nomenklatúru liečivých rastlín bude charakterizovať vysoký výskyt toponymných modifikátorov. Tento predpoklad sme kvantitatívne overili a dospeli sme k zisteniu, že v oboch jazykoch prevažuje sémantický typ deskriptívneho modifikátora. Takéto zistenie bolo zároveň v protiklade z vysloveným predpokladom. Ďalším skúmaním sme však zistili veľmi malý rozdiel medzi hodnotami v jednotlivých kategóriách v oboch jazykoch. Toto zistenie sme považovali za dôležité a následne sme ho štatisticky overili. Dokázali sme, že zastúpenie jednotlivých sémantických typov modifikátorov je v oboch jazykoch takmer zhodné, resp. rozdiely vo výške zastúpenia medzi kategóriami v oboch jazykoch sa v dvoch z troch kategórií potvrdili ako štatisticky nevýznamné. Vyslovujeme zovšeobecnenie, že v anglickej a slovenskej nomenklatúre liečivých rastlín sa v oboch jazykoch v približne rovnakej miere používajú rovnaké sémantické typy modifikátorov.

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PaedDr. Peter Bojo, PhD.  
Department of English Language and Literature  
Comenius University in Bratislava  
Račianska 59, Bratislava, 813 34  
Slovakia  
pbojo@cambridge.com

doc. PhDr. Daniel Lančarič, PhD.  
Department of British and American Studies  
Comenius University in Bratislava  
Gondova 2, Bratislava, 811 02  
Slovakia  
daniel.lancaric@uniba.sk