

# Synonymy in English Botanical Terminology

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## *Abstract*

*The paper presents partial results of research into the existence of synonymy in English botanical terminology. Terminological synonyms are on no account rare and insufficient knowledge of them may complicate the process of scientific text translation. The paper points out two categories of synonyms observed in the studied terminological area. The first part deals with the issues of terminological synonyms in general; the second part illustrates selected examples and discusses the methods used in the process of synonym differentiation and equation.*

Key words: botanical terminology, terminological synonyms, standard definition, corpus analysis, equation

## 1. Introduction

There is a Native American legend which tells us the story of why wild roses have thorns. *Long ago there grew wild roses that had no thorns. They were smooth, fragrant, with delicate green leaves and pink blossoms, so they made delicious eating for rabbits and other creatures. By and by there were only a few of them left in the whole world. Therefore they decided to find a strange fellow who had magic power. After they talked things over with him, he gave them a lot of small little prickles to cover their branches and stems with so that animals would not be able to eat them. And ever since that day all wild roses have had many thorns.* Having read through the legend one may wonder what roses actually have – thorns or prickles. Or do they mean the same thing?

The present paper discusses the existence of synonymy in English botanical terminology and the importance of their recognition in a translation process. For that purpose we must, of course, move from “the realm of legends” to the world of science which speaks its own language: the scientific terminology whose basic tools are scientific terms. While there are many definitions that try to explain what a *term* is, most agree that a *term* is a lexical unit that makes reference to a specific concept in a limited domain and therefore that occurs in specialized discourses of a scientific style. A term is characterized by its qualities, including motivation, systematic character, stability, definiteness, applicability, precision and accurateness, transparency, or translatability. Some of these attributes also apply to the scientific style itself. We must bear in mind that even within the scientific style we encounter some variations. According to Mistrík, the scientific style may be divided into “higher” and “lower”, with the latter (sometimes termed popular scientific style) being characterized by the use of words with a broader meaning. Nonetheless, these words are still terms, but of a different stylistic layer. Therefore in scientific texts we often find lexical units (terms) which seem to be semantically very close or identical, which, of course, affects the translation process. Our first task is to distinguish whether or not we are faced with synonymous terms; our second is match the terms with their corresponding equivalents in a target language.

Synonymy is basically defined as identity of meaning and so, according to Lyons, the distinction may be drawn between a complete, absolute, and incomplete synonymy. He, like many other linguists, maintains that absolute synonyms defined by the property of having the same distribution and being completely synonymous in all their meanings and in all their contexts of occurrence are almost nonexistent. (Lyons, 1981: 148) In his view, lexemes are completely synonymous when they have “the same descriptive, expressive and social meaning (in the range of contexts in question)” and he claims that, though rarely, context-restricted synonymy certainly exists. (1981: 148) On the other hand, incomplete synonymy is not rare at all. In such case the identity of one kind of meaning is most clearly recognizable, most commonly of the descriptive meaning (therefore it is referred to as descriptive synonymy), as in, for example, the set *mother*, *mum*, *mummy*, *ma*, *mater*. Other linguists traditionally distinguish absolute (full) synonyms from partial synonyms. During the development of a language, as Peprník states, “the absolute synonymy is usually disturbed when one of the synonyms acquires a special notional feature, or a special connotation or when the usage becomes different – one of the synonyms became obsolete or rare”. (2001: 27-28) To characterize synonyms is not an easy task. As Cruse proposes, the problem may be attacked in two ways: “first, in terms of necessary resemblances and permissible differences, and, second, contextually, by means of diagnostic frames,” and he further adds that, except for having “a high degree of semantic overlap,” synonyms “must also have a low degree of implicit contrastiveness.” (1986: 266) How does synonymy manifest itself in scientific terminology? According to J. Horecký, despite a basic principle stating that terms must be precise and unambiguous, terminological synonyms are on no account rare in scientific terminology. They are represented by such pairs as a loanword *vs.* domestic word; a one-word term *vs.* a two- (or more) word term; so called syntactic synonyms (characteristic of Slovak rather than English) differing in the position of an attribute within a word-group (close or loose), or by such pairs that are neither stylistic nor lexical synonyms, but simply names for the same thing used simultaneously, so that the links between the older and newer literature of a given field are sustained. Several criteria may be used for their differentiation. One of them is substitutability, based on which, if two terms are substitutes for each other in all contexts of occurrence, they are said to be synonymous. However, some authors dispute this criterion as the only sufficient one. For example R. Kocourek suggests combining it with what he calls a “definitional” interpretation of synonymy, and arrives at a definition of a synonymous term: “synonymous to term A is term B which is interchangeable with term A in a definiendum of its definition”. (1965: 216) Put differently, if both terms satisfy the same definition they are synonymous, because they name the same thing.

## 2. Synonymy in Botanical Terminology

At this point we shall focus on the above mentioned botanical terms. Several categories of synonyms may be observed in botanical terminology and the present article points out two of them.

### 2.1 *type cordate vs. heart-shaped*

One type of synonym is represented by adjective – adjective pairs formed by a loanword *vs.* a domestic word, e.g.: *cordate* – *heart-shaped*, *palmate* – *hand-shaped*, *peltate* – *shield-shaped*, *pinnate* – *feather-shaped*, *reniform* – *kidney-shaped*, *stellate* – *star-shaped*; or *scalariform* – *ladderlike*, etc. In each pair, the adjective is a loan word of Greeco-Latin origin belonging to the so-termed International Scientific Vocabulary (ISV), defined by the Merriam-Webster’s Online Dictionary as

“a part of the vocabulary of the sciences and other specialized studies that consists of words or other linguistic forms current in two or more languages and differing from New Latin in being adapted to the structure of the individual languages in which they appear.”

Apparently, a domestic equivalent is much more reader-friendly and self-explaining. But are the two terms absolutely synonymous? Let us examine the pair of terms *cordate* – *heart-shaped*. The following extracts illustrate their usage (excerpted from the following publications: *The World Book Encyclopedia of Science*, Volume 5, *The Plant World*, 1989; *Plant Systematics*, 2006, further in the text denoted by numbers 1, 2 respectively):

- (1) **There are, however, some monocotyledons that have cordate (heart-shaped), ovate or arrow-shaped leaves, and they generally have a network of veins (reticulate) or ladder-like veined leaves (scalariform). (1, 1989: 57)**
- (2) **Other sorts of simple leaf form include palmate (as in geraniums, *Geranium* spp.), spear-shaped (as in some arums, *Arum* spp.), heart-shaped (as in the lesser celandine, *Ranunculus ficaria*), and circular (as in penny-wort, *Hydrocotyle* sp.). (1, 1989: 64)**
- (3) **Base shapes in which the sides are curved are rounded, basal margins convex, forming a single, smooth arc; cordate, with two rounded, basal lobes intersecting at sharp angle, the margins above lobes smoothly rounded; (2, 2006: 392)**

The first publication introduces *heart-shaped* parenthesized immediately after *cordate* and uses both terms in collocation with leaf/leaves (*cordate leaf*, *heart-shaped leaf*), which no doubt indicates their synonymous relationship; in the second publication only the term *cordate* is listed among general terms denoting the shape of a leaf blade. As has already been mentioned, two terms are synonymous if they satisfy the same definition. Definitions are a valuable source of information, helping to identify the differential marks of respective terms. Masár emphasizes the effectiveness of a standard genus/species definition which proceeds from a larger class to which specific signs are assigned, the principle per genus proximum et differentiam specificam, i.e. a definition consisting of “first identifying the genus (larger class) to which the definiendum belongs, then listing various species which distinguish it from other species of the genus.” (Kinney, 2004) Such definition is arrived at from a so-called “logical spectrum of a concept” which is understood as an “unlimited number of predications each of which communicates a new piece of information about the concept.” (Masár, 2000: 23-23) Honestly though, an ideal definition is hard to find even in field-specific dictionaries. Except for a standard definition there are other methods of term specification, e.g. enumerative, analytic or etymological definitions, or strategies like classification, contrast, comparison, the last one being based on the use of a more familiar synonym.

The analysis of the relation between **cordate** and **heart-shaped** will now proceed by examining definitions of both terms. For that purpose the following dictionaries and online glossaries will be used: 1. *Oxford Dictionary of Plant Sciences*, 2006; 2. *The Compact Oxford English Dictionary*, Second Edition, 1991; 3. *The Penguin Dictionary of Botany*, 4. online *Botanical Dictionary*; 5. online *Botanical Glossary*, 6. online *The Complete Herbal Guide to Botanical Terms*; 7. online glossary *Botanical Terms*, further in the text denoted by Roman numbers from I to VII respectively.

## cordate

- I. Said of a leaf base which has the form of the indented end of a conventional heart.
- II. Heart-shaped; resembling in form a longitudinal section of a heart, i.e. with outline generally rounded, but pointed at one end and having an indentation at the other.
- III. Heart shaped, such as the leaves of the sweet violet (*Viola odorata*) or the lemmas of quaking grasses (*Briza*).
- IV. Heart-shaped (leaf base).
- V. of a leaf blade, broad and notched at the base; heart-shaped
- VI. 0
- VII. heart-shaped

## heart-shaped

- I. 0
- II. Having the shape of a heart, especially the conventional form; cordate
- III. 0
- IV. 0
- V. 0
- VI. 0
- VII. 0

Apparently, the analysis of the definitions brings little benefit. The definitions of *cordate* enabling us to identify differential marks (*of a leaf/base/blade, indented end, notched*) are provided by sources I, II and V. Five out of six available definitions use *heart-shaped* to explain the meaning of *cordate*. Only the second reference work defines *heart-shaped* reciprocally using *cordate* to explain its meaning. Hence, the synonymous relationship between the two terms cannot yet be specified.

In the synonym analysis process the following aspects must be considered: connotation, denotation, distribution, frequency and linguistic layer. Two terms with the same denotation may differ in other aspects of their usage. The differences may include such matters as stylistic connotation or collocation constraints. Keeping this fact in mind, we have gathered a corpus of scientific articles that enables us to observe the terms as used by professionals in their scientific practice. Altogether 65 articles published in the online scientific journals *The American Journal of Botany* and *Annals of Botany* from 1995 till the present containing either of the two terms were collected. These articles represent 105 occurrences of the analyzed terms. In none of the articles do the terms co-occur. Table 1 illustrates the occurrence of the terms in the analyzed corpus.

<i>term</i>	<i>number of articles</i>	<i>number of occurrences</i>
<b>cordate</b>	28	45
<b>heart-shaped</b>	37	60

**Table 1** *The number of occurrences of the analyzed terms in the selected corpus.*

Table 2 summarizes terms that occurred in collocations with the analyzed terms and the number of occurrences of respective collocations in the studied corpus.

<i>collocation term</i>	<i>Slovak equivalent</i>	<i>number of occurrences</i>	<i>of</i>	<i>number of occurrences of heart-</i>
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		<b>cordate</b>	<b>shaped</b>
base	báza	8	0
blade	listová čepeľ	4	0
capsules	tobolky	0	1
cotyledons	klíčne listy	0	1
embryo(s)	embryo	0	37
embryo stage	štádium embrya	0	10
epicalyx	epikalych, kalištek	1	0
gametophyte	gametofyt	6	1
lamina	listová čepeľ	1	0
leaflets	lístky	0	1
leaf/ leaves	list/listy	13	3
petals	lupienky	1	0
phyllaries	zákrovné listene	1	0
prothallus/ prothalli	prvorast/prvorasty	1	2
seed(s)/fossil seeds	semeno/fosílna semená	2	1
stigma	blizna	0	1
stipules	prilístky	1	0
theca	peľový vačok	0	1
vasculature	žilnatina	0	1

**Table 2** Terms' collocations and their occurrence in the selected corpus.

## 2.2. Summary and Conclusion

The analysis yields the following results: the term *cordate* is used in collocations with the terms *base*, *blade*, *epicalyx*, *gametophyte*, *lamina*, *leaf/leaves*, *petals*, *phyllaries*, *prothallus/prothalli*, *seed(s)/fossil seeds*, and *stipules*. The term *heart-shaped* collocates with the terms *capsules*, *cotyledons*, *embryo*, *embryo stage*, *gametophyte*, *leaflets*, *leaf/leaves*, *prothallus/prothalli*, *seed(s)/fossil seeds*, *stigma*, *theca*, and *vasculature*. Both terms occur in collocations with the following terms: *gametophyte*, *leaf/leaves*, *prothallus/prothalli*, *seed(s)/fossil seeds* (the singular/plural difference is irrelevant).

Since there are no norms or rules defining which of the two terms should be used in a particular context a satisfying answer may be provided by a common usage, i.e. the usage of these terms in scientific papers and publications by members of the scientific community. Since, to a certain degree, our analysis is limited by the availability of relevant publications, we do not claim to have clarified the common usage of all observed collocations. Some observed examples seem to be a matter of an idiosyncratic preference. However, the following findings may be stated: 1. the terms *cordate* and *heart-shaped* are partial synonyms. They do not substitute each other in all contexts, their usage is collocationally constrained (the term *heart-shaped*, not *cordate*, is used in the terminology of plant embryology to denote a particular stage in the development of a plant embryo) and it is often determined by a common usage; 2. the corresponding Slovak equivalent to both terms is the adjective *srdcovitý*. The term is used in the Slovak terminology primarily to denote the shape or contours of two-dimensional flat organs; however it may also be applied to three-dimensional organs; 3. the findings may be applied in the scientific text translation as follows:

<i>srdcovitá báza</i>	→	<i>cordate base</i>
<i>srdcovitá čepeľ</i>	→	<i>cordate blade, cordate lamina</i>
<i>srdcovité embryo</i>	→	<i>heart-shaped embryo</i>
<i>srdcovitý gametofyt</i>	→	<i>cordate gametophyte, (also heart-shaped gametophyte)</i>
<i>srdcovitý list</i>	→	<i>cordate leaf, (also heart-shaped leaf)</i>
<i>srdcovité štádium embrya</i>	→	<i>heart-shaped embryo stage</i>
<i>srdcovitá blizna</i>	→	<i>heart-shaped stigma</i>
<i>srdcovitý kališteľ</i>	→	<i>cordate epicalyx</i>
<i>srdcovitý lístok</i>	→	<i>heart-shaped leaflet</i>
<i>srdcovitý lupienok</i>	→	<i>cordate petal</i>
<i>srdcovitý peľový vačok</i>	→	<i>heart-shaped theca</i>
<i>srdcovitý prílístok</i>	→	<i>cordate stipule</i>
<i>srdcovitý prvorast</i>	→	<i>heart-shaped prothallus, cordate prothallus</i>
<i>srdcovité semeno</i>	→	<i>cordate seed, heart-shaped seed</i>
<i>srdcovitá tobolka</i>	→	<i>heart-shaped capsule</i>
<i>srdcovitý zákrovný listeň</i>	→	<i>cordate phyllary</i>
<i>srdcovitá žilnatina</i>	→	<i>heart-shaped vasculature</i>

### 2.3 type runner – stolon – sucker

As Cruse states, the synonymous relationship between two words may often be signaled by a phrase like *that is to say* or a particular variety of *or* (Cruse, 1986: 267). For example:

- (1) Suckers, or stolons, **may be underground runners that behave in the same way as surface runners or may be the shoots produced by root buds.** (1, 1989: 55)
- (2) A stolon or runner **is a stem with long internodes that runs on or just below the surface of the ground, typically terminating in a new plantlet, as in *Fragaria* (strawberry).** (2, 2006: 352)

In accordance with the Cruse's statement the terms *sucker*, *stolon* and *runner* might be assumed synonymous. We will use the same procedure to identify the relation between the terms and assign to them their correct Slovak equivalents, adding an initial "pre-step": consulting one of the most popular bi-lingual electronic version lexicons--*Lingea 2002*, which provides the following equivalents for the analyzed terms:

**runner** - 0  
**stolon** - výbežok, šľahúň, pakoreň, výhonok  
**sucker** - prízemný výhonok, šľahúň

Earlier in the text we have referred to the importance and effectiveness of a standard genus/species definition which is grounded on the nearest larger concept to which specific (differential) marks are assigned. Thus, the analysis concentrates on the comparison of these elements (if present) in the definienda of the studied definitions and also on the presence of other two terms of the analyzed row in the definienda of the respective definienda.

### **runner**

- I. 0
- II. A naked creeping stem thrown out from the base of the main stem of the strawberry and certain other plants, and itself taking root.
- III. A creeping stem that arises from an axillary bud and runs along the ground, giving rise to plantlets at the nodes, as in the creeping buttercup (*Ranunculus repens*), or apex, as in the wild strawberry (*Fragaria vesca*). Runners are formed by many rosette plants. They often differ greatly from the normal stem of the plant and usually possess greatly lengthened internodes.
- IV. A horizontally spreading stem that runs above ground and roots at the nodes to form new plants. The stem eventually dies leaving many well-rooted plants surrounding the original one. An example is the Strawberry. Often confused with stolon.
- V. A slender, prostrate or trailing stem which produces roots and sometimes erect shoots at its nodes.
- VI. A thin stem or shoot growing along the ground and producing roots at the nodes.
- VII. 0

Only five out of seven reference materials include entries for the term *runner*. All the definitions comply with the requirement of providing the nearest larger concept: *stem* (also *shoot* in def. VI). The logical predications (*creeping, spreading, prostrate, trailing, from axillary bud, along/above the ground, rooting at the nodes/apex, with lengthened internodes*) in respective definitions slightly vary and in some cases contradict one another. One definition uses the term *stolon* and point out the possible confusion of the term with *runner*.

### **stolon** (borrowed from Latin stoló)

- I. A stem that grows horizontally, a runner (e.g., as in the strawberry)
- II. sucker of a plant
- III. A long branch that is unable to support its own weight and consequently bends down to the ground. Where nodes on the stolon touch the soil a new plant may develop from the axillary bud. Examples of stolons are the long shoots of currants and gooseberries (*Ribes*). Often ordinary shoots will behave like stolons if pegged to the ground, which is the basis of the layering method of vegetative propagation.
- IV. A horizontally spreading or arching stem that runs along the ground or just below the surface, which roots at its tip to produce a new plant. Often confused with runner.
- V. A prostrate or trailing stem that produces roots at the nodes.
- VI. 0
- VII. An elongated horizontal shoot above or below the ground, rooting at the nodes or apex.

Six reference materials define the analyzed term. Three definitions use the larger term (genus proximum) *stem*, while one definition (VII) is inclined to the term *shoot* and one (III) to the term *branch*. The logical spectrum predications in some cases contradict one another

(horizontal, arching, prostrate, spreading, trailing, **above/along/just below** the ground, rooting at the **tip(apex)/nodes**) The second definition includes *sucker* in its definiens; the fourth definition points out the possibility of confusion of the term with *stolon*.

### sucker

- I. An underground shoot arising adventitiously from the roots or lower stem of a tree or shrub and emerging from the soil to form a new plant, initially nourished by the parent plant. In cultivated species where grafting is practiced (e.g. roses and fruit trees), production of suckers from the stock may seriously detract from the vigour of the grafted scion. The term may also be applied to the modified root of a parasite that enables it to extract nutrients from the host.
- II. A shoot thrown out from the base of a tree or plant, which in most cases may serve for propagation; now esp. such a shoot rising from the root under ground, near to, or at some distance from, the trunk; also (now rare), a runner (as of the strawberry); also, a lateral shoot; in the tobacco plant, an axillary shoot.
- III. 0
- IV. These are similar to runners except that the horizontal parts of their stems are below the surface of the soil. Rooted suckers can be dug up and planted elsewhere. Shoots that grow from the understock on which a tree or shrub is budded are also called suckers. These should be cut off as low down as possible, otherwise they may kill off the named varieties that have been grafted or budded onto the understocks.
- V. 0
- VI. 0
- VII. 0

The term *sucker* is a bit more complicated. As seen from the definitions above (provided by only three out of seven reference materials), the term has several “meanings”. As Kocourek puts it, it cannot be expected that all semantemes of a polysemous term are synonymous with all semantemes of another possibly polysemous terms (Kocourek, 1965: 215-216). Therefore in the analysis of the synonymous relationship between the three terms we do not take into consideration all “meanings” of the term *sucker*. However, for the purpose of the correct translation we seek all possible Slovak equivalents of the term. All three definitions contain genus proximum *shoot*. Logical predications reflecting differential marks include *arises adventitiously, underground, from roots/lower stem/base of tree/shrub/plant, forms new plant, for propagation*. Though indicating a rare use, the second definition contains *runner* in its definiens, implying the identical meaning of both terms.

Similar to the previous analysis, a corpus illustrating the use of the terms was collected using two online scientific journals. Altogether 43 articles were collected in which 200 occurrences of the analyzed terms were recorded. Table 3 illustrates the occurrence of the analyzed terms in the gathered corpus.

<i>Term</i>	<i>total number of articles</i>	<i>total number of occurrences</i>	<i>number of co-occurrences with runner</i>	<i>number of co-occurrences with stolon</i>	<i>number of co-occurrences with sucker</i>
Runner	3	9	-	2	-



Stolon	<b>36</b>	<b>181</b>	<b>2</b>	-	-
Sucker	<b>4</b>	<b>10</b>	-	-	-

*Table 3 The number of occurrences of the analyzed terms in the selected corpus.*

In the selected corpus we recorded two co-occurrences of the terms *runner* and *stolon*, both indicating their synonymous relationship. Both terms were used in similar contexts (associated with the species *Fragaria* and *Saxifraga*). However, there is a noticeable difference in the frequency of the use of both terms. Concerning the term *sucker*, neither co-occurrence with either of the two other terms nor appearance in a similar context exist to indicate the substitutability of *sucker* with one of the other two terms appears in the studied corpus.

#### 2.4 Summary and conclusion

Despite the differences pointed out by the definitions from source IV the results of the analysis suggest that the two terms *runner* and *stolon* correspond in all aspects except for frequency. Although there is a variance in the specification of the “object” that the terms refer to, i.e. the definitions do not agree in whether the stem runs below, above, or along the ground, or whether it roots at the nodes or apex, the logical predicates in the definitions of respective terms often coincide. This inference is ascertained by the use of both terms in same contexts. For the purpose of assigning the corresponding Slovak equivalents to the analyzed terms, Slovak nomenclature suggests two terms too, namely *poplaz*, and *stolón* and, similarly, the difference between the two terms is rather disputable. While some authors/botanists employ *poplaz* to denote an above-ground stem and *stolón* to name an underground stem, others use both terms interchangeably. Concerning the term *sucker*, no definition or context proving the assumption that it is completely synonymous with any of the two other terms was recorded. The differential marks expressed by the logical predications and also the contexts illustrating the use of the term show that it refers to: 1. an underground shoot arising from roots; 2. an adventitious shoot arising from the base; of a woody plant. There is no specific term suggested by Slovak nomenclature that would match the first semanteme; thus the only appropriate equivalent to the given term is *podzemný poplaz*. The corresponding Slovak equivalent to the second semanteme is *výmladok*.

There is no corresponding term in the Slovak nomenclature to *sucker* denoting a lateral/axillary shoot of a tobacco plant (the use was demonstrated by its occurrence in the analyzed corpus); therefore a more general term *výhonok* is proposed. Finally, as regards the fourth “meaning” of *sucker*, that appears a matter for the analysis of the synonymous relationship between *sucker* and *haustorium* (*haustórium*).

<i>Term</i>	<i>Slovak equivalent(s)</i>
<b>runner</b>	poplaz, stolón
<b>Stolon</b>	poplaz, stolón
<b>Sucker</b>	1. podzemný poplaz 2. výmladok

**Table 4** *The analyzed terms and their Slovak equivalents.*

### 3. Conclusion

Terminology is a basic tool used by specialists to communicate and share their experience and findings. Botanical terminology, though formed on Latin bases, has its specifics in both the Slovak and English languages. Since English is the language science speaks today, the knowledge of these particulars facilitates easy communication and cooperation.

The process of analyzing terminological synonyms is time-consuming, demanding, often complicated, but at the same time very interesting and challenging. Hopefully, the results of our research into the issues of English botanical terminology will be of assistance to scientists, translators, ESP teachers or students in everyday practice.

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