



KAPITEL 9 / CHAPTER 9⁹ GREEK AND LATIN DOUBLETS DENOTING PLANT PARTS IN MODERN BOTANICAL TERMINOLOGY

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Introduction

For historical reasons for the emergence of many biological sciences in the ancient world, their terminological systems were formed on the basis of Greek and Latin lexical funds, which led to the appearance of Greek and Latin doublet designations of concepts [1]. Among the various ways of replenishing terminological vocabulary, the most productive was morphological one that according to which term formation was carried out by compounding and affixation.

V. Shynkaruk distinguishes two types of compounding: syntactic (compounding stems), and paratetic (compounding words) [11]. The use of various combinations of roots, stems, affixes and word-building models, both “pure” (Latin or Greek), and hybrid, made it possible not only to mark the distinguishing features of a new concept but also to determine its place in the system of concepts. The means of word formation, determining the limits of the content of concepts, got, in turn, a clearer semantic specialization. With the development of science, there arose a need for clearly motivated designations, the internal form of which is exactly consistent with the content.

In modern terminology, research on Greek and Latin terminological elements is carried out in various aspects: a bioscientific terminology: words from Latin and Greek stems (D. Ayers), the internationalization of the terminological fund (V. Akulenko, S. Grinev-Grinevich, V. Grigoriev, F. Nikitina, G. Samburova, A. Superanska), the status and role of Greek and Latin terminological elements in the terminological systems of national languages (T. Kandelaki, N. Yushmanov), terminological synonymy (D. Lotte), terminological elements in the terminological systems of specific sciences (O. Balalaieva, N. Misnik, Yu. Brazhuk, I. Vakulyk, V. Shynkaruk, N. Tsymbal, G. Hasanshina).

However, there are few fundamental works devoted to the analysis of botanical terminology as such. The historical aspect of the emergence and development of Ukrainian scientific botanical terminology was studied by V. Gamalia, some aspects of the use of Greek and Latin doublets are mainly covered in the dictionaries of

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botanical terminology by M. Barna [5], A. Bulakh, S. Ziman [12], I. Dudka [6].

The purpose of the study is to analyze the Greek and Latin doublets in botanical terminology, denoting the names of plant parts.

Research methods and materials: morphemic analysis of botanical terms denoting the names of plant parts. The study is based on materials of classical dictionaries for botanists by J. Lindley [9], S. Pell, B. Angell [10], from which most definitions of terms are taken.

The process of creating the Latin botanical terminology took place through the absorbing of Greek terminology, searches in Latin for equivalents of Greek terms and borrowings. The statement that, as a result of the parallel use of Latin and Greek terms, the synonymy in terminology expanded, a specific Latin-Greek bilingualism has emerged, which was a distinctive feature of ancient medical terminology and became traditional for modern, can be extrapolated to all biological terminology, including botanical one.

Based on the results of the morphemic analysis, scholars prove that affixing and compounding are productive ways of forming items of the Latinized semantic metalanguage of agronomy, that fully complies with the speech substratum, the Latin language. The researcher notes that the grammatical foundation of the Latinized metalanguage of agronomy is represented by three parts of speech: nouns, adjectives and participles. In compound words, numerals and adverbs are also presented as terminological elements. However, in modern botanical terminology, not all roots or stems of Greek nouns found in derivatives are used as separate terms.

Most compound botanical terms have a transparent internal form: the meaning of an unknown word can be revealed from its word-forming structure through the analysis of terminological elements – morphemes and morpheme blocks, which are regularly reproduced in existing definitions or used to create new ones and have a definite permanent meaning. The terminological element conveys a generalized and specialized meaning determined by one of the signs of concept the denoted by the term. In this sense, terminoelements are constitutive units in terms and nomina.

With the help of frequency terminological elements, a series of terms with the same type of semantics and structure are formed. As a result of the interaction, the terminological elements form a complex open formal-semantic terminological system in which each term has a specific place and a constant meaning [7].

Let's consider some Greek and Latin initial and final doublet terminological elements denoting the names of plants and their parts.



9.1. Greek and Latin roots denoting parts of plant

9.1.1. Greek *-phyt-* / Latin *-plant-* 'plant'

The high-frequency root *phyt-* can be either initial or final, and used in *phyto-/-phyton* variants:

phytognosis = *phytologia* – science of plants, the part of botany which treats of plants in general;

phytobiologia – *phytobiology*, the branch of biology that studies plant life (the same botany);

phytographia – *phytography*, the part of botany teaching the art of describing plants;

phytopathologia – phytopathology, science of plant diseases;

phytotomia – *phytotomy*, the part of botany teaching anatomical structure of plants;

phytocenosis – plant community, a collection or association of plant species within a designated geographical unit;

phytogelin – gelatinous matter of Algae;

phytochlore – green coloring matter;

phytoliths – fossil plants;

phytopolitus – any parasitical plant, whether real or apparent;

phytophagus – phytophagous, an animal feeding on plants;

phytoncida – phytoncides, antimicrobial, allelochemic, volatile organic compounds derived from plants;

hygrophyton – hygrophyte, a plant adapted to the conditions of abundant moisture pads of surrounding air;

xerophyton – xerophyte, a plant adapted to dry growing conditions; to survive in an environment with little water;

mesophyton – mesophyte, a plant of medium or favorable conditions as to moisture and light, or intermediate between wet and dry.

The final terminological element *-phyta* is common for the names of the divisions of plants: *Magnoliophyta* – division of Flowering plants; *Pinophyta* or *Coniferophyta* – division of vascular land plants, conifers; *Equisetophyta* – division of horsetails rushes; *Polypodiophyta* – division of vascular land plants, ferns.

The Greek noun *φυτον* is not used in terminology as stand-alone; its root is used



only in derivatives. The Latin word *planta* is used to denote the concept 'plant' (but sometimes the word *stirps* with the same meaning is used in publication names). The root **plant-** is used in such terms as *plantarium* – plant nursery, *plantatio* – plantation, etc.

9.1.2. Greek **-phyll-** / Latin **-foli-** 'leaf'

Both terminological elements are high-frequency and can be initial or final:

phylloideus / **foliaceus**, **foliiformis** – leaf-like, having a texture or form of a leaf;
phyllooma – leaf-like thallos of Algae;

phyllomania – the production of leaves in unusual number or in unusual places;

phyllophor – upper herbaceous part of the stem of a Palm tree;

phyllotaxis – the manner in which leaves distributed over a stem,

phyllula – scar left on a branch by the fall of a leaf;

phyllodium – the kind of leaf, which results from enlargement of the petiole and the loss leaflets;

foliaris – inserted upon, or proceeding from the leaf;

foliatio – the act of leafing;

foliatus – clothed with leaves.

They can form doublet pairs:

polyphyllus / **multifolius** – having or consisting of many leaves or leaf-like parts;

macrophyllus / **grandifolius** – having large or elongated leaves, large-leaved;

amblyophyllus / **obtusifolius** – having obtuse leaves, obtuse-leaved;

platyphyllus / **latifolius** – having broad leaves, broad-leaved;

stenophyllus / **angustifolius** – having narrow leaves, narrow-leaved;

microphyllus / **parvifolius** – having small leaves, small-leaved;

holophyllus / **integrifolius** – holophyllous, integrifoliate;

leptophyllus / **tenuifolius** – having thin leaves, thin-leaved;

pachyphyllus / **crassifolius** – having thick leaves, thick-leaved;

cyclophyllus / **rotundifolius** – having round leaves.

As a term, the noun **phyllum** is used with the transformed specific meaning 'sepal, perianth leaf'.

9.1.3. Greek **-anth-** / Latin **-flor-** 'flower'

Both stems are frequency and could be prepositional and postpositional. For example: **Anthophyta** – the Flowering Plants;



anthesis – the flowering period of a plant, act of expansion in a flower;

anthotaxis – an arrangement of flowers;

anthoclinium – a receptacle of inflorescence;

anthesmolysis – a metamorphosis of inflorescence;

anthesmus – inflorescence;

anthocarpous – composed of flowers and fruit blended into a solid mass;

anthocyane – the blue coloring matter of plants;

anthodium – head of flowers;

anthophorum – a short stalk or internode which sometimes between the calyx and petals, supporting the latter and the inner organs;

anthophorus – flower-bearing;

anthologia – anthology, a collection of blossoms;

anthurus – an inflorescence consisting of a cluster of flowers at the end of a long stalk; *perianthum* – *perianth*;

flora – all the plant life present in a particular region or time;

florogenesis – process of transformation from vegetative to reproductive phase;

floricultura – floriculture, flower farming;

floristica – floristics, the branch of botany concerned with the types, numbers, and distribution of plant species in a particular area;

florifer – floriferous, that bears flowers;

floralia – flower garden.

There are doublets used in terminology:

polyanthus / *multiflorus* – having many flowers;

oliganthus / *pauciflorus* – having few flowers;

macranthus / *grandiflorus* – having large flowers; large-flowered;

micranthus / *parviflorus* – having small flowers, small-flowered, etc.

The noun of Greek origin $\alpha\nu\theta\omicron\zeta$ (*anthos*) is not used alone in botanical terminology.

9.1.4. Greek *-carp-* / Latin *-fruct-* 'fruit'

The root *-carp-* can be both initial and final. For example:

carpel – one of the rolled up leaves of which the pistil is composed;

carpologia – carpology, a branch of botany that studies fruits and seeds;

carpophyllum, *carpidium* = carpel;



carpomorphus – fruiting;

carpadelium – an inferior indehiscent to or more celled fruit with solitary seeds, and carpels which, when ripe, separate from a common axis as in Umbelliferae;

carpoclonium – a free case or receptacle of spores;

carpomorpha – those parts in cryptogamic plants which resemble true fruits without being such;

carpostonium – the opening into the spore-case of Algals;

pericarpium – peridium of certain Fungals;

macrocarpus – having large fruits, large-fruited;

microcarpus – having small fruits, small-fruited;

pachycarpus – having thick fruits;

dolichocarpus – having long fruits, long-fruited;

oxycarpus – sharp-fruited;

erythrocarpus – having red fruit;

apocarpium – apocarp, a female element of a flower having separate carpels;

apocarpus – having distinct carpels.

The noun of Greek origin *καρποζ* (in the Latin version *carpus*) is used as an independent and is synonymous with the Latin *fructus*. The terminological element **fruct-** is used mainly as an initial: **fructifer** – bearing fruit; **fructificatio** – fruiting; **fructescentia** – the time of fruit ripening.

9.1.5. Greek *-clad-* / Latin *-ram-* ‘branch’

The Greek noun *χλαδοζ* (*clados*) is not used as a stand-alone term and found only in derivatives and compound words. For example:

cladogenesis – the process of evolutionary splitting of species;

cladodium – a modified stem that has a leaf-like shape;

cladenchyma – branched parenchyma;

cladostroma – a receptacle, or growing point covered with carpels, each of which has a free placenta;

platycladus – broad-branched;

pachycladus – thick-branched etc.

Latin *ramus* is used as a separate term; its stem also occurs in derivatives:

ramosus – branched;

ramifer – branching;



ramiflorus – having flowers on the branches;
breviramosus – short-branched;
polycladus / *multiramosus* – multi-branched etc.

9.1.6. Greek *-rhiz-* / Latin *-radic-* ‘root’

The Greek noun $\rho\iota\zeta\alpha$ (rhiza) is not used as a stand-alone, but occurs as an initial or final terminological element in derivatives and compound words. For example:

rhizologia – rhizology, a part of botany that studies plant roots,
rhizina – young roots of Mosses and Lichens;
rhiziphisis – an expansion of a radicle, as in *Nelumbium*;
rhizoblastus – a term applied of embryos which develop roots;
rhizocarpous/rhizocarpicus – having a perennial root, but a stem which perishes annually, as herbaceous plants;
rhizoideus – resembling a root;
rhizoma – a prostrate rooting stem, progressively throwing up leaves;
rhizomaticus – of the nature of a rhizome;
rhizomorphus – resembling a root;
rhizopodium – the mycelium or spawn of Fungals;
rhizula – the young root of Mosses and Lichens;
rhizotrogus – chafer, feeding on the roots;
gymnorrhizus – having exposed roots, buttress-rooted.

Less common is the Latin stem *-radic-*:

radical – arising from the root, or from its crown;
radicans – throwing out roots, usually applied to stems or leaves;
radicatio/radicellatio – the manner in which roots grow or are arranged;
radicatus – having a root;
radicella – a very small root, the young tiny roots which appear from the lower part of a young plant at the period of germination;
radiciflorus – the same as *radicalis*;
radicinius, radiciformus – being of the nature of a root;
radicula – the first root of a plant, rudimentary in the embryo;
radicosus – having a large root;
radiculoda – the radicle of Grasses.



9.1.7. Greek *-sperm-* / Latin *-semin-* 'seed'

More productive is the Greek terminological element *-sperm-*:

spermatophyton – a plant that produces seeds;

spermophorum – a cord which bears the seeds of some plants, also the placenta;

spermangium – the case containing the spores of Algae;

spermatocystidium – the supposed male organs of the Muscal Alliance;

spermatoidia – small cells containing gonidia in Algae;

spermatium/spermatidium – spore of an Algal;

spermidium – one of the names of the achaenium;

spermodermis – skin or testa of a seed;

spermodophorum – the end of the peduncle of Umbellifers;

spermotheca – seed-vessel, the case in which seeds are contained,

monospermus – having one seed;

polyspermus – having many seeds;

leucospermus – white-seeded, etc.

The final terminological element *-spermae* is common for plant divisions: *Angiospermae*, *Gymnospermae*. The word Σπέρμα is not used as stand-alone in botanical terminology.

Less common is the Latin stem *-semin-*: *seminatio* – the act of dispersing seeds, sowing; *seminulum* – a spore; *seminarium* – a plant nursery, a place for sowing the seeds; *seminicultura* – science of seeds.

9.2. Latin botanical terminology in the mirror of professional linguodidactics

Objective tendencies of integration of European education and creation of European Research Area actualize the need of modern society in highly qualified competitive specialists who are proficient not only in the native language but also in international professional language, are familiar with the scientific conceptual terminology apparatus of modern European languages [3].

It is important for students of biological specialties to learn meanings of the Latin and Greek word-formative elements (terminological elements, roots, suffixes, prefixes), knowledge of which makes for memorization of terms, making it conscious, and therefore easier.

At the present stage, a professional linguodidactics is engaged in the



development of a methodology (researching, modeling, and management) of profession-oriented foreign language teaching aimed at building foreign language professional communicative competence, whose components characterize the linguistic personality of a specialist. According to A. Krupchenko, professional linguodidactics studies strategies for building the professional competence of a specialist in the process of foreign language teaching. The object of professional linguodidactics is a studying the patterns of continuous profession-oriented teaching foreign languages, that builds language professional communicative competence of a specialist, and the subject is an organization of the process of specialist professional competence building by means of a foreign language [8].

Scholars undertook comparative analysis of such approaches as English for Specific Purposes (ESP) and Content-and-Language Integrated Learning (CLIL) and professional linguodidactics on their objectives, definitions, concept characteristics, methodology, assessment and teacher's capacity building in the process of foreign language teaching and came to the conclusion that professional linguodidactics PLD as a new scientific branch of linguodidactics originated from ESP and has much in common with CLIL. A. Krupchenko and A. Kuznetsov state, that professional linguodidactics based on "4-I-Concept": *Interdisciplinary* integration of language & specialism; *Internationalization* – a specialist in a globalized world is involved in a multicultural professional communication; *Interaction* with peers, teachers and professionals for successful FLT process; *Identity* – development of the specialist's linguistic identity [8]

Latin as a dead language cannot be considered in the same breath as other foreign "languages for special purposes". Issues related to the possibility of applying basic ideas and principles of linguodidactics to the teaching of the Latin language remain relevant and valid.

The principle of selectivity "permeates" the whole system of teaching language for professional purposes. This means, that learning a foreign language takes place not in general, but selectively, based on the communicative needs of the profession and specialist's personality. The theoretical teaching any foreign language is necessarily associated with its practical study, since language is a means of communication, and it involves the teaching communicative activity. Latin is a dead language, has some limitations in the formation of linguistic competence at the level of reading and writing, knowledge orthoepic, spelling, grammatical norms, basic linguistic laws and rules for terms composition [2].



Students are encouraged to use selective, functional linguistic material. The Latin course at agrobiological faculties has its own specifics, which significantly distinguish it from studying at other faculties. In the subject content, the profile component (studying terminology) is more actualized and dominates the general one (studying the fundamentals of Latin grammar). The grammatical material is presented in a considerably reduced amount, which is necessary for understanding and translating the Latin names of plants, their diseases, pests, etc.

Students acquire the knowledge and skills necessary for the nomination - the designation of special concepts by terms and scientific names fixed in the international codes of botanical and zoological nomenclature. Some researchers indicate the principal differences between terms and names. the functional approach dominates in educational practice, and the opposition of terms and nominations, although it is stipulated, but not determinative. Scientific names of plants and animals prevail in lexical minima (terms itself make up not more than 20%).

Grammatical fund of the Latinized metalanguage of agronomy is represented by three parts of speech: nouns – 12.9%, adjectives – 65.3%, participle – 21.8%. Numerals and adverbs are also represented as terminological elements in the compounds. The metalanguage of agronomy has a substantive and attributive nature, and the dynamic terminological component is reduced.

Due to the substantive and attributive nature of agrobiological terminology and nomenclature, the most attention is paid to the grammatical features of Latin nouns and adjectives. But even these parts of speech are not studied in full paradigms. The morphological form of the nouns and adjectives (the nominative, sometimes genitive) is the most significant. In this case, the attributive units, being in postposition after the substantive, are ranked according to the degree of importance of the sign for the unit of this taxonomic rank. Such models (substantive + adjective collocation) is a feature of the botanical nomenclature. At the same time, future agrobiologists acquire a significant amount of phytopathological and entomological scientific names. In the names of pathogens of plant diseases and insects, a model of substantive + substantive collocation is rather productive. Therefore, it is compulsory to study only four word forms of nouns and adjectives – nominative and genitive cases singular and plural. A complete derivational paradigm of nouns and adjectives is given for supplementary study.

The principle of foreign language professionalization determines the content of professionally oriented foreign languages learning as a holistic, complex and at the



same time an integrative process of development specialist's linguistic personality, which takes place in the integration of linguistic, communicative and professional skills based of interpenetration, interdependence and complementarity of interdisciplinary information and learning methods Latin language is studied in the first year together with special subjects, or precedes them, being their instrumental and conceptual base and laying the foundations for further conscious perception of the international biological terminology.

During the Latin course, students are introduced to International Code of Nomenclature for algae, fungi, and plants, International Code of Nomenclature for Cultivated Plants, International Code of Nomenclature of Prokaryotes and International Code of Zoological Nomenclature; are acquainted with their main principles (typification, priority, independence). The principle of universality states: "Scientific names of taxonomic groups are treated as Latin regardless of their derivation". Much attention is paid to the special professional topics: systematics, taxonomy, and classification of biological objects, and especially is focused on species, as a basic unit of classification and a taxonomic rank.

Equally important is the study of the structure of the hierarchical system of taxonomic rank above species, and ways of building uninominal names of plants and animals. Precise knowledge of Latin unified final terminological elements of uninominal names, recommended by the current international codes of botanical and zoological nomenclature, and their Ukrainian equivalents is compulsory.

Students should be informed about current trends in biological sciences. The Latin course based on principles of professional linguodidactics, unlike classical one, is not a closed system, it is regularly updated with new information from the achievements of modern science. Ad example, information on principles of syntaxonomy – the theory and practice of the phytocoenoses classification, the ways of creating the Latin names of syntaxa (syntaxon) in physiognomic and floristic vegetation classification, Rules and Recommendations of International Code of Phytosociological Nomenclature were recently included in it.



Conclusions

Based on the morphemic analysis of terms, it was found that terminological elements of Greek origin denoting parts of plants are traditionally more productive than Latin ones, but not all Greek nouns can be used as stand-alone independent terms in modern botanical terminology [1]. They can be divided into three groups:

1) those that can be used alone in transliterated form (sometimes with a Latin ending), and their stems with the same meaning can be part of the derived term. For example: καρποζ – Latinized carpus ‘fruit’;

2) those that can be used both alone and as part of a derived term, but have different meanings. For example, a terminological element of Greek origin -phyll- ‘leaf’ retains this meaning only in derivatives, and as a term phyllum has a specific, much narrower meaning ‘sepal, perianth leaf’;

3) those that are not used as stand-alone in botanical terminology, but their roots are found in derivatives. For example, a terminological element -gyn- (from the Greek Γυνή ‘woman’) means ‘pistil, the female reproductive part of the flower; and is used only in compound terms, for example, monogynus – monogynous, having only one pistil or stigma; a terminological element -rhiz- (from the Greek ριζα ‘root’); a terminological element -clad- (from the Greek χλαδοζ ‘branch’), etc.

It is important for students of biological specialties to learn meanings of the Latin and Greek word-formative elements (terminological elements, roots, suffixes, prefixes), knowledge of which makes fore memorization of terms, making it conscious, and therefore easier.