

Historical notes on pre-Linnaean euphorbias

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Resum

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En l'història prelinneana de les lleterasses es reconeixen tres moments fonamentals: el seu establiment per Dioscòrides i Plini, tots dos partint d'una font comú, la seva sistematització al segle XVI per Cesalpini i la definitiva denominació del grup per Linné.

Mots claus: història pre-Linneana, *Euphorbia*, història de la Botànica.

Abstract

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The pre-Linnaean history of spurge can be divided into three basic periods: their establishment by Dioscorides and Pliny, who undoubtedly worked from a common source; their systematization in the 16th century by Cesalpino; and the definitive denomination of the groups by Linnaeus.

Keywords: pre-Linnean history, *Euphorbia*, History of Botany.

Two significant phenomena must be stressed from the very start: in the first place, the main Mediterranean species of *Euphorbia* were identified very early on and were put to medical purposes; and in the second place, this knowledge and application to medicine remained virtually unchanged over the centuries until the last hundred years. For methodological reasons the present study will stop at Linnaeus and, in view of their slight incidence, will not deal with the incorporation of tropical or extra-European temperate species. Finally our survey does not claim to be exhaustive, and we will confine ourselves to authors whose contribution was either substantial or, for reasons we will state, constituted a turning point. It goes without saying that any detailed study on the subject would have to include the conception of spurge held by Fuchs, Mattioli, Clusius and Caspar Bauhin, to name only the most obvious omissions.

Euphorbia in the Corpus Hippocraticum and Theophrastus

The hermeneutic problems faced by historians of medicine also affect historians of botany and, by extension, historians of the genus *Euphorbia*, the most abundant genus known. Foremost among these common problems are the polysemy of the terms and the true meaning of the words, i.e., deciding whether the latter have a literal or figurative sense. Questions more properly to be clarified by botanists include discovering whether spurges are Mediterranean species or were imported from beyond the Red Sea, ascertaining whether references are to the whole plant or to one of its organs, and determining whether a given term describes the plant itself or the drug extracted from it.

The *Corpus Hippocraticum* comprises over 450 plant species, the vast majority of which correspond to what we know as genera and in some cases families. They are included because of their medical, agronomical or dietetic interest. The presence of the euphorbias is due to their purgative, evacuant and emetic effects. Thus in *Regimen in Acute Diseases* (*Rg. acut.* 23) we are told that *peplion* (*Euphorbia peplis* L.) is a god lenitive and intestinal revulsive, better for expelling gases than black hellebore (*Rg. acut.* 23).¹ The same term, applied to an evacuant which is compared with black hellebore, is found again in *Nat. Mul* 1,16. The species *E. peplis* L., a small euphorbiacea found in sandy, rocky places, is still widespread throughout the Mediterranean basin, except Crete. The hippocratic doctor also recommends that it be mixed with hellebore.

Mēkōnion (*Euphorbia peplus* L.), which is cited in *Morb III* 16, was also used as a purgative. This annual, ruderal, Mediterranean plant, which thrives in sandy soils, has glands with very slender, pointed appendices. The sub-shrub *mēkōnion* (*E. paralias* L.)² was usually gathered in dunes; its glands are half-moon shaped. *E. acanthothamnus* Hekdr. et Sart. ex Boiss., the *ippopheōs* referred to in *De affectionibus internis*³, is a montane species even though it is to be found almost down to the shore. It is widespread in Greece and in the Aegean region. The hippocratic *peplos*⁴ and *tithymallis*⁵ correspond to *E. peplus*. But among the Greeks the handiest word for designating a characteristic euphorbiacea was *tithymallos*⁶, which nearly always referred to *E. characias* L. This pubescent plant with robust stalks grows in Mediterranean scrub and holm oak woods and it has black or reddish-brown glands with appendices.

The correspondences indicated are to the closest and most likely meanings. Other species, such as those we know as *E. falcata*, *E. paralias*, *E. retusa*, and *E. spinosa*, could in some cases replace the translation given. The imprecise identification of the species affects not only the authors of the *Corpus* but Theophrastus, Dioscorides and Pliny as well, though to a lesser extent, since the latter offer information about the root, stalk, leaves and fruit.

Although several works in the *Corpus* date from the time of Theophrastus, it is he who takes the most botanical and agronomical approach in his *Historia plantarum*⁷ and *De causis plantarum*⁸. He is more interested in defining the constitution of the plant, and where and how it was gathered, than in its medicinal use⁹. Aristotle's disciple deals with the *tithymalloi* in Book IX of his *Historia Plantarum*, the authorship of which was questioned at one time. In this work¹⁰ he distinguishes between three classes: *paralios*, *arren* and *myrtiēs*, the equivalent of *E. peplus*, *E. characias* and *E. myrsinites* respectively, though the caveat about translations which we made in reference to the *corpus* and the species it contains must be repeated here, since it has been suggested that these may be species brought from India by Alexander (*E. hirta* L. and *E. pilulifera* L.), or alternatively *E. peplus* L. and *E. paralias* L.¹¹. In his capacity as a botanist, Theophrastus begins by describing the habit of the plant, the characters of the fruit, and the latex extracted from it, before dealing with its agronomical properties and, lastly, its therapeutic applications.

Dioscorides and Pliny

Dioscorides introduces the term *euphorbion* and places it far from the *Tithymalloi*. This separation was to last until the Renaissance. He deals with the former in the third book of his *Materia medica*¹² and with the latter in the fourth¹³. He describes *euphorbion* as a ferulaceous tree from North Africa which produces two types of fluid, one of which is particularly suitable for curing ailments of the eye, among other afflictions; its use, he says, dates back to the reign of Iuba, a monarch contemporary to Caesar Augustus.

Dioscorides introduces various species of Euphorbiae in his fourth book: *ippopheōs*¹⁴ (thorny spurge, *Euphorbia spinosa* L.), *tithymallos* (various species of *Euphorbia*)¹⁵, *pityosa*¹⁶, *lathyris*¹⁷ (*E. lathyris* L.), *peplos*¹⁸, *peplis*¹⁹ and *xamaistykē*²⁰. He recognizes seven species under the heading devoted to the *tithymalloi*: *Euphorbia characias* L., *E. myrsinites* L., *E. paralias* L., *E. helioscopias* L., *E. aleppica* L. (or *E. cyparissias* L.), *E. dendroides* L. and *E. platiphyllus* L.²¹. These seven, for which, he gives a morphological description of the main organs and indicates the medicinal uses, were to be repeated over and over and over again for centuries like a catchphrase.

Pliny deals at length with new details about the origin of *euphorbium* (*E. resinifera* Berg)²², a term he claims derives from the name of Euphorbos, who was physician to King Iuba II of Mauritania. He also establishes seven “genera” of *tithymali*: *characias* (*E. characias* L.)²³, *myrtites* (*Euphorbia myrsinites* L., or *E. fontqueriana* W. Greuter)²⁴, *mecona* or *paralio* (*Euphorbia paralias* L.)²⁵, *heliosopion* (*Euphorbia helioscopia* L.)²⁶, *cyparittiam* (*Euphorbia cyparissias* L.)²⁷, *platyphyllon* (*E. platyphyllus* L.)²⁸ and *dendroides* (*E. dendroides* L.)²⁹. To these seven, Pliny adds *pityusa* (*E. pityusa* L.)³⁰.

Medieval authors

The separation between *euphorbium* and *tithymali* was maintained during Hellenism and the premedieval period (the age of the western fathers of the church). One example is provided by the *Etimologías de San Isidoro de Sevilla* (560-636)³¹. Growing imprecision is detected, however, as illustrated by the fact that, when dealing with *tithymali*, the author describes only *E. helioscopia* L. before launching into a fantastic etymology³². In referring to *euphorbium* (*E. resinifera* Berg) he stresses the use of this species as an eyewash and its North African origin³³.

The rediscovery of classical texts in the West came centuries later with the Arab occupation of the Mediterranean. Most had been translated in Baghdad. Among them was Dioscorides's *Materia medica*, translated during the reign of the Abbasid calif Ja'far al-Mutawakil (847-861) by Stephanos under the supervision of Hunayn ibn Ishaq³⁴. This became the main, though not the only source, of Muslim pharmacopoeia and botany³⁵. Thus, for example, we find euphorbias applied in the *Medical Regimen for the pilgrims to Mecca* by Qusta Ibn Luqa al-Balabakki (820-912), who in the fifth chapter, among the effective remedies against earache, includes a little olive mixed with a small amount of euphorbium (*afarbiyun*, that is, *E. resinifera* Berg.)³⁶. A further example, one century later, is to be found in another classic which was in widespread use in the medieval world, *Liber servitorris* by Abu 'l-Qasim Halaf Ibn al-'Abbas az-Zahrawi (936-1013). An entire chapter of this work is devoted to *tithymali* (*Euphorbia cyparissias* and *Euphorbia helioscopiae*) in recognition of their drastic purgative properties. The author draws a sharp distinction, in accordance Dioscorides's approach, between *tithymalus* and *euphorbium*³⁷. As the centuries go by, the euphorbias remain on the pharmacist's shelves. This is shown by a later example drawn from *Hospital Formulary of Compound Medicaments* by Abu l-Fadj Dawud ibn Abi l-Bayan al-Israili (1161-1240) who uses *Euphorbium officinalis*. And the Arabs were not the only ones to continue using euphorbias. The antidotaries of the Salerno School reproduced Arab medicines using *E. resinifera* Berg. and

sometime spurges³⁸. The fact is that euphorbias were an inherent part of medicine both on the continent and in the islands: several species are recommended in a mid-13th century recipe book, among which it is possible to recognize at least *E. paralias*, *E. resinifera* and *E. uralensis*³⁹.

The use of euphorbias, and thus knowledge about them, was not confined to practical medicine. Medieval alchemists also resorted to their supposed properties, including them among the ingredients of a good many secret recipes. In the *Picatrix*, which was translated into Latin at the court of Alfonso X in 1256 and disseminated throughout Europe, "euphorbium" appears with numerous references⁴⁰. Likewise in *Liber secretorum alchimiae* by Constantino de pisa (probably) compiled in 1257, "euphorbium" is one ingredient in an alchemical preparation for subliming sulphur⁴¹.

The Renaissance

15th century herbariums continued to reproduce much of medieval tradition in a jumble of highly heterogeneous currents which, for the purposes which concern us here, maintained the separation between euphorbium and tithymali. Drawings of the former are based on texts and therefore idealized, while the latter are based on reality⁴².

In the second half of the 15th century, the precarious situation in which botany had been developing underwent a change: the classics were rediscovered and sources were purged⁴³. Prime factors in the change were Teodoro Gaza's translation of Theophrastus, Ermolao Barbaro's "castigationes" of Pliny and the early printed version of *Historia naturalis* from the Latin, as well as the various versions of Dioscorides's *Materia medica*. Where euphorbias are concerned, we will retrace the new trends in a few 16th century works, stopping to consider Ruel, Gessner, Brasavola, *Tragus*, Cesalpino and Dodoens. The first two belong to a first phase in which classical materials were collected and put together in a patchwork-like fashion; the third and fourth are examples of the will to undertake independent herborizing in order to evaluate the knowledge passed down; and the last two provide instances of personal re-elaboration of species.

Jean Ruel was the author of the first Latin translation of *Materia medica* in 1516, and he added to it personal comments taken, to a large extent, from the information contributed by Pliny. This version again highlights the distinction between euphorbium and tithymali, which Ruel endorses in *De natura stirpium libri tres*. Published for the first time in 1536, this work was reprinted in 1537 and 1543, the last edition being the one referred to here. It reproduces the views of Dioscorides and Pliny on the subject of euphorbium⁴⁴. *Euphorbium*, says Ruel, is a flowerless "herba" (according to Pliny), or a "arbor" (in the view of Dioscorides). No other botanical feature worthy of interest is reported. Ruel deals more extensively with *tithymali* (p. 651-653). He begins by recalling the seven species and their synonyms and when he sets about describing them one by one, repeats what was said by Dioscorides and Pliny, with a few additions of his own. Thus, when referring to "characias", he notes that the French call it *expurgia* and *evigilem matutinum* ("morning awakener"). He describes it as one and a half feet high, one finger thick, with five or six stalks, leaves similar to those of the olive tree but broader, a gentle red in colour, narrower towards the root, and culminating in a rus-like plume. On the subject of "myrsinites", he adds that he seen it growing in shady spots (as opposed to dry ground) and that it has leaves much larger than those of the myrtle, small branches like a palm tree, and a fruit similar to walnut; it has no vernacular name. Theophrastus refers to "paralias" as "coccus" while the common people call it *evigilem matutinum*. It has five or six reddish shoots, a palm high. These sprout from the root and bear the flax leaves which are small, narrow, oblong, and distributed in an "orderly" fashion. It also has a capitulum which bears seeds of various colours similar to those of *Vicia*

ervilia (“utervum”). Ruel contributes no new botanical information about “helioscopon” “cyparissias” or “dendroides”.

In the following chapter (146) Ruel deals with “pityusa” and “lathyris”. “Pityusa”, he says, is a variety of “cyparissas”, and hence also belongs to the *tithymali* genus. He reproduces the description given by Dioscorides and Pliny. He points out that in modern times this species is referred to as *esula*, since it is a gnarled bush-like plant, with a stem comprising more than one elbow, fine, pointed leaves like spruce, a small, violet-coloured flower, lenticular seed, and a fleshy white root. His treatment of “lathyris” is similar. Ruel specifies that in pharmacies this species is called *cataputia minor* and that the French call it “espurgia”. The same method is followed with regard to “peplos”, “peplis” and “chamaesyce”, to which chapter 147 is devoted. The classical “peplos” has entered pharmacists’ laboratories under the name of *esula rotunda*, he says, while the common people know it as *vineale revelium*.

With reference Dioscorides’s *euphorbium*, Ruel merely adds a few details from Pliny and mentions the medical contributions made by his two main mentors: Aecium and Actuarius⁴⁵.

The views of Conradus Gessner are expressed much more concisely without any new contribution being made. “Euphorbia”, he says, “is a ‘ferulaceous’ tree from Libya”⁴⁶. He distinguished between seven “genera” of “*Tithymali*”, reproducing almost verbatim the description compiled by Ruel. The same applies to the sections devoted to “peplis” and “peplys”.

When information derived solely from books is abandoned and comparisons with the authors’ own botanizing are undertaken, the situation changes. A first instance of this is Antonio Musa Brasavola⁴⁷. The transition is a slow one, however. He acknowledges that what is sold in pharmacies is euphorbium, but it is not the vigorous species referred to in the classical texts since he has tried it and thus, without giving any botanical notes, he distinguishes between a number of different species⁴⁸. He also adds the Spanish and French translations.

When studying *tithymali*, Brasavola does not trouble to give detailed account of the seven classical species, though he recalls that there are “many”: he begins by referring to the Arab tradition (Serapion before concerning himself directly with the main, predominant species found in pharmacists’ shops, “*cataputia*”). He rejects outright the forced etymologies, which were usual even up to Ruel. *Cataputia*, he goes on, is not the “*characias*” described by Dioscorides, as he originally thought, but “*lathyris*”. He changed his mind on carefully studying the seeds and the oblong stem. He gives synonyms in various languages so that the reader can identify it. Laguna, among others, repeats this identification.

A more systematic reinforcement of this trend takes place in the work of Hieronymus Bock⁴⁹ who, though he recalls the names of Dioscorides’s spurge, prefers to use the equivalent terms prevalent in Germany. The distinctive features he usually notes are the herbaceous or shrub-like character of the plant, the number of stems, the shape of the seed, the presence of a capitulum and leaves. He first deals with “*cataputia minor*”, or “*Lathyris*”, differentiating between two species; he recognizes the glabrous colouring of the leaves and the tripartite shape of the fruit. He identifies the related “*Tithymali*” as: “*Esula maior*”, “*Esula vulgaris*”, “*Esula multicaulis*”, “*Esula sylvestris*”, “*Esula exigua*” and “*Esula dulcis*”, for which he gives the corresponding synonyms from Dioscorides. He states that he has not seen “*paralias*” and has only seen “*pityusa*” dried.

Thirty years later, the vital turning point came, led up to by the botanizing done mainly by Bock and Mattioli: all the euphorbias described by Dioscorides, including the isolated *euphorbium*, were grouped together. This systematic work was carried out by Andrea Cesalpino⁵⁰ who devoted to them the first eighteen chapters of the ninth book of his *De plantis*. The euphorbiae, he explains, are plants with trilocular fruits. Their characteristic juice can flow from the base of the leaf petiole, the stem or the root; the leaves are entire; the stems usually divide into three apical branches which bear the flowers. The triangular fruit is “cutaneous”

outside and "cartilaginous" inside; the three seeds are contained in the same number of cavities. The various genera are differentiated by their size, the shape, the leaf, the stem, the seed and the roots.

After setting out their overall properties, he describes the various tithymali one by one: "characias" (Ch. V), "palustris" (Ch. VI), "esula" (Ch. VII), "alypum" (Ch. VIII), "maritimus" (Ch. IX), "myrsinites" (Ch. X), "arborescens" (Ch. XI), "latifolium" (Ch. XII), "cataputia" (Ch. XIII), "helioscopius" (Ch. XIV), "peplus" (Ch. XV), "peplium" (Ch. XVI), "chamaesyce" (Ch. XVII) and "euphorbium" (Ch. XVIII). He describes the morphological characters of each and their classical and recent synonyms. He takes a firm stand over the inclusion of "euphorbium", noting that the seeds are contained in trigonous capsules, similar in shape to those of the tithymali, and it must accordingly be inferred that euphorbium should be included among the latter.

Rembert Dodoens⁵¹ follows in much the same line. He describes and illustrates five species of "characias" and doubles the number of "paralius". He reinstates Theophrastus's "hippomanes". He refers to *Tragus* for some classes of "esula", though his geographical frame of reference is Belgium, and he also closes Dioscorides's series of tithymali with "euphorbium", from which he in turn distinguishes the "anteuphorbium". It is a well known fact that Dodoens's presentation is outstanding for his careful attention to precise morphological details: roundness and length of stem, leaf limb and lanugo, location of seeds, and other details.

17th century, J. Bauhin.

The next decisive step towards a more precise definition of spurge, if we disregard other interesting intermediate phases, is taken by J. Bauhin and J. Cherlier in their *Historia plantarum*⁵². The novelty of this work consists in the rigorous organization of previous botanical knowledge, and the critical analyses of various earlier descriptions, notably by Dioscorides, Pliny, Tragus, Mattioli, Lonicero, Gesner, Cesalpino, Dodoens, Dalechamps, Clusius, Lobel, Camerarius, and Caspar Bauhin. This in effect amounted to a pre-Linnaean attempt to introduce some order into a group comprising ever more numerous denominations which did not always correspond to new species. For greater clarity, the authors began by giving the morphological description, paying attention to *radix*, *caules*, *folia*, *flores*, *loculi* and *semina*, or, if applicable, *radicula*, *cauliculus*, *ramulus*, *foliola*, and *floscula*. This enabled them to make reliable headway in comparing the various synonyms. The same method had already been followed by Cesalpino, but from now on it was to become an integral part of all studies.

From Ray to Linnaeus.

This method was to be extended to John Ray⁵³. For him, the distinctive characters of the "genus" of tithymali are that they possess a tricoccal seed at the apex and produce a milky juice, which is strong in the majority of species and tasteless in very few. In describing the various species, he follows the same line as the book mentioned above, including contributions by other authors such as Morison and, especially, Parkinson. In the chapter devoted to *euphorbium*, he rejects the idea that the species described by Dodoens is a genuine euphorbium. He also adds others species of American and oriental origin.

Linnaeus, who was inspired to a considerable extent by Ray's work, based his English flora on the third edition of *Synopsis methodica stirpium britannicarum*, published in 1724 by J. J. Dillenius. The two previous editions had been published during the lifetime of John Ray

(1627-1705) in 1690 and 1696 respectively. The *Synopsis* is not arranged in alphabetical order but systematically, according Ray's system. The latter places euphorbias in the twenty-second genus, devoted to "herbae vasculiferae, flore tetrapetalo anomalae", and observes in particular that "Tithymali notae sunt vasculum seminale tricoccum in summo stylo, succus lacteus acer". He differentiates between the following British spurges: "Tithymalus characias Amigdaloides", with a perennial root and stem and lanuginous leaves, which Linnaeus himself identifies with *Euphorbia amygdaloides*; "Tithymalus characias Monspeliensium", for which he specifies no characteristics and which Linnaeus places in *Euphorbia characias*; "Tithymalus verrucosus" or, according to Linnaeus, *Euphorbia verrucosa*; "Tithymalus paralius", glabrous, with a perennial root, a stem with a maximum of one elbow, and firm, briefly incised leaves; "Tithymalus Hibernicus", which has broad, obtuse, smooth, leaves, firm on the stem and flowers in an umbel; "Tithymalus platyphyllos Fuchsii", an annual with wide, oblong leaves, the synonym, Linnaeus *scripsit*, of *Euphorbia platyphyllos*; "Tithymalus segetum longifolius", which has oblong leaves finishing in a point, *Euphorbia seetalis* according to Linnaeus; "Tithymalus maritimus minor", with small leaves, rounded at the point or mucronate, and open floriferous branches, which Linnaeus calls *Euphorbia portlandica*; "Tithymalus leptophyllos", with a small stem and narrow, pitted leaves, Linnaeus's *Euphorbia exigua*; "Tithymalus helioscopius", with crenate leaves, rounded at the apex, classified by Linnaeus as *Euphorbia helioscopia*; "Tithymalus parvus annuus, Peplus dictus", which must logically be *Euphorbia peplus*; "Tithymalus maritimus supinus annuus, Peplis dictus", obviously *Euphorbia peplis*.⁵⁴

And that brings us to Linnaeus. *Euphorbia*, along with the genus *Reseda*, makes up the pair which forms the order "Trigynia" in the eleventh class, "Dodecandria", consisting of plants which have between 11 and 19 stamens and three pistils. In Linnaeus the *Euphorbia* genus comprises 56 species, which makes it one of the most numerous. He introduces the species found in the new herbariums which had been appearing as a result of journeys to the tropics, the east, Siberia, and other localities unknown to Europeans of the Renaissance.

He groups the species together on the basis of the following criterion: a) aculeate fruticose species (*E. antiquorum*, *canariensis*, *heptagona*, *mammillaris*, *ceriformis*, *officinarum* and *neriifolia*), b) inerm fruticose species, which he divides into 1) those which are not dichotomous or lack an umbel (*caput medusae*, *viminialis*, *mauritanica*, *tirucalli*, *tithymaloides*, *heterophylla*, *cotinifolia*, *ocymoidea*, *origanoides*, *hypericifolia*, *hirta*, *pilulifera*, *thymifolia*, *maculata*, *chamaesyce*, *peplis*, *polygonifolia*, *ipecacuanhae* and *portulacoides*), and 2) those with an umbel, which may be trifold (*peplus*, *falcata*, *exigua* and *tuberosa*), quadrifid (*lathyrus*), quinquefid (*spinosa*, *apios*, *dulcis*, *pithyusa*, *portlandica*, *paralias*, *aleppica*, *segetalis*, *helioscopia*, *serrata*, *berrucosa*, *corollata*, *corallioides*, *pilosa*, *orientalis* and *platyphyllos*) or multifid (*esula*, *cyparissias*, *myrsinites*, *palustris*, *hyberna*, *dendroides*, *amygdaloides*, *syvatica* and *characias*)⁵⁵. In order to arrive at such a large number of species, Linnaeus drew from numerous sources. The subsequent evolution of *Euphorbia* belongs to the history of present-day botany.

NOTES

1. Quotations from works belonging to the *Corpus* are usually taken from the edition by Emile Littré, Paris, Bailliére, 1844. Technical editions should be consulted whenever appropriate, provided they exist: examples are those published by Les Belles Lettres, Loeb, Walter de Gruyter, E. J. Brill, "Bernat Metge" and the good Spanish translation in Gredos. For a catalogue of the names of the species used in the *Corpus* and in other texts of classical antiquity, see MOISAN, M. 1990. *Lexique du vocabulaire botanique d'Hippocrate*. Avec a collaboration de Gilles Maloney et de Denis Grenier. Université Laval, Québec.

2. *Fist.* 7.

3. *Int.* 13, 25, 26.

4. *Superf.* 32.
5. *Superf.* 38.
6. *Hip.* 1. var.
7. We use the Loeb edition, reprinted in 1968-1980, of THEOPHRASTUS, *Enquiry into Plants*, translated by A. F. Hort.
8. THEOPHRASTUS, *De causis plantarum*. Edited and translated by Benedict Einarson and George K. K. Link, Harvard, 1976-1990
9. SCARBOROUGH, John. 1978. "Theophrastus on Herbals and Herbal Remedy", *Journal of the History of Biology*, 11, 2, 353-385.
10. IX, 11. 7-9.
11. SCARBOROUGH, 368.
12. WELLMANN, M., ed. 1906-1914. *Pedanii Dioscuridis Anazarbei De materia medica*. Berlin. Especially, III, 82, 92.
13. *De mat. med.* IV, 164. 1-9.
14. Ch. 159.
15. Ch. 164.
16. Ch. 165.
17. Ch. 166. This is our Spanish "tártago".
18. Ch. 167. The common name is that of "peplo".
19. Ch. 168. Equivalent to Spanish "péplide".
20. Ch. 169. "higueruela".
21. BERENDES, Julius. 1891. *Die Pharmacie bei den alten Culturvölkern. Historischkritische Studien*. 2 vols. Halle.
22. Plinius, *Natural History* 5, 16; 25, 77 sq.; 27, 2. Cambridge, Mass. Loeb Classical Library, 10 vols. 1938-1963.
23. "Tithymallum nostri herbam lactariam vocant, alii lactucam caprinam, narrantque lacte eius incripto corpore, cum inaruerit (when it dries), si cinis inspargatur, apparere litteras, et ita quidam adulteras adloqui maluere quam codicilis. genera eius multa: primus cognominatur characias, qui et masculus existimatur, ramis digitali crassitudine, rubris sucosis, quinque aut sex, cubitali longitudine, a radice foliis paene oleae, in cacuminibus coma iunci. nascitur in asperis maritimis, legitur semen autumnno cum coma, siccatum sole tunditur et reponitur. sucus vero incipiente pomorum lanugine defractis ramulis excipitur faina ervi aut ficis ut cum iis arescat. quinas autem guttas singulis exipi satis est, traduntque etiam toties purgari hydropicos fico sumpta quot guttas ea lactis exceperit. sucus cum colligitur, ne attingat oculos cavendum est. fit et e foliis tunsis priore minus efficax. fit et decoctum e ramis. est et semen in usu cum melle decoctum ad catapotia solvendae alvi gratia. semen et dentium cavis cera includitur. coluntur et radicis decocto e vino aut oleo, onlinunt et lichenas suco, bibuntque eum ut purget vomitione et alvo solutaa, alias stomacho inutilem. trahit pituitam sale addito in potu, bilem aphronitro, si per alvum purgari libeat, in posca, si vomitione, in passo aut aqua musa. media potio tribus obolis datur. ficos a cibo sumpsisse melius est. fauces urit leniter, est enim tam ferventis naturae ut per se extra corpori imposita pusulas ignium modo faciat et pro caustico in usu sit." *HN* 26, 62-65)
24. "Alterum genus tithymali myrtitem vocant, alli caryten, foliis myrti acutis et pungentibus, sed maioribus, et ipsum in asperis nascens. colliguntur comae eius hordeo turgescente siccataeque in umbra diebus novemmin sole inarescunt. fructus non pariter maturescit, sed pars anno sequente, et nux vocatur. inde cognomen Graeci dedere. demetitur cum messium maturitate lavaturque, diende siccatur et datur cum papaveris nigri duabus partibus ita ut sit totum acetabuli modus, minus hic vomitorios quam superior quam superio, ceteri idem, aliqui sic et folium eius dedere, cucem vero ipsam in mulso aut passo vel cum sesima. trahit pituitam et bilem per alvum. oris ulcera sanat, ad nomas oris folium cum melle estur." *HN* 26, 66-67.

25. "Tertium genus est tithymalon —mecona vocant, a alii paralion— folio lini, flore albo, capite magnitudine fabae. colligitur uva florent, siccatur in umbra, semen potum purgat alvum dimidio acetabulo in mulso. cuicumque autem papaveris acptum viride vel siccum inlitum epiphoras oculorum lenit. opium ex vino meraculo si protinus detur, scorpionum ictibus resistit. aliqui hoc tantum nigro tribuunt, si capita eius vel folia terantur. HN 20,209.
26. "Quartum genus (Tithymalli) helioscopion appellant, foliis porcillacae, ramulis stantibus a radice quattuor aut quinque rubentibus semipedali altitudine, suci plenis. hoc circa oppida nascitur semine albo columbis gratissimo; nomen accepit, quoniam capita cum sole circumagit. trahit bilemper inferna in oxymelite dimidio acetabulo, ceteri usus qui characiae." HN 26, 69.
27. "Quintum (genus Tithymalli) cyparittiam vocant propter foliorum similitudinem, caule gemino aut triplici, nascentem in campestribus. eadem vis helioscopio aut characiae." HN 26,70.
28. "Sextum (genus Tithymalli) platyphyllon vocant, alii corymbitem, alii amydalitem a similitudine. nec ullius latiora sunt folia. pisces necat alvum solvit. radice vel foliis vel suco in mulso aut aqua mulsa drachmis quattuor. detrahit privatim aquas." HN 26, 70.
29. "Septimum (genus Tithymalli) dendroides cognominat, alii cobion, alii leptophyllon, in petris nascens, comosissimum ex omnibus, maximis cauliculis rubentibus, et semine copiosissimum, eiusdem effectus cuius characias." HN 26,71.
30. "Cum honore et pityusa simili de causa dicetur, quidam in tithymali genere numerant. frutex est similis piceae, flore parvo pupureo. bilem et pituitam per alvum detrahit radix decocti hemina aut seminis lingula in balanis. folia in aceto decocta furfures cutis emendant, balanis. folia in aceto decocta furfures cutis emendant, mammas quoque mixto rutae decocto et tormina et serpentium ictus et in totum collectiones incipientes." HN 24, 31.
31. CORTES, L., ed. 1951 *Etimologías de San Isidoro de Sevilla*. Madrid, BAC.
32. "Titimallum vocabulum sumpsit quod coman foliorum ad radium solis circumacta convertat. Nam Graeci solem titana vocant, mallon comam; ex quo confectum est ut titimallum diceretur. Huius speciem diversis in locis nascentes." *Etim.* xvii, 9,77. Ed. de J. André, Les Belles Lettres, Paris, 1981.
33. "Euforbium dictum quod eius succus oculorum acuat visum. Cuius vis tanta est ut duris carnibus superadiecta citius coqui compellat. Nascitur in multis locis, sed plurima in Mauritania." *Etim.* xvii, 9, 26.
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42. See for example RAGAZZINI, Stefania. 1983. *Un erbario del XV secolo. Il ms. 106 della Biblioteca di Botanica dell'Università di Firenze*. Firenze, Olschki editore.

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44. RUEL, J. *De natura stirpium libri tres*. 1543. Basilea, In officina Frobeniana. p. 544.
45. RUEL, J. *Pedanii Dioscoridis anarzabei, de Medicinali materia Libri sex. lib. III, Ch.78*.
46. GESNER, C. 1541 *Historia plantarum et vires ex Dioscoride, Paulo Aegineta, Theophrasto, Plinio, et recentioribus Graecis, iuxta elementoru ordinem*. Paris, Apud Ioannem Roigny; p. 98. The French denominations in the margin are from Ruel.
47. BRASAVOLA, A.M. 1546. *Examen omnium simplicium, quorum usus in publicis est officinis*; Lyon, Sub Scuto Coloniensi. The first edition of this work, which was reprinted several times during the author's lifetime, dates from 1536, but the one quoted here is the most complete.
48. Id. p. 650-651
49. TRAGUS, H. 1552. *De stirpium, maxime earum, quae in Germania nostra nascuntur, usitatis nomenclaturis, propriisque differentiis, neque non temperaturis ac facultatibus, Commentariorum Libri tres, Germanica primum lingua conscripti, nunc in Latinam conversi, Interprete Davide Kybero Argentinensi*. Argentorati, Wendelinus Rihelius.
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55. LINNAEUS, C. 1753. *Species plantarum*. Facsimile edition. London, Ray Society 1957, Vol. I, pp. 450-463.
56. The sources from which he drew were: works of his own (*Flora lapponica*, *Hortus cliffortianus*, *Flora suecica*, *Hortus upsaliensis*, *Flora zeylanica*, *Materia medica*) or directed by him (*Dissertatio botanica de Euphorbia, ejusque historia naturalis et medica*, by Joh. Wiman); works by other authors: A. van Royen (*Florae leydensis prodromus*), J. Commelin (*Horti medici Amstelodamensis rariorum plantarum descriptio et icones*), H. A. van Rhee de tot Draakens-tein (*Hortus indicus malabaricus*), Caspar Commelin (*Praeludia botanica*), L. Plukenet (*Almagesti botanici mantissa*), H. Boerhaave (*Index plantarum quae in horto academico Lugduni-Batavorum*), Danty d'Isnard (*Etablissement d'un genre de plante appelé Euphorbe, en "Acta parisiensia"*, 1720), Johannes Burman (*Rariorum africanarum plantarum*), by R. Morison (*Plantarum historia universalis oxoniensis*), Albert Seba (*Locupletissimi rerum naturalium thesauri accurata descriptio*), Caspar Bauhin (*Pinax Theatri botanici y Prodromos theatri botanici*), Prospero Alpino (*De plantis Aegypti liber cum...notis Ioannis Veslingii*), J. Dillenius (*Hortus elthamensis*), Leonardus Plukenet (*Phytographia sive stirpium...icones*), Paul Hermann (*Paradisus batavus*), William Houstoun ("Musei Imperialis Petropolitani", Saint Pe-

tersburg 1745), Jan Fredrik Gronovius (*Flora virginica, exhibens plantas quas v. c. Iohannes Clayton in Virginia observavit atque collegit; easdem methodo sexuali disposuit*), Iohannes Burmannus (*Thesaurus zeylanicus*), Hans Sloane (*Catalogus plantarum quae in insula Jamaica sponte proveniunt* and *A voyage to the islands Madrea... and Jamaica, with the natural history of the herbs and trees*), Johann Georg Gmelin (*Flora sibirica, sive historia plantarum Sibiriae*), Carolus Clusius (*Rariorum plantarum historiae*), Jean Etienne Guèttard (*Observations sur les plantes*), Joachim Camerarius (*DE plantis epitome utilissima Petri Andreae Matthioli... aucta et locupletata a domino Io. Camerario*) Jacques Dalechamps (*Historia generalis plantarum*), John Ray (*Historiae plantarum tomus tertius, qui est supplementum duorum praecedentium y Synopsis methodica stirpium britannicarum*), Louis Feuillée (*Journal de observations... faites... sur les côtes orientales de l'Amérique meridionale*), Pehr Kalm (manuscript sheet), Thomas François Dalibard (*Florae parisiensis prodromus, ou catalogue des plantes qui naissent dans les environs de Paris*), Leonhart Fuchs (*De historia stirpium commentarii insignes*), Rembert Dodoens (*Stirpium historiae pemptades sex libri XXX, varie ab auctore...emendati*), David de Gorter (*Flora gelro-zutphanica*), Pierre Magnol (*Botanicum monspeliense*), Joachimb Burscher (*Hortus siccus Joannis Burseri*), Johann Christian Busxbaum (*Plantarum minus cognitarum centuria I, II, III*), Pierre Augustin Boissier de la Croix de Sauvages (*Methodus foliorum, seu plantae florae monspeliensis*), Matthias de l'Obel (*Plantarum seu stirpium icones*), Albert Haller (*Iter helveticum*), Jacques Barrelier (*Plantae per Galliam... observatae, iconibus aeneis exhibitae*), Joseph Pitton de Tournefort (*Corollarium institutionum rei herbariae*), Jacobus Theodorus aus Bergzabern (Tabernaemontanus) (*Neu vollkommen Kräuterbuch...jetz widerumb auff's neue übersehen*) and Fabio Colonna (*Minus cognitarum... stirpium*).