



## Studies in *Mespilus*, *Crataegus*, and $\times$ *Crataemespilus* (Rosaceae), II. The academic and folk taxonomy of the medlar, *Mespilus germanica*, and hawthorns, *Crataegus* (Rosaceae)

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### Abstract

This paper examines the relationship between *Mespilus* (medlar) and *Crataegus* (hawthorn) in both academic and folk taxonomy. Academic taxonomy since Linnaeus has mostly kept *Mespilus* and *Crataegus* distinct but not always for correct or adequate reasons. On the other hand, the study of folk-names, explored across 22 European and Near-Eastern modern languages, finds medlar always different from hawthorn, which, from such a large sample, underlines the cultural distinctness of medlar, and supports its taxonomic distinctness. Looking at the earliest recorded usage of the two generic names, in ancient Greece, the Greek names as found in Theophrastus have debatable applications, though this may be due to a corrupt text. The findings of the present paper thus lend support to those in a companion paper by the author clarifying the morphological distinction between the *Mespilus* and *Crataegus*, and arguing for the retention of a monotypic *Mespilus*, which distinction receives support from recent cladistic work.

**Key words:** academic history of *Mespilus*, hawthorn, medlar, *Mespilus* as folk-genus, *Mespilus* distinct from *Crataegus*, Rosaceae

### Introduction

Although there has been a significant majority usage among academic taxonomists in favor of recognizing two genera, a monotypic *Mespilus* and a species-rich *Crataegus*, a recent paper by Lo *et al.* (2007) rejected their distinctness and *Crataegus* was proposed for conservation against *Mespilus* by Talent *et al.* (2008), this subsequently accepted by the Nomenclature Committee for Vascular Plants (Brummitt 2011). However, I argue in a companion paper (Phipps 2016) that the weight of morphological and cladistic evidence favors the continued recognition of two genera. That paper reviews recent molecular studies all of which show *Mespilus* to be sister to *Crataegus*. It also clarifies and enhances the known differences between these genera. Briefly, *Mespilus* is distinguished by its large brown fruit, an adaptation to carnivore frugivory, its covered pyrenes, *Amelanchier*-like bracteoles, notched petals, and somewhat different resting buds. As well, its rare hybrids with *Crataegus*, all of which are seed-sterile, now all have a name in the nothogenus  $\times$ *Crataemespilus*.

The present paper looks at the generic delimitation problem from the perspective of Linnaean and post-Linnaean academic taxonomy, as well as from the experience of folk cultures as expressed in 22 European and Near-Eastern languages across the native region of medlar and that of its historic cultivation. With regard to treatments in academic taxonomy, attention is paid to the important character of covered pyrenes, first noticed by Medicus, as well as characters incorrectly posited by various botanists as discriminating. In the case of folk usage the linguistic evidence powerfully supports the view that *Mespilus* should be considered as a ‘folk-genus’, that is possessing a unique name that is well-established in the common culture across a great variety of ethnic and linguistic groups. Finally, the first recorded use of the names ‘mespile’ and ‘krataigos’, by Theophrastus in ancient Greece, the first botanical author, are examined to discover how they relate to later usage.

## Academic taxonomy

Although our generic and specific nomenclature dates back only to Linnaeus, much of it has earlier, even ancient, roots. Linnaeus's theory of classification commenced as an Aristotelian one in which species represented different manifestations of the generic essence but where the genus was the most fundamental category. This was clearly articulated in *Philosophia Botanica*: 'genus omne est naturale in primordio tale creatum' (Linnaeus 1751: 100). However, as it became clear to Linnaeus that two plants (a male and a female) or one plant (a hermaphrodite) must have originated each species, the species became a surrogate fundamental unit. Later still, observation of hybridization blurred this concept of species. In *Philosophia Botanica*, Linnaeus made clear his belief in a 'natural system'—a classification system that reflected the natural order and in which the major groupings were 'ordines naturales'. However, Linnaeus never worked up the whole Plant Kingdom in detail with natural orders of this kind. Instead, fascination with the sexuality of plants led him to introduce the practical 'Sexual System'. This system was initially adumbrated in *Systema Naturae* (Linnaeus 1735) but without binomial nomenclature, and the details were not filled in until the publication of *Species Plantarum* in 1753 with its full complement of Linnaean species, genera and natural orders. The 'Sexual System' was designed to facilitate identification of species by their possession of the requisite number of stamens and gynoecial parts and was avowedly both artificial and very practical. However, even in *Species Plantarum*, genera were not defined beyond what can be gleaned from the names of the classes to which they belonged. Instead, Linnaeus used *Genera Plantarum* (Linnaeus 1754) as his vehicle for defining genera. Linnaeus' generic names were derived from a medley of those of other recent authors, particularly Tournefort, from classical names, some of which represented folk-genera, as well as names coined by himself.

With the 'Sexual System' fully in place in *Species Plantarum*, one of Linnaeus' great achievements was displayed. Here was a world flora, ostensibly, with a practical system for identification that reflected Linnaeus' belief in the sexuality of plants, all combined with a fully binomial nomenclature. The tabulation of characters of the calyx (CAL), corolla (COR), androecium (STAM), gynoecium (PIST), fruit (PER), and seed (SEM) made comparisons between Linnaeus' genera straightforward and achieved instant popularity as an identification tool. *Species Plantarum* also eventually became the choice as the starting point for botanical nomenclature. Nevertheless, the formalistic nature of the 'Sexual System' made the resultant classification more or less artificial and was unattractive to those botanists who only valued natural systems.

In *Species Plantarum*, *Mespilus* was placed in the class 'Icosandria pentagynia' and had seven species, including six from five other maloid genera as later recognized. These were: *Mespilus germanica*, *M. pyracantha* (now *Pyracantha*), *M. arbutifolia* (now *Aronia*), *M. amelanchier* and *M. canadensis* (now *Amelanchier*), *M. cotoneaster* (now *Cotoneaster*), and *M. chamaemespilus* (now *Chamaemespilus*). On the other hand, Linnaeus' *Crataegus* was placed in the class 'Icosandria digynia', and contained ten species, six of which are still recognized as *Crataegus* (*C. oxyacantha*, *C. azarolus*, *C. tomentosa*, *C. viridis*, *C. crus-galli*, and *C. coccinea*). The other four species were *C. aria* and *C. suecica* (now *Aria*), *C. torminalis* (now *Torminaria*), and *C. indica* (now *Raphiolepis*). Linnaeus tolerated inconsistency in his genera as seen for example in his *Crataegus* where several species have more than two carpels or fewer than 20 stamens. Linnaeus' other maloid species were all placed in his *Sorbus* or *Pyrus*, both also broadly circumscribed, and do not influence the *Mespilus-Crataegus* issue.

With its considerable number of active participants, the practice of botanical classification in the later 18<sup>th</sup> century ranged between more or less artificial systems in which ease of use was paramount, and natural systems, those that gave precedence to grouping like with perceived like. Not only could these two approaches generate different results at the generic level (which concerns this paper) but differing approaches to natural systems could also do so, and the later 18<sup>th</sup> century plant taxonomy was in a state of dynamic flux. However, in spite of the issues created by different approaches to classification and the large number of new species, and potentially genera, being made known at this time, the stabilization of generic limits in the Maleae towards modern norms commenced very early. At first this process involved different authors separating particular components from Linnaeus's often amorphous genera; later, species requiring new genera were discovered.

In the case of Linnaeus's *Mespilus* the genus was at an early date brought to the monotypic state normally used thereafter by Medicus (1789) who retained *M. germanica* and transferred six species to other genera: *M. arbutifolia* (to *Aronia*), *M. amelanchier* and *M. canadensis* (to *Amelanchier*), *M. chamaemespilus* (to *Chamaemespilus*), *M. cotoneaster* (to *Cotoneaster*), and *M. pyracantha* (to *Crataegus*), thus treating these taxa in a very modern manner. After Medicus' pruning of Linnaeus' *Mespilus*, *Mespilus* accreted (and then lost) a few species later placed in other genera, e.g., *M. bengalensis* (*Eriobotrya*).

Medicus was particularly interested in fruit characters, and the maloid group of genera, less the core maloids (his ‘Mispelnfamilie’ in Medicus (1789: 155)), were considered by him under the wider heading ‘Steinfrüchte’, or ‘stone fruits’. Broadly, these were genera with fleshy fruits containing hard seeds or nutlets. Medicus was highly critical of Linnaeus as Stearn (2008) underlines, and in treating his ‘Mispelnfamilie’ he disputed Linnaeus’ understanding of berry, drupe, pome and nut (Medicus 1789: 162). With relatively minor exceptions Medicus’ generic taxonomy of the ‘Mispelnfamilie’ has survived over 240 years though there are some clear differences between ‘Philosophische Botanik’ (Medicus 1789) and the later ‘Geschichte der Botanik’ (Medicus 1793), principally in the treatment of *Pyrus* and *Malus* (united in 1789 and elaborately separated in 1793) and a group of genera including *Chamaemespilus* and *Torminaria* (kept separate in 1789 but united under *Hahnia* in 1793). Of particular note to this paper is the fact that Medicus was the first to recognize covered pyrenes fully sunken in the flesh of the fruit as a fundamental discriminator for *Mespilus* though this is articulated clearly only in ‘Geschichte der Botanik’ (Medicus 1793: 86, 88) where he speaks of fruit “closed at the top” and “flesh completely filling the spaces between the stones”.

Similarly, Linnaeus’ *Crataegus* was early pruned to close to its final form by various authors who removed elements of *Aria*, *Torminaria* and *Rhaphiolepis*, though not *C. pyracantha*. Medicus (1793: 83, 84) shared this restricted view of *Crataegus* and described the genus as having stone fruits open at the top. In addition, he placed it in a different supra-generic category from *Mespilus*. Further, Medicus’ comments on *Cotoneaster* (1793: 86) are illuminating; he said *Cotoneaster* would be a *Crataegus* except for a different habit and leaf structure, it having fruits open to the top and stones covered on the inside with a leather-like skin. The Medikian view of *Crataegus* was eventually terminated by Roemer (1847), who transferred *C. pyracantha* to *Pyracantha*. In carrying out his reorganization of maloid genera, Medicus recognized much smaller and more natural genera than Linnaeus and, as a consequence, was the nomenclatural author of *Amelanchier*, *Aronia*, *Chamaemespilus*, *Cotoneaster*, as well as recognizing as distinct in at least one of his works the genera *Cydonia*, *Malus*, *Pyrus*, *Sorbus*, and *Torminaria* of other authors.

After *Mespilus* (1789, initially) and *Crataegus* (1847, finally) attained their familiar circumscriptions, they were treated in this manner by most students of Maloideae. The addition of many further species to *Crataegus* during the nineteenth and early twentieth centuries had no further effect on its delimitation. Neither did the growth of maloid generic diversity which increased dramatically in this period, as summarized in Robertson *et al.* (1991). Talent *et al.* (2008) give a useful summary of the small minority of authors who differed from the customary two-genus delimitation. Most important are Focke (1888) and Wenzig (1883), who combined the two genera under *Mespilus*, and Kuntze (1891), who combined them under *Crataegus* contrary to the present-day rules of botanical nomenclature. The priority of *Mespilus* was early established by Scopoli (Art. 11.5 of ICN, McNeill *et al.* 2012) by virtue of his placing *Crataegus* species under synonymy of *Mespilus* in his *Flora Carniolica* (Scopoli 1760, 1772). The first edition of this work lacked, while the second edition used, Linnaean binomials.

In spite of the strong academic consensus for retaining *Crataegus* and *Mespilus* as separate genera during the long period 1847–2007, their formal morphological distinction could be inadequately perceived. I therefore provide several examples of this. Firstly, Lindley’s (1822) separation by fruit characters (‘*pomum apertum*’ for *Mespilus* and ‘*pomum clausum*’ for *Crataegus*) seems an unsatisfactory way of indicating their differences because, though defensible on literal grounds, the terms could just as easily be reversed with the correct meaning. Lindley’s ambiguity is also noted by Talent *et al.* (2008). On the other hand, Roemer (1847) utilized a complex, multi-character key to distinguish only with great difficulty *Mespilus* (including both *M. germanica* and *M. smithii* = *Crataemespilus* × *grandiflora*) from his 5-carpellary *Crataegus* sect. *Phaenopyrum*. Roemer did not use Medicus’ differentiating characters and relied on slight differences in anther shape, flower number per inflorescence, and persistence of bracteoles (there called ‘bracts’) for this purpose. Further, his generic diagnosis added nothing. Decaisne (1874) merely differentiated the two genera on flower number per inflorescence which fails due to the existence of *C. uniflora*. Rehder’s (1940) key separated the two genera by leaf margin characters, which does not work for certain species in *Crataegus* ser. *Lacrimatae*; also his generic descriptions offer no defining differences. Similarly, Hutchinson (1964), in his invaluable but unfinished *Genera Plantarum*, and who recognized virtually the same suite of maloid genera as Robertson *et al.* (1991), differentiated *Mespilus* and *Crataegus* only on leaf margin characteristics and armature (*Mespilus*-none), neither of which work. Finally, the Dickinson group (e.g., Lo *et al.* 2007; Talent *et al.* 2008) appear to regard the sole distinction between *Mespilus* and *Crataegus* as being Medicus’ criterion as to whether or not the pyrenes are covered by epidermis. They consider this as an insufficient, indeed trivial, generic distinction compared to the major differences between the *Amelanchier* and *Crataegus* clades.

There are various reasons for the failure to properly appreciate the distinctions between *Crataegus* and *Mespilus*. Basically, Medicus’ crucial diagnostic character for *Mespilus* was by many either ignored, unappreciated, or perhaps, not known, due to its having been published in German, at a time when Latin was more of a *lingua franca* to educated

persons. However, it never seems to have been formally contested except perhaps by Lindley (1822). This has led to the substitution of other presumed differentiators, such as number of flowers per inflorescence, number of stamens, flower size, as well as leaf margination. Thus, when considering number of flowers per inflorescence, the description of *C. uniflora* in 1770 has already been noted. A later problem involved the discovery of *C. triflora* and its description by Chapman in 1892, a species with large flowers, numerous stamens and unusual inflorescence positions. Neither species appears to have provoked critical thinking on the generic distinctions. Admittedly, the high stamen count of *C. triflora* (and the position of its inflorescence) were not spotted until the review of *C. ser. Bracteatae* and *Triflorae* (Phipps *et al.* 2006), though the large flower size had been noted earlier.

Examples of accurate separation of *Mespilus* after Medicus are relatively few. Koehne (1890), for instance, clearly separated *Mespilus* from *Crataegus*, not only by its uniflorous inflorescence (wrong), but, uniquely, by its lack of 'Vorhemd', for which there seems no English equivalent and which relates to part of the pyrene exposed in *Crataegus*, as well as the 'Discusbecher (glatt)', or smooth disc covering the pyrenes in fruit in *Mespilus*. The Russian *Crataegus* expert Pojarkova (1939), writing in the *Flora of the USSR*, the authors of which were required to produce comprehensive generic descriptions not limited to the species of their area, was also perceptive. If one combines her key with the text differentiators, she separated *Mespilus* by that genus having solitary flowers, flowers 5 cm diam., and 'nutlets entirely sunken in the pome'. Thus, Pojarkova accurately identified the key discriminator, even though the first two characteristics were accurate only if restricted to the limited range of *Crataegus* in the then Soviet Union (essentially *C. sect. Crataegus* and *C. sect. Sanguineae*) plus other species from the Eurasian area.

## Folk taxonomy

The relevance of vernacular names to this discussion inheres in the concept of 'folk-genera', groups of plants united by a particular vernacular name, and distinguished from other such groups by a different vernacular name. It is impossible to define a folk genus more closely but the concept is obviously embedded in language itself: the genus being represented by the noun or noun-phrase and different individual species being represented by an adjectival modifier of the generic name, which is also the source of our formal naming system. The significance of a particular folk-genus is obviously enhanced if different linguistic groups independently create the same folk-genus. Also, if a folk-genus matches one in formal taxonomy this, too, enhances its stature. Bartlett's (1940) provocative paper showed that many southeastern Asian folk-genera corresponded well to the genera created by taxonomic botanists. Indeed, folk-genera can be observed clearly in our vernacular names for familiar north-temperate genera such as oak, ash, chestnut, hellebore, columbine, and many others. At first blush, therefore, folk genera deserve the taxonomist's attention. Even so, caution must be exercised when using the concept of 'folk-genus' in support of a taxonomic position, as there is obviously a range from a strongly supported folk-genus to a very weakly supported or dubious folk-genus. This paper will show that it is difficult to imagine medlar being more strongly supported as a folk-genus than is shown here.

### *Folk names of the present*

In order to discover the extent to which vernacular names for medlar and hawthorn might justify the use of the term 'folk-genus', their names were collected for 22 modern European and Near-Eastern languages (see Tab. 1) that cover the natural and cultivated range of medlar. For reasons of space, Tab. 1 only gives the most commonly used variant(s); for more names see the cited references. The sources for vernacular names vary considerably in detail, some providing many alternative names and variant spellings, while others may provide only a standard form with few, if any, variants. Thus, for Spain, the website Anthos (1999) not only provides different regional and local names but also a large number of spelling variants. There, *Mespilus germanica* has 133 different names that are variants of 'nispero' or 'mispolo' as well as seven quite different names, while *Crataegus azarolus* has 55 names cognate with the specific epithet and 14 variants of seven other names. Considerable numbers of variants were also provided by correspondents for Ukraine, German-speaking lands, Romania, and Turkey (see Acknowledgments). In all countries there has been a dying out of local names and the adoption of a few favored names by floristic workers as is illustrated, for instance, by the limited value for our purposes of most academic floristic works as well as English-other language dictionaries. Thus, even in countries for which few names were discovered (which would be from dictionary sources only), it may be reasonably assumed that if these are countries in which medlar and hawthorns are widespread, and especially if there are numerous species, many alternative names and variant spellings probably still exist or have recently existed.

Critical examination of the large numbers of names recorded from the 22 languages selected reveal not a single counter-example to the observation that medlar is always distinguished from hawthorn in folk taxonomy. Therefore, medlar (*Mespilus*), throughout the region of its historic occurrence, may be regarded as a ‘folk-genus’ in the strongest sense of the term.

**TABLE 1.** Main vernacular names for *Mespilus* (medlar) and *Crataegus* (hawthorn) in 22 modern languages. Note that in many cases far more local variants occur than there is space for. For discussion and further examples see text.

LANGUAGE/ LANGUAGE GROUP	MEDLAR	HAWTHORN, generic	HAWTHORN, azarole	HAWTHORN, others
<b>Latin and Greek</b>				
Latin (botanical)	<i>Mespilus</i> <sup>4</sup>	<i>Crataegus</i>	<i>C. azarolus</i>	
Greek (modern) <sup>2</sup>	mespilιά (μεσπιλιά), ousmouliá, (ουσμouλιά) -rarer *mousmouliá, μουσμouλιά)	trichoukia (τρικουκιά); mourtzia (μουρτζιά); leukagathi λευκάγκαθα ( <i>C. monogyna</i> ).	koudoumaelia (κουδομηλιά)	trichoukia (τρικουκιά) = <i>C.</i> <i>heldreichii</i> ; mlerkia (μπερκιά) = <i>C.</i> <i>pycnoloba</i> ; trichoukia (τρικουκιά); mourtzeia (μουρτζιά); moumoutzaelia (μουμουτζελιά) = <i>C. monogyna</i>
<b>Romance</b>				
Catalan <sup>3</sup>	nespler <sup>4</sup>	arç	atzeroler	
French	néslier <sup>4</sup>	aubépine	azarole	
Old French	medlar <sup>4</sup> , variant of mesle <sup>4</sup>			
Italian	nespolo <sup>4</sup>	biancospino	azzarolo	
Romanian <sup>1</sup>	moșmon, nuspu <sup>4</sup>	gherghin, păducel		
Spanish <sup>3</sup>	nispero <sup>4</sup>	espino, majuelo, majoleto	acerolo	
<b>Slavic</b>				
Bulgarian	mushmula (мушмула)	†hloh, hlohina (глог, глогина)		
Czech	mišpule <sup>4</sup> , nyšpule <sup>4</sup>	†hloh		
Polish	niesplik <sup>4</sup> , nieszpułka <sup>4</sup> , myszpuła <sup>4</sup>	†głóg		
Russian	mushmula (мушмула)	boyaryshnik (боярышник) boyarka (боярка), hlod (глюд), barinya (барыня), gluditsa (глубица), glog (глог), talono (талоно)		
Serbian	mushmula мџшмула)	†hloh (глог)		
Slovak	mišpula <sup>4</sup>	†hloh		
Ukrainian	mushmula (мушмула), chyshka (чишка), chyshkun (чешкун)	†hlid (глід) plus many folk names		60 folk names for <i>C. monogyna</i> (per V. Mezhenyskyi)
<b>Teutonic</b>				
English	medlar <sup>4</sup>	hawthorn	azarole	
German	mispel <sup>4</sup> , 14 others	weissdorn, hagdorn <sup>5</sup>	---	
<b>Other</b>				
Armenian	gowakan (գոյակաւն)	sgeni, alocheni (սղենի)		
Farsi (Persian)	ezgil	zalzalek		
Georgian	zghmartli	kuneli		
Hungarian	naspolya <sup>4</sup>	galagonya		
Kurdish	guhij	giviij		
Turkish	beşbiyik, muşmula <sup>6</sup>	alıç		

\*in modern Greek, loquat, *Eriobotrya japonica*

<sup>1</sup> for many more see Borza (1968)

<sup>2</sup> see also Arambatzis (1998)

<sup>3</sup> for hundreds more see Anthos (1999)

<sup>4</sup> derived from Greek ‘mespile’

<sup>5</sup> in Austria five others

<sup>6</sup> plus five more

† derived from the Indo-European word “glōgh”-“thorn” (Rodzevych 1989).

### *Distribution of different vernacular names for medlar and hawthorn*

The generic name *Mespilus* is cognate with ‘mispel’ (German), ‘neslier’ (French), ‘nespolo’ (Italian), etc., and mespile (μεσπίλη, classical Greek), which illustrates the wide geographical currency of the word. However, according to Bazos (see Acknowledgments), the modern Greek vernacular for medlar is ‘ousmoulia’ (ουσμουλιά), whereas it is ‘mespilia’ (μεσπιλιά) in formal modern Greek. The ‘ousmoulia’ form of the word makes its first appearance in Greek before the modern period, as ‘mousmoulo’, being recorded in Kriaras’ dictionary of demotic Greek from 1100 to 1669 and it is intriguing that ‘mousmoulia’ (μουσμουλιά) is now applied to the loquat, *Eriobotrya japonica*, this species being native to eastern Asia. It is also worth noting that the standard Russian, Ukrainian and Greek names for medlar, i.e. moushmula and its variants, are held to be Ottoman in origin (Rodzevych 1989) and perhaps that ‘mousmoulo’, according to Rodzevych (1989), is also cognate with *Mespilus*. On the other hand, the normal Turkish word for medlar is ‘beşbiyik’, meaning ‘five moustaches’ (i.e., the sepals) rather than the rare ‘muşmula’ (Dönmez, pers. comm.). Of course, Hundarsarsch (Ger.), openarse (Engl.), beşbiyik (Turk.), etc., represent quite different and very graphic epithets for medlar and illustrate the diversity of folk names for so remarkable a plant. None of the above vernacular names is used for any species of hawthorn. Baird & Thieret (1989) elaborate the long history of medlar as an edible fruit which further consolidates its position as a folk-genus.

Vernacular names for hawthorn may be generic, e.g., ‘hawthorn’, or ‘biancospino’ (Ital.), or they may refer to a given species, e.g., *Crataegus azarolus* (azarole, Fr.). Even though numerous names are also known for hawthorns in the languages considered, in only one case is any the same as a vernacular for medlar (Table 1). This is the azarole or ‘Naples Medlar’ and it appears to be an invented name for British use, rather than a true vernacular. It is interesting that one widespread vernacular name for *Crataegus*, ‘white-thorn’, exists in quite unrelated languages, e.g., weissdorn (Ger.), biancospino (It., etc.), although in English ‘whitethorn’ is *Prunus spinosa*. ‘Haw’ in ‘hawthorn’ is cognate with OE ‘hag’, meaning ‘hedge’ which is still found in Ger. ‘hagdorn’. Classical Latin used *saepes* (f. pl.) for hedge, which in northern Italy would have included *Crataegus monogyna*.

The vernaculars reported above are those for west Eurasian species only and that evidence therefore supports, in the first instance, not a distinction between *Mespilus germanica* and *Crataegus* as a whole, but between *Mespilus germanica* and *Crataegus* sect. *Crataegus*. With regard to the considerable North American radiation of *Crataegus*, with its admixture of lobeless, narrow-leaved hawthorns and species with pinnate leaf lobing, the vernacular English language names are always ‘hawthorn’, ‘haw’, and ‘thorn-apple’, perhaps with a modifier. While many names have been coined for educated use, only a few, these for very distinctive kinds such as ‘mayhaw’ (all *C. ser. Aestivales*) and ‘blueberry haw’ (*C. brachyacantha*), have popular usage. North America has thus produced little variation in English language vernacular names for hawthorn in spite of their great visible diversity, perhaps because of the relatively short time post-settlement but also due to their perceived minimal utility in the rural community. The North American hawthorns most superficially similar to medlar are the lobeless, narrow-leaved species, of which *C. punctata*, *C. crus-galli*, and *C. opaca* stand as good examples. However, none of these is called ‘medlar’ nor any novel name that distinguishes them from the pinnately-lobed species. This supports the idea that folk cultures, although they may recognize medlars in western Eurasia by leaf form, perceive the fruiting characteristics as definitive. As with the large anglophone North American region, Quebec continues the use of old-world French vernaculars as do new world Hispanic nations with the Spanish ‘espino’, though in Mexico-Guatemala the indigenous ‘tejocote’ is commonly used. Similar considerations seem equally applicable to the eastern Asian diversification of *Crataegus*, mainly in China, where, however, only one species has narrow, lobeless leaves.

### *Etymologies of Mespilus and Crataegus*

Botanical Latin ‘*Mespilus*’ is cognate with classical Latin ‘mispila’ which is the medlar. It is also clear that Latin *mespilus* is cognate with classical Greek ‘mespile’ (μεσπίλη). The word is perhaps derived from Greek mesos, half, and pilos, felt or ball, possibly alluding to shape of medlar fruit resembling half a ‘ball’, following George Don’s suggestion (Don 1832: 604), who anachronistically used ‘bullet’ instead of ‘ball’. Still, standard Greek lexicons, e.g., Liddell & Scott (1897) and its many later editions, provide no derivation. ‘Mespile’ (Μεσπίλη) makes its first appearance in Theophrastus, Enquiry into Plants, Book III\* according to Baird & Thieret (1989). However, its meaning there was, in part, ambiguous, as discussed below. ‘Mespilon’ (μέσπιλον) is a rare variant specifically alluding to the medlar fruit.

\* I have used the so-called Loeb edition of Theophrastus’s ‘Enquiry into Plants’, referred to here as Theophrastus (1916). This represents the first translation of Theophrastus into English, by Arthur Hort. Positions in the Greek text are indicated in the standard manner, e.g., III.xii.5. The Loeb edition constitutes part of an extensive series, initiated by James Loeb, of works by both Greek and Latin authors from the classical period with English translation on opposing pages. Collectively these works lack the level of critical comment of more scholarly editions and are intended for those who need to know the material and may not have the linguistic knowledge, or need, for that matter, to deal with deeper analysis. The relatively little critical comment is all in footnotes. The Loeb edition of Theophrastus, however is distinguished by having plant identifications by Wm. Thistleton-Dyer, then emeritus Director of Kew.

'*Crataegus*' is usually derived from Greek 'κράταιγος' (krataigos) probably via 'κράτος' (kratos), with a classical meaning of 'strength' or 'hardness', usually ascribed to qualities of hawthorn wood. However, Quattrocchi (2012) provides a more detailed etymology by combining the Greek *kratos*, strength, with the root *akis*, sharp tip, alluding to hard or strong thorns. 'Κράταιγος' is also first found in Theophrastus' 'Enquiry into Plants' where Thistleton-Dyer (Theophrastus 1916) surprisingly equates it to *C. heldreichii*.

#### *Theophrastus' usages of 'mespile' and 'krataigos'*

Descriptive materials for the words 'mespile' and 'krataigos' were first provided by Theophrastus (1916). In 'Enquiry into Plants' Theophrastus recognized three different kinds of mespile by use of colloquial and non-parallel, descriptive information (Tab. 2). The three kinds were "as distinguished by the people of Mt. Ida" (Theophrastus, III.xii.5), and comprised 'μεσπίλη ἢ ἀνθηδών' (mespile e anhedon), 'μεσπίλη ἢ ἀνθηδονοειδής' (mespile e anhedonoeides), and 'μεσπίλη ἢ σατάνειος' (mespile e sataneios). The first two (by elimination, since Theophrastus's grammatical sense could mean 'all') have 'celery-like' leaves, which suggests, reasonably enough, that they could be *Crataegus*. On the other hand 'mespile e sataneios' is described as having fruit that is larger, paler, more spongy, with softer stones, keeping less well than the others, and with leaves like a bird-cherry (III.xiii.1). These represent good reasons why Thistleton-Dyer equated 'mespile e sataneios' with *Mespilus*. Confusingly, however, 'κράταιγος' (krataigos) is also said by Theophrastus (III.xiii.6) to have a smooth leaf, like the sataneios, but without its jagged edge, and he suggests that it might be the wild form of the type. A further difficulty is posed by the fact that while the leaves of *Mespilus germanica* may be finely serrate, by no means could they be called 'jagged' as said by Theophrastus. Thus, with a literal reading of Theophrastus, 'krataigos' appears to mean medlar. The footnotes on p. 238 of Theophrastus (1916) suggest a corrupt text with missing elements as an explanation for inconsistencies.

**TABLE 2.** Vernacular names for medlar (*Mespilus germanica*) and different hawthorns (*Crataegus* spp.) in classical languages.

LANGUAGE	MEDLAR	HAWTHORN (general)	HAWTHORN (azarole)	HAWTHORN (others)
Latin (botanical)	<i>Mespilus</i>	<i>Crataegus</i>	<i>C. azarolus</i>	
Latin (classical)	mespila (fruit), mespilum (tree)	no records located		
Greek (classical)	mespile (μεσπίλη) = fruit; mespilon (μεσπίλον) = tree*; mespile e sataneios (μεσπίλη ἢ σατάνειος)-Theophrastus, IIIxii5; krataigos (κράταιγος)*	mespile-Theophrastus, IIIxii5	mespilon (Dioscorides)	mespile e anhedon† = <i>C. orientalis</i> ; mespile e anhedonoeides† = <i>C. oxyacantha</i>

\*but see discussion about Theophrastus (1916)

†in Theophrastus (1916)

Attempts to rationalize the difficulties in Theophrastus require careful consideration. We start with the simplest question-that of location. There were two Mt. Idas in the ancient Hellenic region (Thanos 2003). One was in Crete, its highest mountain, today called 'Psiloritis', and the other was in modern Turkey, today called 'Kazdağı', on the border of Çanakkale and Balıkesir provinces in northwestern Anatolia. For Crete the European *Crataegus* authority Christensen (1994) records only *Crataegus monogyna* (in two varieties), and *C. azarolus* var. *aronia* (Tab. 3), both quite commonly, and I have encountered no floristic record of *Mespilus* for that island. Similarly, the distribution information given by Browicz (1972) for the Turkish provinces of Çanakkale and Balıkesir adjacent to Lesbos yields only *C. orientalis*, *C. monogyna* (as *C. stevenii*) and no *Mespilus*. Lacking clinching biogeographical data I sought the advice of the Turkish *Crataegus* expert Ali Dönmez who told me that the provinces of Çanakkale and Balıkesir had a mixture of more mesic and drier habitats and that he had collected there *C. monogyna*, *C. rhipidophylla*, *C. azarolus* var. *aronia*, *C. orientalis*, and *C. pentagyna* (Tab. 3). However, he had not seen *Mespilus* there but believes the area is very suitable for it. This region of Çanakkale and Balıkesir, containing the site of historic Troy, is generally more mesic than the Mt. Ida of Crete, and clearly has the greater variety of *Crataegus* (Tab. 3). Also, it is noteworthy that Theophrastus was born on the eastern Aegean island of Lesbos, very close to Kazdağı, and lived there later in his life, so on these grounds collectively the Anatolian Kazdağı is by far the most likely 'Mt. Ida' of Theophrastus. The choice of Theophrastus' Mt. Ida being in modern Anatolia proves to be fully in line with Thanos' (2003) complete listing of Theophrastus' woody plants for Mt. Ida.

**TABLE 3.** *Crataegus* and *Mespilus* in the Hellenic area.

SPECIES	TAXONOMIC GROUP*	GEOGRAPHICAL REGION					
		North and Central Greece	Thrace	Peloponnese	Aegean	Crete	Çanakkale and Balıkesir †
<i>C. monogyna</i>	1a	w	w	w	r	w	P
<i>C. rhipidophylla</i>	1a	m	r	r	-	-	P
<i>C. azarolus</i>	1b	-	-	-	r (east)	w	P
<i>C. orientalis</i>	1b	w	-	w	r (east)	-	P
<i>C. heldreichii</i>	1b	w	r	w	r (west)	-	-
<i>C. pycnoloba</i>	1c	-	-	w	-	-	-
<i>C. pentagyna</i>	1d	-	r	-	-	-	P
<i>M. germanica</i>	2	r	r	-	-	-	prob.

\*Taxonomic groups are *C. ser. Crataegus* (1a), *C. ser. Orientales* (1b), *C. ser. Tanacetifoliae* (1c), *C. ser. Pentagynae* (1d), *Mespilus* (2). Frequency is: w = widespread; m = moderately common; r = rare; P = present; - = absent. † Mt. Ida (Kazdaği) area in northwestern Anatolia, Turkey (Dönmez, pers. comm.).

The second problematic issue concerns the identification of the Mt. Ida ‘mespilē’ and ‘krataigos’ given in Theophrastus (III.xii.5; III.xiii.6). Book III concerns ‘of wild trees’ where the plants called ‘mespilē’ are discussed together with those having edible fruit, such as Cornelian cherry (*Cornus mas*). The two hawthorns were equated by Thistleton-Dyer with *Crataegus orientalis* (mespilē e anthedon) and *C. ‘oxyacantha’* (mespilē e anthedonoeides). *Crataegus oxyacantha* is now a *nomen rejiciendum* and is replaced by *C. rhipidophylla*. Both species are widespread in mainland Greece (not Crete) and Anatolia. It is not possible to know how Thistleton-Dyer arrived at his decisions in view of the lack of explanation in the introduction to the Loeb edition. Suffice it to say they are entirely plausible and the Greek words ‘anthedon’ and ‘anthedonoeides’ certainly suggest similar species. Perhaps, instead, if edibility of fruit were a paramount consideration to Theophrastus, they may have been two species of *C. ser. Orientales*, e.g., *C. azarolus* and *C. orientalis*, the former still a minor fruit in the Mediterranean region. On the other hand, with regard to ‘krataigos’, one cannot accept Thistleton-Dyer’s equating it to *C. heldreichii* Boiss. in view of the restriction of that species to the Greek peninsula (Tab. 3) and consequent absence from Anatolia (Browicz 1972; Christensen 1994). In addition there is the difficulty caused by Theophrastus’ explicitly equating ‘krataigos’ to medlar (III.xiii.6) even while he states that the leaves of the two kinds of medlar are so different-see above. Consequently, unless a different source text emerges that clarifies this issue, Theophrastus’ precise views cannot be ascertained. Pliny’s first century *Naturalis Historia* (Pliny 1968) offers on ‘mespilē’ no more than a précis of Theophrastus. Thus, the true origins of the word appear to be lost in time.

Theophrastus gives us a glimpse into the folk-taxonomy of the day, and in contrast to modern academic and vernacular usage, some of his terms for hawthorns and medlar appear very similar. It is possible, of course, that Theophrastus was confused and perhaps, as the introduction to the Loeb edition suggests, he didn’t see all the hawthorns and medlars of Mt. Ida. More likely though, the received Greek text is corrupt, which is the simplest interpretation of its contradictions. Thus, whether a word cognate with ‘mespilē’ referred originally to a medlar, a hawthorn, or to some other woody plant, is unknown. Rather, what is clear is that at some point in the classical period the word ‘mespilē’ became firmly affixed to *Mespilus germanica* and not to a species of *Crataegus*.

This survey of vernacular names shows unequivocally that, in its historic area of native and cultivated distribution, and, except for the confusion in Theophrastus, medlar is always regarded, in 22 European and Near-Eastern languages, as distinct from hawthorn, and, as such, is an authentic folk genus that receives virtually perfectly support from vernacular nomenclature.

### Folklore

Dealing in detail with the attitudes of rural peoples to *Mespilus* and *Crataegus* as shown by folklore, and through the same region as the linguistic analysis, would be a task far beyond the possibilities of this paper. Nevertheless, one may assume that the vernacular names themselves represent a subset of folkloric influence and thus I reference only Rolland (1903) for France and Vickery (1995) for the British Isles to indicate quite different treatments by folk cultures for the two genera. A few characteristic examples of these are given in Phipps *et al.* (2003).

## Conclusions

With regard to academic taxonomy, Medicus split Linnaeus' artificial *Mespilus* into its component parts, in the process making *Mespilus* monospecific, and most subsequent authors followed this. Particularly noteworthy is the fact that Medicus was the first to recognize covered pyrenes as a discriminator for *Mespilus*. Linnaeus' *Crataegus* was treated along the same lines, partly by Miller, but retained a larger core of species, plus *Pyracantha*. *Crataegus* reached its current circumscription only after the removal of *Pyracantha* by Roemer in 1847. This sense of *Mespilus* and *Crataegus* was retained by nearly all later authors except for a handful who combined them. Nevertheless, in spite of the majority of academic taxonomists treating *Mespilus* as distinct from *Crataegus*, not many appeared to have grasped the crucial differences between the two.

The folk taxonomy of *Mespilus* and *Crataegus* was studied by compiling the vernacular names used across 22 languages taken from the relevant area of sympatry of the two genera which is basically the southern part of western Eurasia. The etymological evidence overwhelmingly demonstrates that the folk cultures of western Eurasia always distinguish *Mespilus* from *Crataegus*. If extraterritorial *Crataegi* were included it is hard to imagine another conclusion, because the basic distinctions are not altered. Thus the retention today of *Mespilus* as a distinct genus speaks not only to its taxonomic distinctness but to its cultural uniqueness. The word 'mespile' can be traced back to Theophrastus in the fourth century B.C. where it is applied to both hawthorns and medlar. The situation is the same for 'krataigos'. There is so much confusion in Theophrastus with regard to *Mespilus* and *Crataegus*, however, that either he had inadequate first-hand knowledge or the received text is corrupt. Aside from this, the application of names for medlar and hawthorns rapidly diverged (if it was ever truly the same).

Thus the considerable majority opinion of academic taxonomy has considered *Mespilus* distinct, while folk-taxonomy does so overwhelmingly (*nem. con.*, in fact) and both these findings are in conformity with a monotypic *Mespilus* as elaborated in a companion paper (Phipps 2016). The current paper is itself not decisive for academic taxonomy, nor is it meant to be. However, in offering a wide-ranging analysis of the linguistic evidence for the folk view that medlar is distinct this paper provides further information that is not only compatible with that of Phipps (2016), but supportive of the companion paper.

## Acknowledgments

Dr. Volodymyr Mezhenkyj, Kiev, Ukraine, is thanked for detailed information on the vernacular names of medlar and hawthorn in all Slavic languages. Mr. Johannes Rabensteiner, Austria, did so for German-speaking Central Europe. Dr. Ali Dönmez, Ankara, Turkey, is thanked for similar information for Turkey, the Caucasian region, and Iran-Kurdistan, and freely provided data on Turkish hawthorn distribution. Dr. R. Morales, Jardín Real, Madrid, pointed me to the Anthos website for vernacular names used in Spain. Dr. Marisa Vidali, Trieste University, provided vernacular names for Italy, as did Dr. Janos Podani, L. Eötvös University, Budapest, for Hungary, Dr. Iannis Bazos, National and Kapodistrian University of Athens, for Greece, and Researcher Roxana Ion, Taxonomy and Nature Conservation Institute of Biology of the Romanian Academy, Bucharest, for Romania. I am also indebted to my friend, Antony Littlewood, Dept. of Classical Studies, University of Western Ontario for his erudite comments on Latin and Greek names and discussions on Theophrastus. Finally, Dr. Alexander Sennikov, with his suggestions of additional Russian vernacular names, references, and meticulous editing, was of great help in polishing the final version.

## References

- Anthos (1999) *Information System of the plants of Spain*. Real Jardín Botánico, CSIC-Fundación Biodiversidad. Available from: <http://www.anthos.es> (accessed 1 January 2015)
- Arambatzis, T.I. (1998) *Shrubs and trees in Greece*, vol. 1. Ecological Movement of Drama, Technological Educational Institution of Kavala, Drama, 292 pp. [in Greek]
- Borza, A. (1968) *Dicționar etnobotanic, cuprinzând denumirile populare românești și în alte limbi ale plantelor din România*. Editura Academiei Republicii Populare România, 320 pp. [in Romanian]
- Baird, J. & Thieret, J. (1989) The medlar (*Mespilus germanica*, Rosaceae) from antiquity to obscurity. *Economic Botany* 43: 328–372. <http://dx.doi.org/10.1007/BF02858732>

- Bartlett, H.H. (1940) The concept of genus. *Bulletin of the Torrey Botanical Club* 67: 349–369.  
<http://dx.doi.org/10.2307/2481068>
- Browicz, K. (1972) *Mespilus* L., *Crataegus* L. In: Davis, P.H. (Ed.) *Flora of Turkey and the East Aegean Islands*, vol. 4. Edinburgh University Press, Edinburgh, pp. 128–129, 133–147.
- Brummitt, R.K. (2011) Report of the Nomenclature Committee for Vascular Plants: 62. *Taxon* 60: 226–232.
- Christensen, K.I. (1994) *Crataegus* (Rosaceae) in the Balkan Peninsula. *Annales Musei Goulandris* 9: 39–90.
- Decaisne, M.J. (1874) Mémoires sur la famille des Pomacées. *Nouvelles Archives de la Musée Nationale d'Histoire Naturelle* 10: 113–192.
- Don, G. (1832) *A general system of gardening and botany*, vol. 2. J.G. and F. Rivington, London, 875 pp.
- Focke, W.O. (1894) *Mespilus*. In: Engler, A. & Prantl, K.A. (Eds.) *Die natürliche Pflanzenfamilien*, vol. 3(3). W. Engelmann, Leipzig, pp. 26–27.
- Hutchinson, J. (1964) *Genera Plantarum*, vol. 2. Clarendon Press, Oxford, 659 pp.
- Koehne, B.A.E. (1890) *Die Gattungen der Pomaceen*. Gaertner, Berlin, 33 pp.
- Kuntze, C.E.O. (1891) *Revisio Generum Plantarum*, vol. 1. A. Felix, Leipzig, 374 pp.
- Liddell, H.G. & Scott, R. (1897) *A Greek-English lexicon*, 8th ed. Clarendon Press, Oxford, 1776 pp.
- Liddell, H.G. & Scott, R. (1940) *A Greek-English lexicon*, new 9<sup>th</sup> ed. (revised by Jones, H.S. & McKenzie, R.). Clarendon Press, Oxford, with suppl. revised by cooperation of many scholars, 2111 pp.
- Lindley, J. (1822) Observations on the natural group of plants called Pomaceae. *Transactions of the Linnaean Society of London* 13: 88–106.  
<http://dx.doi.org/10.1111/j.1095-8339.1821.tb00058.x>
- Linnaeus, C. (1735) *Systema Naturae*. L. Salvius, Stockholm, 14 pp.
- Linnaeus, C. (1751) *Philosophia Botanica*. L. Salvius, Stockholm.
- Linnaeus, C. (1753) *Species Plantarum*. L. Salvius, Stockholm, 1200 pp.
- Linnaeus, C. (1754) *Genera Plantarum*, ed. 5. L. Salvius, Stockholm, 521 pp.
- Lo, E.E.Y., Stefanovic, S. & Dickinson, T.A. (2007) Molecular reappraisal of the relationship between *Crataegus* and *Mespilus* (Rosaceae, Pyreae)-Two genera or one? *Systematic Botany* 32: 596–616.  
<http://dx.doi.org/10.1600/036364407782250562>
- McNeill, J., Barrie, F.R., Buck, W.R., Demoulin, V., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Marhold, K., Prado, J., Prud'homme van Reine, W.F., Smith, G.F. & Wiersema, J.H. (2012) *International Code of Nomenclature for algae, fungi, and plants (Melbourne Code)*. Königstein, Koeltz Scientific Books, 208 pp. [Regnum Vegetabile 154]
- Medicus, F.C. (1789) *Philosophische Botanik*, vol. 1. In der neuen Hof- und Akademischen Buchhandlung, Mannheim, 266 pp.
- Medicus, F.C. (1793) *Geschichte der Botanik unserer Zeiten*. Schwan und Götz, Mannheim, 96 pp.
- Phipps, J.B. (2016) Studies in *Mespilus*, *Crataegus*, and  $\times$ *Crataemespilus* (Rosaceae), I. Differentiation of *Mespilus* and *Crataegus*, expansion of  $\times$ *Crataemespilus*, and comments on some inflorescence differences between the *Crataegus* and *Amelanchier* clades. *Phytotaxa* 260 (1): 25–35.  
<http://dx.doi.org/10.11646/phytotaxa.260.1.3>
- Phipps, J.B., O'Kennon, R.J. & Lance, R. (2003) *Hawthorns and Medlars*. Timber Press, Portland, OR, 139 pp.
- Pliny (1968) *Naturalis Historia*, Loeb edition. H. Rackham translation, vol. 4. Heinemann, London.
- Pojarkova, A.I. (1939) *Mespilus* and *Crataegus*. In: Juzepczuk, S.V. (Ed.) *Flora of the USSR*, vol. 9. Academy of Sciences of the USSR, Moscow & Leningrad, pp. 414–468, 498–510. [In Russian]
- Quattrocchi, U. (2012) *World dictionary of medicinal and poisonous plants*, vol. 2. CRC Press, 4013 pp.  
<http://dx.doi.org/10.1201/b16504>
- Rehder, A. (1940) *Manual of Cultivated Trees and Shrubs*, ed. 2. MacMillan, New York, 996 pp.
- Robertson, K.R., Phipps, J.B., Rohrer, J.R. & Smith, P.G. (1991) A synopsis of genera in Maloideae (Rosaceae). *Systematic Botany* 16: 376–394.  
<http://dx.doi.org/10.2307/2419287>
- Rodzevych, N.S. (1989) *Medlar*. In: Melnychuk, O.S. (Ed.) *An Etymological Dictionary of Ukrainian Language*, vol. 3. Naukova Dumka, Kyiv, 545 pp.
- Roemer, M.J. (1847) *Familiarum naturalium regni vegetabilis synopses monographicae*, vol. 3. Landes-Industrie-Comptoir, Weimar, 249 pp.
- Rolland, E. (1903) *Flore Populaire*, vol. 4. Librairie F. Staude, Paris, 282 pp.
- Scopoli, J.A. (1760) *Flora Carniolica*, ed. 1. J.T. Trattner, Vienna, 607 pp.
- Scopoli, J.A. (1772) *Flora Carniolica*, ed. 2, vol.1. J.P. Krauss, Vienna, 448 pp.
- Stearn, W.T. (2008) Medicus, Friedrich Casimir. In: Gillespie, C.C., Holmes, F.L. & Koertge, N. (Eds.) *Complete Dictionary of Scientific*

- Biography*. Charles Scribner's Sons, Detroit. (Encyclopedia. com).
- Talent, N., Eckenwalder, J.E., Lo, E., Christensen, K.I. & Dickinson, T.A. (2008) Proposal to conserve the names *Crataegus* L. against *Mespilus* L. (Rosaceae). *Taxon* 57: 1007–1008.
- Thanos, C.A. (2003) Mt Ida in Mythology and Classical Antiquity—a Plant Scientist's Approach. In: *Proceedings, 1<sup>st</sup> National Symposium on the past, present and future of the Kazdağları Mountains*. Ankara, pp. 87–102.
- Theophrastus (1916) *Enquiry into plants*. Loeb edition. 2 vols. Transl. Arthur Hort.
- Vickery, R.A. (1995) *A dictionary of plant lore*. O.U.P., Oxford, 458 pp.
- Wenzig, T. (1883) Die Pomaceen. Charaktere der Gattungen und Arten. *Jahrbuch des Königlichen Botanischen Gartens, Berlin* 2: 287–387.