

# Famiose peatlands and ungulate hoof diseases: on the meaning of a word from ‘On the meaning of words’ (Festus, 2<sup>nd</sup> century CE; Paulus Diaconus, 8<sup>th</sup> century CE)

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## SUMMARY

The dictionary ‘On the meaning of words’ was written by the Roman grammarian Marcus Verrius Flaccus (ca. 55 BCE – 20 CE) but has not been preserved. A summary (“epitome”) by Sextus Pompeius Festus (2<sup>nd</sup> century CE), which did survive in a heavily damaged state, was in turn further epitomised by Paul the Deacon (Paulus Diaconus, 8<sup>th</sup> century CE). The work contains the intriguing peatland related phrase “famiosam terram palustrem vocabant” (‘they called marshy soils famiose’). The meaning of “famiosus” has been lost, and no other texts are known that contain the word. Grammatically, “famiosus” originates from the noun “famex” that denotes a collection of swellings of ungulate hooves. In moist and wet settings hooves tend to soften - which was well known by ancient Romans - and become prone to bacterial infections. Especially *Fusobacterium necrophorum*, which occurs under anaerobic conditions in wet/moist locations, causes hoof and claw diseases like interdigital dermatitis (sheep), thrush (horses) or bush rot (pigs). In combination with other bacteria like *Dichelobacter nodosus* or *Treponema* spp. even more severe hoof diseases like scald, foot rot or contagious digital dermatitis may occur (ovine/bovine). It is likely that the Romans called mires and marshes “famiose” because animals frequently developed infectious hoof diseases in these landscapes.

**KEY WORDS:** ancient Roman society, Latin linguistics/philology, peatland terminology, peatland use, veterinary science

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## INTRODUCTION

Understanding the meaning of words and using them with their correct intention is perhaps the most important requirement for effective communication. To avoid misunderstanding, all communicating persons should have a common notion of the meaning of the words that they use (cf. Joosten & De Klerk 2002, Joosten *et al.* 2017a). Building on the work of Greek scholars, in ancient Roman times books were written that aimed to explain the meaning of words and to clarify their background and context.

Verrius Flaccus (ca. 55 BCE – 20 CE) wrote the first roughly alphabetic Latin dictionary named “De verborum significatu” (‘On the meaning of words’) but, unfortunately, the work has not been preserved (apart from some fragments). ‘Roughly alphabetic’ means that the words were ordered according to their first letter, and occasionally to the second or third letter, but not any further. The 2<sup>nd</sup> century CE author Sextus Pompeius Festus wrote a summary of the

work by Verrius Flaccus which became known by similar titles, although this may not have been the title used by Festus himself (Acciarino 2017). The tradition of writing summaries of texts was widespread in late Antiquity and Early Mediaeval, and served to make large works available for a broader audience (Banchich 2007). Nowadays these summaries are called ‘epitomes’ (from the Greek word “ἐπιτομή” meaning ‘abridgment’); the ancient Latin term was “compendium”. The work by Festus has survived only in a heavily damaged state, but his epitome was in turn epitomised by Paul the Deacon (late 8<sup>th</sup> century) and this secondary compendium has been preserved.

We studied ‘On the meaning of words’ within the context of an inventory of how ancient cultures perceived peatlands and other wetlands (De Klerk & Joosten 2019). There is a curious peatland-related phrase in the work: “famiosam terram palustrem vocabant”. Whereas “vocabant” translates as ‘they called’ and “terram palustrem” as ‘marshy

soil/ground' or 'marshy area', the meaning of the adjective "famicosus" (of which "famicosam" is the feminine accusative case) has been lost. There are no other known texts from Antiquity that include the word (see Traina 1988 and the extensive 'Bibliotheca Teubneriana Latina Online' database). Because the word occurs in a single sentence only, its meaning cannot be inferred from a textual context.

In order to look further into this puzzling entry, in this article we discuss available information on the word "famicosus" (with the proposed Anglicisation 'famicose') and its relationship with peatlands, in order to better understand how ancient Romans perceived and utilised these ecosystems.

## METHODOLOGICAL REMARK

We studied texts from Antiquity preferably as e-books or pdf documents as these can easily be searched for relevant words and phrases. After location of relevant phrases, these were compared with standard text-editions. We provide new translations of all quoted Greek or Latin text passages. Anglicised author names and English titles of works mentioned in the text are according to the editions from the 'Loeb Classical Library'; for works not included in this book series we follow our own judgement.

## THE AUTHORS AND THE TRANSMISSION OF THEIR WORKS

Marcus Verrius Flaccus (ca. 55 BCE–20 CE) was - according to the 1<sup>st</sup>/2<sup>nd</sup> century CE author Suetonius ('On grammarians and rhetoricians' 17) - a freedman and a scholar who was chosen by Emperor Augustus to teach his grandchildren. Suetonius wrote that Verrius Flaccus died in old age during the reign of Emperor Tiberius. The very extensive work 'On the meaning of words' consisted of some 40 books, of which the first four covered the letter A alone (Glinister 2007, Glinister *et al.* 2007). One of the main reasons for compiling the dictionary was to explain words that were already antiquated (Glinister 2007), so the dictionary of Verrius Flaccus reaches back from the reign of Augustus into the language of Republican times (after 509 BCE). According to Howatson (1996), it focused especially on the literature of early Republican times.

Little is known about Sextus Pompeius Festus, except that he probably worked in the 2<sup>nd</sup> century CE and may have lived in the Gallic city of Narbo (present-day Narbonne in France) (Glinister *et al.*

2007). He probably wrote his epitome of the work of Verrius Flaccus because the original was hard to handle owing to its gigantic size (North 2007). The 11<sup>th</sup> century "Codex Festi Farnesianus" (or just "Codex Farnesianus") - named after its 16<sup>th</sup> century owner, Cardinal Ranuccio Farnese, and currently preserved in the Biblioteca Nazionale in Naples - contains the only known mediaeval copy of the work of Festus (Glinister *et al.* 2007). Regrettably it has survived in a very bad state: the parts before the letter M have been lost completely (Glinister *et al.* 2007) and the remaining parts have suffered severe damage by fire and water (Figure 1).

The entry "famicosus" originates from the epitome by Paul the Deacon (Paulus Diaconus, late 720s–799 CE). He lived as a cleric at the courts of the Lombard kings and later joined the group of international scholars at the court of Charlemagne (Glinister *et al.* 2007, Woods 2007, Patterson 2018). Paul wrote in his dedication that he had prepared the work for Charlemagne and his library (see also Glinister *et al.* 2007, Woods 2007).

As far as can be deduced from comparison with the fragmented remains of the Festus manuscript, Paul omitted and simplified many passages from the text and removed most quotes from and references to other authors (Holtz 1996, Glinister *et al.* 2007, North 2007, Woods 2007). Paulus himself claimed in his preface "Ex qua ego prolixitate superflua quaeque et minus necessaria praetergrediens et quaedam abstrusa penitus stilo proprio enucleans, nonnulla ita, ut erant posita, relinquens, hoc vestrae celsitudini legendum compendium optuli." ('From this abundance I omitted much content that was superfluous and less necessary. I completely rewrote some obscure text passages in my own style, left some untouched as they were, and I offer this compendium to Your Highness to read.') It is obvious from this statement that Paul - although he omitted much - did not add new entries. Thus, the "famicosus" entry must have been already included in the work by Festus. Woods (2007) lists some 25 preserved handwritten copies from the 9<sup>th</sup> to the 15<sup>th</sup> century that contain the 'Epitome', of which ten originate from the 9<sup>th</sup> century (see Figure 2). Several of these manuscripts did not mention the name of Paul (Woods 2007), and it was not before the 1570s that French scholars suspected Paul the Deacon to be the author of the 'Epitome' - a view that was not generally accepted until the late 19<sup>th</sup> century (Acciarino 2016).

Various printed editions of 'On the meaning of words' have been published over the centuries (see references). Most editions contain additional information in the form of (foot)notes. Only Latin



Figure 1. Photograph of two pages from the 11<sup>th</sup> century CE manuscript of the work by Festus ('Codex Festi Farnesianus', currently preserved in Naples) showing severe damage by fire and water, from Thewrewk de Ponor (1893).

editions exist except for a French translation from 1846. An English translation of extracts was provided by Patterson (2018) but does not include the entry "famicosus". The Festus Lexicon Project at the Department of History of University College London aims to provide a critical edition of all remaining versions as well as a translation (Glinister et al. 2007), but the work is still in progress and the "famicosus"-entry has not yet been processed (F. Glinister, pers. comm. February 2020).

The various editions of 'On the meaning of words' have different versions of text, including that of the "famicosus" entry, and they do not include the other entries in an identical order. This relates to differences in the manuscripts that included errors, additions/omissions, well-intended but not always useful improvements, comments from the various copyists, and corrections by the supervisors of the

copyists (cf. Bak 2012, Teeuwen 2015). It was the task of compilers of Mediaeval manuscripts to aid readers of classical texts and, as most of the manuscripts were intended for private libraries (Nebbiai-dalla Guarda 1996), they were edited by the copyists according to the fashions of their times and the intended readership. This resulted in a gradual increase of 'ballast' in the form of Mediaeval and Post-Mediaeval made-up Latin words and fantasised explanations (cf. Dionisotti 1996). It was (and still is) a difficult task for linguists to seek out which preserved text versions of antique works were the closest to the original and the least corrupted (Bak 2012). For 'On the meaning of words' the edition by Lindsay from 1913, which was reprinted in 1997, eventually became the standard version (Glinister et al. 2007, Woods 2007).

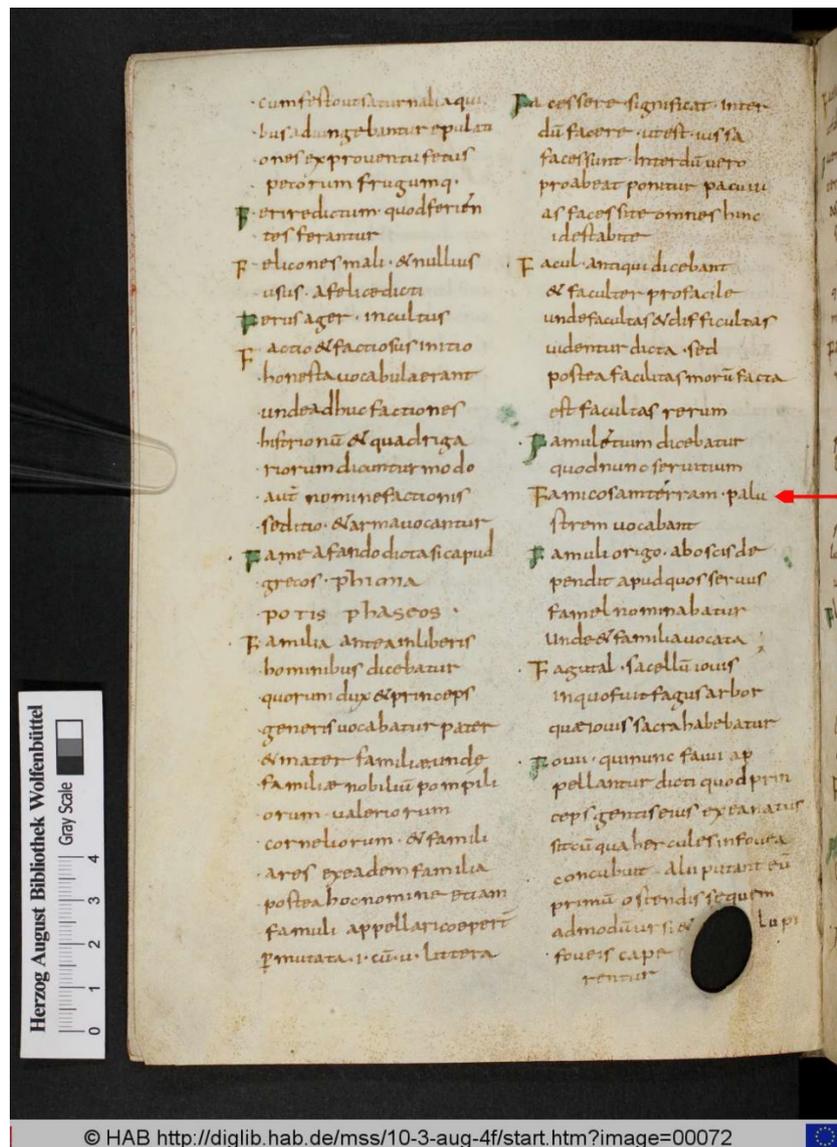


Figure 2. The “famulosus” entry in the 10<sup>th</sup> century manuscript Cod. Guelf. 10.3 Aug. 4<sup>o</sup>; Heinemann-Nr. 2997, Herzog August Bibliothek Wolfenbüttel, <http://diglib.hab.de/mss/10-3-aug-4f/start.htm?image=00072>, accessed 15 Jun 2020).

### THE ENTRY “FAMICOSUS” IN THE VARIOUS EDITIONS

The oldest text-editions of the epitome by Paul were the handwritten copies; of which the earliest would be the author’s manuscript, which is lost, leaving the subsequent manuscript tradition as evidence. Since Lindsay, in his documentation of these manuscripts, does not list any other spelling or alternative words in the standard edition, we can be fairly sure that “famicosam” is indeed the transmitted word (see Figure 2).

The printed text-editions from 1474, 1492 and 1519 and the compilation dictionary ‘On the former meaning of words’ by Iunianus Maius contain

“famelicolas terram palustrem uocabant”. The 1477 edition states “famelicolas terram palustrem uocabant”, and those from 1575, 1576 and 1584 have “famelicolas terram, terram palustrem uocabant” with the note that it may also be “famelicolas” or “famicosam” (Figure 3). This means that the earliest editors were puzzled by the otherwise unattested and inexplicable word, and could not help meddling with the transmitted text, so they printed another word that they thought they understood, only making things worse. The Dutch scholar Gerardus Johannes Vossius (1577–1649 CE) wrote in his posthumously published ‘etymology of the Latin language’ “A famosus est famelicus... Festus: Famelicolas, terram palustrem uocabant. Ubi MSSi quidam, famicosam:

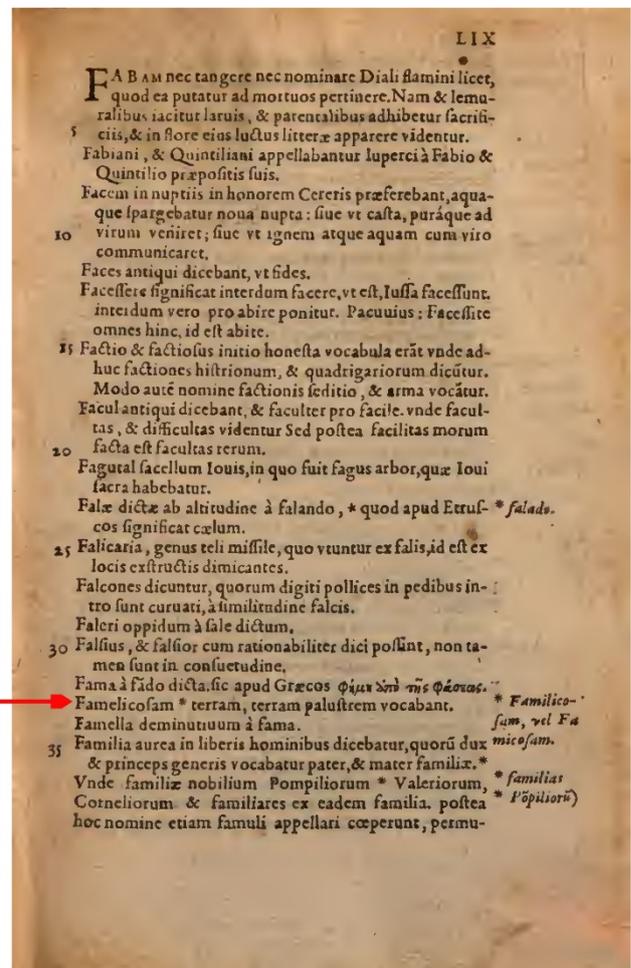
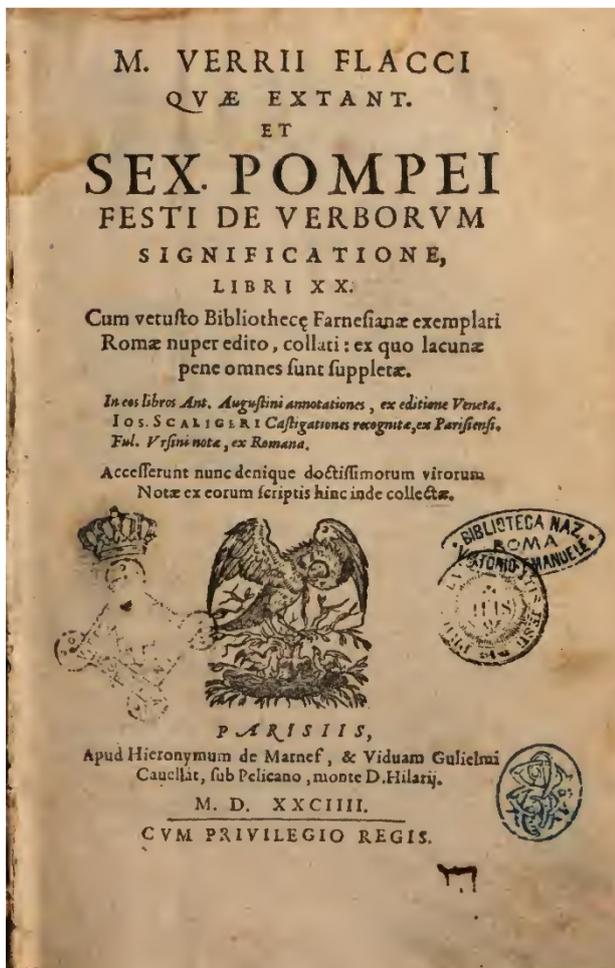


Figure 3. Title page of the 1584 edition of ‘De verborum significatione’, and the page with the entry “famelicosam \* terram, terram palustrem vocabant \* famlicosam, vel famicosam.”

sed perperam” (‘From “fames” “famelicus” is derived... Festus has the phrase “famelicosam, terram palustrem vocabant”. Various manuscripts have “famlicosam”, but this is wrong’) (Vossius 1662). Following Vossius, the edition of ‘On the meaning of words’ of 1681 (reprinted in 1700 and 1826) has “famelicosam terram, terram palustrem vocabant”, and notes that “famelicosus” means “aridus” (‘dry’). This would imply that the entry is about ‘dry marshy soils’, i.e. dried-out or reclaimed peatlands, but semantically ‘they called marshy soils dry’ does not fit. The 1681 edition and its reprints also claim that “famelicosus” is related to “famelicus” (‘hungry’). The edition from 1832 and all subsequent editions contain “famlicosam terram palustrem vocabant”: 19<sup>th</sup> century scholars tended in general to base their editions on original manuscripts and, thus, included the form “famlicosam”. A footnote in the 1832 editions links the word “famlicosus” to “famelicosam” with the designation “vulg.” to signify that most editions include “famelicosam” but that it is unknown who used this form first. The

edition of 1839 has a note mentioning the alternatives “famelicosam”, “familicosam” and “fumicosam”. The 1846 edition provides the French translation “On appelait ainsi un terrain marécageux” (‘Thus one calls a marshy terrain’). The standard edition by Lindsay includes a footnote that a manuscript from the collection of the Dutch philologist Isaac Vossius (1618–1689 CE, the son of Gerardus Vossius mentioned above) includes the word “plaustre” instead of “palustrem” (see above on the printed edition of 1477), which is probably a spelling error by exchanging the ‘a’ and the ‘l’.

### FAMICOSUS AND F-WORDS

Meissner (1874) - although he was not the first to propose this hypothesis (cf. Diez 1836 who knew of the proposed etymology) - stated that the French word “fangeux” (‘muddy’) originated from the middle Latin “famlicosus”, which he in turn considered to be a linguistically unrelated synonym

of the classical Latin adjective “paluster”. Haillant (1886), who also suggested other possibilities, noted that a derivation of “faignas” and similar Romance words (e.g. “fango” or “fanc”) from “famicosus” was completely satisfying, but - in the end - stated that he favoured a Germanic origin for these words. Diez (1836, 1853) mentioned that the Italian “fango” (‘mud’) and “fangoso” (‘muddy’), together with similar extinct or extant words in Romance languages, might be derived from “famicosus” on the basis of their spelling but actually came from the Gothic word “fani” meaning ‘mud’ (Köbler 1989, see also Grandgagnage 1845). “Fani” and its Romance derivatives are related to a collection of similar peat or peatland related f-words (“fen/veen/Fehn/fagne”) from indo-european languages (Joosten *et al.* 2017a). An etymological connection between “famicosus” and Romance f-words is, thus, non-existent: early etymologists may have thought that “famicosus” could only mean something like ‘muddy’ because of its textual connection to mires, and - unaware of the substance peat (but linguists will not have had actual experience of peatlands) - made the unjustified link with mud.

## FAMICOSUS AND THE HOOF AFFLICTION FAMEX

Various editions note explicitly - predominantly in (foot)notes - that “famicosus” is not derived from “fames” (‘hunger’) but from “famex” (e.g. the editions of 1839 and 1846, and also the works by Walde & Hofmann (1938), Ernout & Meillet (2001), Glare (2016) and the Bayerische Akademie der Wissenschaften (2020).

Whereas these linguistic works reject a connection between “famicosus” and “fames”, grammatically it cannot be ruled out completely. A derivation of “-cosus”-adjectives from “-x” words is common, e.g. “frutex” and “fruticosus”, but the ending may also originate from an adjective with a “c”, e.g. “bellum-bellicus-bellicosus”. However, an intermediate adjective “famicus” between “fames” and “famicosus” has not been preserved and may never have existed. Nevertheless, scholars would not have considered an etymology for “famicosus” other than its derivation from “fames” if there was not this word “famex”, which makes it much more likely that “famicosus” comes from “famex” and not from “fames”.

The word “famex” (or “famix”) is used infrequently in Roman literature within a veterinary context. The etymology of the word is unknown (cf. Adams 1995, De Vaan 2008), but a connection to the Greek word “φῶμα” (“phuma”, meaning ‘tumour’ or

similar bump-related words) seems not impossible (cf. notes in the used edition of ‘Healing cattle’ by Gargilius Martialis, cf. Walde & Hoffmann 1938).

In the first century CE, Columella (‘On agriculture’ VI:12) wrote about a defect connected to superfluous blood in ungulate hooves: “His idem sanguis nisi emissus fuerit, famicem creabit, qui si suppuraverit, tarde percurabitur” (‘If this blood cannot be drained, a “famex” will develop, that - if suppurated - heals only slowly’). The same sentence also occurs in the work ‘On veterinary medicine’ - the rediscovered 14<sup>th</sup> book of ‘On agriculture’ (XIV:12) by Palladius - that was evidently copied from Columella. Gargilius Martialis (3<sup>rd</sup> century CE) wrote in ‘On the healing of cattle’ (29): “Famicem si boves habuerint, sale et aceto diligenter eluito, postea aeris flos conterito commixtum cum axungia vel alumine solo, vel galla cum alumine” (‘If the cows have a “famex”, wash carefully with salt and vinegar, then pulverise vitriol, mix it with grease or with a little bit of alum alone, or with a mixture of gall and alum’). In the fourth century CE, Vegetius (‘The distempers of horses and of the art of curing them’ III:19) listed “famex” among the “...cancromata et plagas et famices” (‘bumps or tumours or famices’). In the same century Pelagonius wrote “Ad famicem. Si iam aperta fuerit famix...” (‘On “famex”: If the “famex” has opened...’). The work by Pelagonius, however, has been transmitted in a heavily corrupted state with many omissions and later additions from copyists (Adams 1995) and it is unknown whether the preserved “famex” entry even remotely resembles the original. Chiron Centaurus - a humorously intended pseudonym of another 4<sup>th</sup> century CE author - wrote: “Si quod iumentum pedem contusum habuerit, hoc facito. [...] cum famex facta fuerit, adaperito”. (‘If an animal has a bruised foot, you should do the following [...] As soon as a “famex” grows, open it.’) (‘Medicine for mules’ 636). A few paragraphs later, the work states “Quodcunque iumentum ab stercore equalis, quod femum vocatur, collectionem in unguam fecerit, famicem quod appellamus femi vel si clavum calcaverit, sic intelligis, prodiens super caput unguae calcabit et pedem assidue a terra suspendit, cuius ungula ferventem invenies” (‘If an animal - because of horse manure that we call “femus” - accumulates pus in its hooves we name it a “manure famex”, or when it stands on a nail, you will notice it because the animal steps on the tip of the hoof only when it walks, continuously lifts it foot, and the hoof is boiling hot’) (‘Medicine for mules’ 698). The various authors recommend similar treatments for “famices” as Gargilius Martialis: cut it open, drain it, and treat it with vinegar and alum and other substances. In Paragraph 698 of ‘Medicine for

mules' a "scalpellum famicale" is mentioned which is probably a scalpel that was developed specifically for the treatment of "famices".

The word "famex" clearly denotes a hoof affliction, but it is mostly not specified what kind of affliction this was. In Paragraph 636 of 'Medicine for mules' the word "contusum" apparently refers to a bruise caused by an external trauma, whereas in Paragraph 698 of the same work a reaction to moist manure most likely refers to an infection. The author also mentions stepping on a nail, but it is not clear from the text passage whether he also connects this with the development of a "famex". Thus, it is not clear what hoof conditions are covered by the word "famex", but it seems that it was used to designate various kinds of swellings or bruises.

Many 19<sup>th</sup> and 20<sup>th</sup> century scholars wrote more generally about the meaning of the word "famex". The 1839 edition of 'On the meaning of words' provides a footnote on "famicosus" to the effect that a "famex" "constat sanguinem dici contusione coactum" ('it is certain that it means blood brought together by contusion'). The German notes in 'Healing cattle' by Gargilius Martialis explain "famex" as "Eiterbeule, Schwäre" ('boil, ulcer') (the editor added that it was up to veterinarians to decide whether this was foot-and-mouth disease). Other translations of "famex" include: 'blood of a bruise' (Hewitt Key 1856); "contusions, sang coagulé par suite d'une contusion" ('bruises, coagulated blood from a bruise') (Schuermans 1885); 'bruise, contusion' (Brown 1954); "durch Quetschung entstandene wunde Stelle, Blutunterlauf, Blutgeschwür" ('a bloodshot created by bruising, a blood blister'; Walde & Hoffmann 1938, Georges 1995); or 'a swelling or abscess (on the hooves of cattle)' (Glare 2016). In the glossaries edited by Loewe (1884) and Goetz (1888) "famex" is explained with "spado contusis culionibus" ('eunuch [or generally an impotent male] with crushed testicles'), which was quoted literally without further analysis by Adams (1982) and Ernout & Meillet (2001). Loewe (1884) included a footnote to this statement that "mire et perverse ampliavit" ('they [i.e. the testicles] swell surprisingly and unnaturally'). The source and context of this statement are unknown, which prohibits its understanding or intention. Most of the post-1839 scholars, evidently, connected "famex" with bruises in general, although all preserved Roman texts use it specifically in a veterinary context. "Famex", and derivatives thereof, seemingly have not entered present-day veterinary terminology and the precise meaning has been lost (see Mack 1988, Ilchmann 1993, Wiesner & Ribbeck 2000, Mack *et al.* 2002).

## WHAT ARE FAMICOSE PEATLANDS?

Latin adjectives with the ending -osus generally specify 'full of' or 'rich in' the noun from which they derive (Borrer 1988, Glare 2016). For example, "aquosus" - that comes from "aqua" ('water') - means 'abundant in water', or 'very wet'. The wetland plant taxon *Cicuta virosa* is 'rich in venom', i.e. 'poisonous'. "Pilosus", from "pilus" ('hair') means 'full of hairs', i.e. 'hairy', and appears (with this connotation) in many scientific plant names.

In this context, it may be tempting to translate "famicosus" as something like 'with many swellings' or 'full of bumps', which intuitively invokes the natural hummock-hollow microtopography of acidic nutrient-poor peatlands (cf. Rydin & Jeglum 2013, Joosten *et al.* 2017b) that also occur in Italy (Bragazza *et al.* 2017). However, the acidity and nutrient poverty make such peatlands unattractive for ungulate grazing, although grazing does indeed increase the microrelief and makes peatlands bumpier (cf. Booth *et al.* 2015, Smith 2015). But linking peatland microrelief to a word that is generally used for hoof afflictions would imply a very strong metaphoric or even allegoric use of the word and is unsatisfactory: the comparison 'the marshy ground looks full of "famices" just seems odd.

Adjectives ending with -osus may also mean "prone to" (cf. Borrer 1988). "Lacrimosus" - which comes from the noun "lacrima" ('tear') - may mean both 'rich in tears' (i.e. 'weeping') and 'causing tears'. "Perniciosus" is derived from "pernicies" ('physical destruction' of people or animals, 'fatal injury') and means 'causing insidious harm', 'deadly', 'fatal' (cf. the English 'pernicious').

Another meaning of "famicosus" may, thus, be "prone to famices" or "causing famices". Indeed, moist or wet settings cause a softening of hooves, which makes the feet vulnerable to various kinds of infections (Gregory *et al.* 2006, Hulek 2014, Smith *et al.* 2014, Strobel 2014). A widespread infector is the bacterium *Fusobacterium necrophorum* that - apart from being present in the intestines of humans and animals and causing various internal diseases (Jakob *et al.* 2000, Petrov & Dicks 2013a, Riordan 2007, Clifton *et al.* 2019) - is an important contributor to externally caused hoof infections of many ungulates. These infections include interdigital dermatitis, scald, foot bush, foot rot and foot thrush; of goats, sheep, horses and other equines, cattle and other bovines, pigs and cervidae (Zhou *et al.* 2009, Guo *et al.* 2010, Handeland *et al.* 2010, Anto *et al.* 2012, Petrov & Dicks 2013a,b, Osová *et al.* 2017, Farooq *et al.* 2018, Clifton *et al.* 2019). Foot thrush and foot bush in horses and pigs, as well as interdigital

dermatitis in ruminants, may indeed be caused by *F. necrophorum* on its own (Zhou *et al.* 2009, Anto *et al.* 2012, Petrov & Dicks 2013b). Scald and foot rot in sheep result from synergistic infections of *F. necrophorum* and *Dichelobacter nodosus* (Petrov & Dicks 2013a, Farooq *et al.* 2018, Clifton *et al.* 2019). Contagious digital dermatitis in cattle and sheep is often a consequence of synergistic infections of *F. necrophorum* with *D. nodosus* and *Treponema* spp. (Sayers *et al.* 2009, Wilson-Welder *et al.* 2018). In New Zealand goats it was found that foot rot also develops from *D. nodosus* alone (Bennett *et al.* 2009). *F. necrophorum* thrives especially in moist and wet settings (Guo *et al.* 2010, Handeland *et al.* 2010, Petrov & Dicks 2013a, Clifton *et al.* 2019) - e.g. in peatlands and low-lying moist pastures (Jakob *et al.* 2000) - and may infect ungulate hooves that have been weakened by moisture. It seems unambiguous that these kinds of infections were referred to at the end of 'Medicine for mules' as being caused by (moist) horse manure. Water buffalo is less vulnerable to hoof diseases than other bovines (Ad Hoc Panel 1981, Greifswald Moor Centrum 2016),

and this species is increasingly deployed for grazing in restored wet peatlands in Europe (cf. Wiegleb & Krawczynski 2010, Sweers *et al.* 2013, Greifswald Moor Centrum 2016) (Figure 4).

In Greek and Roman Antiquity, animals were frequently herded in marshes or on marshy ground. Homer (7<sup>th</sup> century BCE) wrote about pasturing of horses and cattle in settings for which he used the noun for 'mire' ("ἕλος", "helos") ('Iliad' XV:630–634, XVI:148–153, XX:221–222). Apollonius Rhodius (3<sup>rd</sup> century BCE) wrote about cattle on 'marsh-meadows' ("ἑλεσπίδας", "helespidas") ('Argonautica' I:1265–1269) and about sheep in mires ('Argonautica' II:500–504). Dionysius of Halicarnassus (1<sup>st</sup> century BCE) related about horses, cattle, sheep and goats in "ἕλειος καὶ λειμωνία βοτάνη" ("heleios kai leimonia botane", 'marshy and grassy pastures') ('Roman Antiquities' I:37,3). Columella (1<sup>st</sup> century CE) mentioned pasturing of horses on "spatiosa et palustria montana pascua" ('wide and marshy mountainous meadows') ('On agriculture' VI:27) and of swine on "palustribus agris" ('marshy fields') ('On agriculture' VII:9,6).



Figure 4. Water buffalo had already been introduced into the central Italian Pontine marshes in the late 19<sup>th</sup> century, where they were used both for grazing and for other tasks. Engraving of a drawing from 1888 by Franz Oskar Bernhard Schreyer (1858–1938).

The setting of the shepherd novel “Daphnis and Chloe” by Longus (2<sup>nd</sup> century CE) is amidst sheep and goat herding in marshes: the author did not use a specific word for the pastures but just placed his story in general in a marsh. Nonnos (4<sup>th</sup>/5<sup>th</sup> century CE) also referred to mires for cow herding (‘*Dionysiaca*’ XV:214/215). Note that, usually, the noun ‘mire’ was not used, but rather designations like ‘marshy soils’ or ‘marshy fields’.

Romans were well aware that moist settings cause softening of hooves. Varro stated: “Cum peperit equa mulum aut mulam, nutricantes educamus. Hi si in palustribus locis atque uliginosis nati, habent ungulas molles; idem si exacti sunt aestivo tempore in montes, quod fit in agro Reatino, durissimis ungulis fiunt.” (‘When a mare gives birth to a male or female mule, we rear it with the teat. If these are born on swampy or moist ground, they have soft hooves; but if they are driven into the mountains in summer, as is done in the region of Reate, their hooves become the firmest.’) (‘On agriculture’ II:8). Pliny the Elder (1<sup>st</sup> century CE) quoted a lost work by Cicero (1<sup>st</sup> century BCE): “Cicero in admirandis posuit Reatinis tantum paludibus ungulas iumentorum indurari.” (‘Cicero proposes in the ‘Admiranda’ that the hooves of pack animals become hard only in the marshes of Rieti’) (‘Natural history’ XXXI:8,12), i.e. they remain soft in other marshes. The region of Rieti lies ~70 km north-east of Rome and, after drainage of a large lake in ca. 300 BCE, consisted of some relict lakes within a large reclaimed peatland/wetland that was well-known for its marshy soils (cf. Coccia & Mattingly 1992, De Klerk 2019). Seneca the Younger (mid-1<sup>st</sup> century CE) wrote: “Quamlibet viam iumenta patiuntur, quorum durata in aspero ungula est: in molli palustrique pascuo saginata cito subteruntur” (‘Pack animals whose hooves are hardened on rough ground endure any road: if they [the animals] are fattened-up in soft and marshy pastures they [the hooves] wear out rapidly’) (‘Moral epistles’ XI:51). The 4<sup>th</sup>/5<sup>th</sup> century CE author Palladius stated: “Pascua ouillo generi utilia sunt quae uel in noualibus uel in pratis siccioribus excitantur: palustria uero noxia sunt.” (‘Pastures on fallow land or on dryer meadows are useful for sheep: marshy pastures, on the other hand, are harmful.’) (‘On agriculture’ XII:13). Note that also in these texts - apart from that of Pliny the Elder - adjectives were used instead of the noun to denote marshy soils instead of proper mire.

The Romans were thus well aware that moist marshy ground was harmful to the hooves of ungulates. It is therefore very probable that they connected the formation of “famices” to pasturing in moist settings (although there are no preserved texts that mention this link directly) and that they called

marsh soils ‘prone to famices’ because they cause hoof diseases. It is, however, conceivable that they had not yet acknowledged “famices” as a medical condition that arose from an infection, but instead envisaged that the “famices” were picked up directly from the ground; in which case ‘full of famices’ may have been a correct intention after all. There are only a few imaginable contexts in which the combination “famiosa terra” would make sense: it was possibly a warning between herders to avoid ground that would result in “famices”.

Ancient Romans had a generally negative attitude towards mires and peatlands, as is evident from many texts (see De Klerk & Joosten 2019). The peatlands used for pasturing had a profitable use, yet the Romans noticed that they were harmful. The concept “famiosus”, thus, added to the negative attitude of the Romans. Since the word is preserved in only one text it is not known how the word was used, but since it does not occur in the major works on farming by Cato the Elder, Varro, Columella and Palladius it was not used frequently. It is most likely that the word was already out of (common) use in the times of Verrius Flaccus who focused on terms and phrases that were already, for him, old-fashioned (see earlier section ‘The authors and the transmission of their works’).

## CONCLUDING REMARKS

There are many indications that the phrase “famiosam terram palustrem vocabant” means - in a somewhat more elaborate interpretation - ‘they called marshy soils famiose, because these cause swellings’. Two factors affect ungulates in wet settings: the wet soil softens the hooves, after which microbes infect the weakened hooves. The problems encountered by the ancient Romans persist into the present and, thus, the famiose character of peatlands or marshy soils still exists today.

The search for the meaning of the peatland word “famiosus” has directed us to the extraordinary intersection of (palaeo)ecology, philology, and veterinary science. Only this transdisciplinary intersection allowed us to come up with a plausible explanation for a peatland term of which the meaning had been lost for many centuries.

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## AUTHOR CONTRIBUTIONS

PdK conceived the study, researched and interpreted the ancient and modern literature, and wrote the manuscript in intense exchange with the other authors. IM further provided all philologic and linguistic information, translated the ancient texts, and assisted in the formulation of the manuscript, whereas HJ provided the peatland contexts and edited the text of the manuscript.

## REFERENCES

### Texts from Antiquity

Greek author names and titles of works are according to the ‘Catalogue of the Library of Congress’; Latin author names and titles follow the ‘Bibliotheca Teubneriana Latina Online’. Anglicised author names and English titles of works (which are not necessarily translations of the Greek/Latin titles) are standardised as much as possible after the ‘Loeb Classical Library’ (adding the epithets ‘the Elder’ for their Pliny and Cato editions, and ‘the younger’ for their Seneca edition). For works not covered by these sources we followed our own judgement. Note that only the editions we actually consulted are mentioned.

Bibliotheca Teubneriana Latina Online: <https://www.degruyter.com/view/db/btl>; accessed 29 Jun 2020.

Library of Congress catalogue: <https://www.loc.gov/aba/publications/Archived-LCC2018/P-PA-text.pdf>; accessed 30 Jun 2020.

Apollonius Rhodius (Ἀπολλώνιος ὁ Ῥόδιος; early 3<sup>rd</sup> century BCE) Ἀργοναυτικά (Argonautica). - Greek text and English translation by Seaton, R.C.: *Apollonius Rhodius the Argonautica*. Loeb Classical Library, William Heinemann, London / The Macmillan Co., New York, 1912, 432 pp.

Cato the Elder (Marcus Porcius Cato; 234–149 BCE) De agri cultura (On agriculture). - Latin text and English translation by Hooper, W.D.: *Marcus Porcius Cato on agriculture, Marcus Terentius*

*Varro on agriculture*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd, London, 1934, 1-157. - Latin text: *M. Porci Catonis De agri cvltvra ad fidem florentini codices deperditi. Iteratis cvris edidit Antonivs Mazzarino*. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, BSB B.G. Teubner Verlagsgesellschaft, Leipzig, 1982, 138 pp.

Chiron Centaurus (pseudonym; 4<sup>th</sup> century CE) Mulomedicina Chironis (Medicine for mules). - Latin text: *Claudii Hermeri mulomedicina Chironis edidit Eugenius Oder*. Teubner, Leipzig, 1901, 467 pp.

Columella (Lucius Iunius Moderatus Columella; 4–70 CE) Res rustica (On agriculture). - Latin text and English translation by Ash, H.B.: *Lucius Junius Moderatus Columella. On agriculture I. Res rustica I-IV*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd, London, 1960, 461 pp. Latin text and English translation by Forster, E.S. & Heffner: *Lucius Junius Moderatus Columella. On agriculture II. Res rustica V-IX*. Loeb Classical Library, William Heinemann Ltd, London / Harvard University Press, Cambridge (Massachusetts), 1954, 503 pp. Latin text and English translation by Forster, E.S. & Heffner, E.H.: *Lucius Junius Moderatus Columella. On agriculture X-XII, On trees*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / London, 1993, 435 pp.

Dionysius of Halicarnassus (Διονύσιος ὁ Ἀλικαρνασσεύς; ca. 60 - >7 BCE) Ῥωμαϊκὴ ἀρχαιολογία (Roman antiquities). - Greek text and English translation by Cary, E.: *The Roman antiquities of Dionysius of Halicarnassus in seven volumes I*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd, London, 1960, 553 pp. - Greek text: *Dionysii Halicarnasei Antiquitatum Romanarum quae supersunt edidit Carolvs Jacoby. Vol. I. Editio stereotypa editionis primae (MDCCCLXXXV)*. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, B.G. Teubner, Stuttgart, 1995, 404 pp.

Festus (Sextus Pompeius Festus; late 2<sup>nd</sup> century CE) and Paul the Deacon (8<sup>th</sup> century CE) Epitoma operis de uerborum significato Uerrii Flacci (On the meaning of words). - Latin text: Manuscript, Cod. Guelf. 10.3 Aug. 4<sup>o</sup>; Heinemann-Nr. 2997. Herzog August Bibliothek Wolfenbüttel, 10<sup>th</sup> century. <http://diglib.hab.de/mss/10-3-aug-4f/start.htm?image=00072>, accessed 15 Jun 2020. - Latin text: Manuscript, BSB-Hss Clm 14734,

Bayerische Staatsbibliothek, München, 10<sup>th</sup>/11<sup>th</sup> century. <https://download.digitale-sammlungen.de/BOOKS/download.pl?id=00104003&nr=1>, accessed 15 Jun 2020). - Latin text: *Pompei Festi collectanea priscorum verborum*. No publisher and place mentioned, 1477, not paginated. - Latin text: integrated dictionary of various authors by Junianus Maius: *De priscorum proprietate verborum*. Junianus Maius, Naples, 1490, not paginated. - Latin text: *De proprietate latini sermonis. Sextus Pompeius Festus. De verborum significatione*. Marc Tereci Varró, *De lingua Latina*. Nicolaus de Ferraris de Pralormis, Venice, 1492, not paginated. - Latin text: *Qve hoc libro continentvr: Nonii Marcel. peripathetici ad filivm: et de verborvm proprietate compendivm. Sexti Festi Po. Fragmenta per ordinem alphabeti. Marci Terentii Varronis de lingva latina libri tres, de analogia libri dvo*. Publisher or place not mentioned, date unclear (possibly 1519), not paginated. - Latin text: *M. Verrii Flacci quæ extant. Sex. Pompei Festi de verborvm significatione Libri XX. Et in eos Iosphe Scaligeri Ivli. Caesaris filii Castigationes nunc primum publicate*. Petrus Santandreas, no place mentioned, 1575, not paginated. - Latin text: *M. Verrii Flacci quæ extant et Sex. Pompei Festi de verborvm significatione Libri XX. Iosphe Scaligeri Ivlii Caesaris F. in eosdem libros. Castigationes, recognitæ & auctæ*. Mamertus Patissonius, Paris, 1576, not paginated. - Latin text: *M. Verrii Flacci quæ extant. Et Sex. Pompei Festi de verborvm significatione, Libri XX. Cum vetusto Bibliothecæ Farnesianæ exemplari Romæ nuper edito, collati: ex quo lacunæ pene omnes sunt suppletæ. In eos libros Ant. Augustini annotations, ex edition Veneta. Ios. Scaligeri Castigationes recognite, es Parisiensi. Ful. Vrsini note, ex Romana. Accesserunt nunc denique doctissimorum virorum notæ ex eorum scriptis hinc inde collectæ*. Hieronymus de Marnes & Viduas Gulielmus Cauellat / Pelicano Monte D. Hilarius, Paris, 1584, not paginated. - Latin text: *Sex. Pompei Festi et Mar. Verrii Flacci de verborum significatione Lib. XX. Notis et emendationibus illustravit. Andreas Dacerius. Jussu Christianissimi Regis, in usum serenissimi delphini*. Lambertus Roulland, Paris, 1681, not paginated. - Latin text: *Sex. Pompei Festi et Mar. Verii Flacci de verborum significatione Lib. XX. Notis et emendationibus illustravit Andreas Dacerius, in usum serenissii delphini. Accedunt in hac nova editione notæ integræ Josephi Scaligeri, Fulvii Ursini, & Antonii Augustini, cum fragmentis & Schedis, atque indice novo*.

Huguetanorus, Amsterdam, 1700, not paginated. - Latin text: *M. Verrii Flacci quæ extant et Sexti Pompeii Festi de verborum significatione Libri XX. Ex editione Andrae Dacerii cum notis et interpretatione in usum delphini variis lectionibus notis variorum recensu editionum et codicum et indicibus locupletissimis accurate recensiti. Volumen primum*. A.J. Valpy, London, 1826, 504 pp. - Latin text: *Corpus grammaticorum latinorum veterum collegit auxit recensuit ac potiolem lectionis varietatem adiecit Fridericus Lindemannus sociorum opera adiutus. Tomus II. Pauli Diaconi excerpta et Sex. Pompeii Festi fragmenta continens*. B.G. Teubner et F. Claudius, Leipzig, 1832, 846 pp. - Latin text: *Sexti Pompei Festi de verborum significatione quæ supersunt cum Pauli epitome, emendata et annotata a Carolo Odofredo Muellero*. Weidmann, Leipzig, 1839, 445 pp. - Latin text and French translation by Savagner, M.A.: *Sextus Pompeius Festus. De la signification des mots. Traduit pour la première fois en français par M.A. Savagner*. C.L.F. Panckoucke, Paris, 1846, 755 pp. - Latin text: *Sexti Pompei Festi de verborum significatu quæ supersunt cum Pauli epitome. Edidit Æmilies Thewrewk de Ponor. Pars I. Academia Litterarum Hungarica, Budapest, 1889, 631 pp. - Latin text: Glossaria Latina iussu academiae Britannicae edita. IV Placidus, Festus, ediderunt J.W. Pirie, W.M. Lindsay. Georg Olms Verlagsbuchhandlung, Hildesheim, 1965, 506 pp. - Latin text: *Sexti Pompei Festi de verborvm significatv quæ svpersvnt cvm Pavli epitome. Therewkianis copiis vsvs edidit Wallace M. Lindsay. Edition stereotypa editionis primæ (MCMXIII)*. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, B.G. Teubner, Stuttgart / Leipzig, 1997, 574 pp.*

Gargilius Martialis (pseudo-Gargilius Martialis, 3<sup>rd</sup> century CE) *Curæ boum* (Healing cattle). - Latin text with German comments by Schuch, T.: *Curæ boum ex corpore Gargilii Martialis. Alter rätselhafter und neugestalteter Text mit kritischen wie fachlichen Bemerkungen aus dem Gebiete der Alterthumskunde und Naturwissenschaft und gelegentlichen Verbesserungen verdorbener bei den Alten*. B. Mayer, Rastatt, 1856, 47 pp.

Homer (Ὅμηρος; 7<sup>th</sup> century BCE) Ἰλιάς (Iliad). - Greek text and English translation by Murray, A.T.: *Homer the Iliad II*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd., London, 1976, 644 pp. - Greek text: *Homeri Ilias recensvit / Testimonia congressit Martin L. West. Volvmen altervm rhapsodias XIII-XXIV et*

- indicem nominum continens*. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, K.G. Saur Verlag, München / Leipzig, 2000, 396 pp.
- Longus (Λόγγος; 2<sup>nd</sup> century CE) Κατὰ Δάφνιν καὶ Χλόην (Daphnis and Chloe). - Greek text and English translation by Thornley, G. (revised and augmented by Edmonds, J.M.): *Daphnis & Chloe by Longus. The love romances of Parthenius and other fragments*. Loeb Classical Library, William Heinemann, London / G.P. Putnam's sons, New York, 1916, 4–247. - Greek text: *Longus Daphnis et Chloe edidit Michael D. Reeve editio stereotypa editionis correctioris (MCMXCIV)*. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, K.G. Saur Verlag, München / Leipzig, 2001, 105 pp.
- Nonnos (Νόννος; 4<sup>th</sup>/5<sup>th</sup> century CE) Διονυσιακά (Dionysiaca). - Greek text and English translation by Rouse, W.H.D.: *Nonnos Dionysiaca in three Volumes I Books I–XV*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd, London, 1940, 533 pp.
- Palladius (Palladius Rutilius Taurus Aemilianus; 4<sup>th</sup>/5<sup>th</sup> century CE) Opus agriculturae (On agriculture), including the later discovered book XIV De veterinaria medicina (On veterinary medicine). - Latin text: *Palladii Rutilii Tauri Aemiliani viri inlustris, opus agriculturae, de veterinaria medicina, de insitione*. Edidit Robert H. Rodgers. Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, BSB B.G. Teubner Verlagsgesellschaft, Leipzig, 1975, 336 pp. - English translation by Fitch, J.G.: *Palladius the work of farming (opus agriculturae) and poem on grafting*. Prospect Books, Blackawton, 2013, 302 pp.
- Pelagonius (Pelagonius, 4<sup>th</sup> century CE) Ars ueterinaria (Veterinary medicine). - Latin text: *Pelagonius Ars veterinaria*. digilibLT, Vercelli, 2015, 83 pp. (Text derived from the edition published by K.D. Fischer, Leipzig, 1980).
- Pliny the Elder (Gaius Plinius Secundus; 23–79 CE) Naturalis historia (Natural history). - Latin text and English translation by Jones, W.H.S.: *Pliny natural history Volume VIII: Libri XXVIII–XXXII*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd., London, 1963, 596 pp. - Latin text: *C. Plinius Secundus Naturalis Historia libri XXXVII post Iuliodiciani obitum recognovit et scripturae discrepantia adiecta*. edidit Karl Mayhoff. Vol. V. Libri XXXI–XXXVII. Editio stereotypa editionis prioris (MDCCCXCVII). Bibliotheca Scriptorum Graecorum et Romanorum Teubneriana, K. G. Saur Verlag GmbH, München / Leipzig, 2002, 512 pp.
- Seneca the Younger (Lucius Annaeus Seneca; c. 4 BCE–65 CE) Epistulae morales ad Lucillum (Moral epistles). - Latin text: *L. Annaei Senecae Opera quae superstunt. Recognovit et rerum indicem locupletissimum adiecit Fridericus Haase prof. Vratislav. Vol. III*. B.G. Teubner, Leipzig, 1886: 1–417. - Latin text and English translation by Gummere, R.M.: *Seneca in ten volumes IV. Ad Lucillum epistulae morales in three volumes I*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd, London, 1979, 467 pp.
- Suetonius (Caius Suetonius Tranquillus; c. 69–>122 CE) De grammaticis et rhetoribus (On grammarians and rhetoricians). - Latin text and English translation by Rolfe, J.C.: *Suetonius in two volumes II*. Loeb Classical Library, William Heinemann, London / G.P. Putnam's sons, New York, 1920, 396–432.
- Varro (Marcus Terentius Varro; 116–27 BCE) Res rusticae (On agriculture). - Latin text and English translation by Hooper, W.D.: *Marcus Porcius Cato on agriculture, Marcus Terentius Varro on agriculture*. Loeb Classical Library, Harvard University Press, Cambridge (Massachusetts) / William Heinemann Ltd, London, 1934, 159–543.
- Vegetius (Publius Flavius Vegetius Renatus; late 4<sup>th</sup> century CE): *Digesta artis mulomedicinae* (the distempers of horses, and of the art of curing them). - English translation by “The author of the translation of Columella”: *Vegetius Renatus the distempers of horses, and of the art of curing them, and also of the diseases of oxen, and of the remedies proper for them [etc.]*. A. Millar, London, 1748. - Latin text: *Vegetius (Flavius Vegetius Renatus) Digesta artis mulomedicinae*. digilibLT, Vercelli, 2018, 103 pp. (Text derived from the edition by Ernestus Lommatzsch, published by B.G. Teubner, Leipzig, 1903).

### Modern texts

- Acciarino, D. (2016) The Renaissance editions of Festus: identifying Paulus Diaconus. *Journal of Ancient History and Archaeology*, 3.4/2016, 26–30, doi: 10.14795/j.v3i4.203.
- Acciarino, D. (2017) The Renaissance editions of Festus: notes on the title. *Acta Classica*, 60, 162–172, doi: 10.15731/AClass.060.08.
- Adams, J.N. (1982) *The Latin Sexual Vocabulary*. Duckworth, London, 272 pp.
- Adams, J.N. (1995) *Pelagonius and Latin Veterinary Terminology in the Roman Empire*. E.J. Brill,

- Leiden / New York / Köln, 697 pp.
- Ad Hoc Panel (1981) *The Water Buffalo: New Prospects for an Underutilized Animal*. National Academy Press, Washington DC, 116 pp.
- Anto, L., Joseph, S., Mini, M., Mohan, S.G., Krishna, S.V., Pellissery, A.J., Usha, A.P. (2012) Molecular detection of porcine foot bush with anaerobic etiologies. *Journal of Indian Veterinary Association Kerala*, 10, 13–16.
- Bak, J.M. (2012) *An Introduction to Editing Manuscripts for Medievalists*. DigitalCommons@USU, Utah State University, 70 pp.
- Banchich, T.M. (2007) The epitomizing tradition in Late Antiquity. In: Marincola, J. (ed.) *A Companion to Greek and Roman Historiography Volume I*. Blackwell Publishing Ltd., Malden, 305–311.
- Bayrische Akademie der Wissenschaften (2020) *Thesaurus Linguae Latinae (Thesaurus of the Latin Language)*. <https://thesaurus.badw.de/tll-digital/index.html>, accessed 16 Jun 2020 (in Latin).
- Bennett, G., Van Loenen, A., Zhou, H., Sedcole, R., Hickford, J. (2009) The detection of *Dichelobacter nodosus* and *Fusobacterium necrophorum* from footrot lesions in New Zealand goats. *Anaerobe*, 15, 177, doi: 10.1016/j.anaerobe.2009.02.003.
- Booth, D.T., Cox, S.E., Likins, J.C. (2015) Fenceline contrasts: grazing increases wetland surface roughness. *Wetlands Ecology and Management*, 23, 183–194, doi: 10.1007/s11273-014-9368-0.
- Borrow, D.J. (1988) *Dictionary of Word Roots and Combining Forms. Compiled from the Greek, Latin, and Other Languages, with Special Reference to Biological Terms and Scientific Names*. Mayfield publishing Company, Mountain View, 134 pp.
- Bragazza, L., Lasen, C., Gerdol, R., Novello, E. (2017) Italy. In: Joosten, H., Tanneberger, F., Moen, A. (eds.) *Mires and Peatlands of Europe - Status, Distribution and Conservation*. Schweizerbart Science Publishers, Stuttgart, 462–477, doi: 10.1127/mireseurope/2017/0001-0035.
- Brown, R.W. (1954) *Composition of Scientific Words*. Self-publication, Baltimore, 882 pp.
- Coccia, S., Mattingly, D. (1992) Settlement history, environment and human exploitation of an intermontane basin in the central Apennines: The Rieti survey 1988–1991, part I. *Papers of the British School at Rome*, 60, 213–289, doi: 10.1017/S0068246200009831.
- Clifton, R., Giebel, K., Liu, N.L.B.H., Purdy, K.J., Green, L.E. (2019) Sites of persistence of *Fusobacterium necrophorum* and *Dichelobacter nodosus*: a paradigm shift in understanding the epidemiology of footrot in sheep. *Scientific Reports*, 9, 14429, 11 pp., doi: 10.1038/s41598-019-50822-9.
- De Klerk, P. (2019) Peatland prose from the past: the trembling soils of Pliny the Elder (23–79 CE). *IMCG Bulletin*, February–March 2019, 3.
- De Klerk, P., Joosten, H. (2019) How ancient cultures perceived mires and wetlands (3000 BCE – 500 CE): an introduction. *IMCG Bulletin*, 2019-04 (May–July), 4–15.
- De Vaan, M. (2008) *Etymological Dictionary of Latin and the Other Italic Languages*. Brill, Leiden / Boston, 825 pp.
- Diez, F. (1836) *Grammatik der Romanischen Sprachen, Erster Theil (Grammar of the Romance Languages, Part I)*. Eduard Weber, Bonn, 334 pp. (in German).
- Diez, F. (1853) *Etymologisches Wörterbuch der romanischen Sprachen (Etymological Dictionary of the Romance Languages)*. Adolph Marcus, Bonn, 820 pp. (in German).
- Dionisotti, A.C. (1996) On the nature and transmission of Latin glossaries. In: Hamesse, J. (ed.) *Les manuscrits des lexiques et glossaires de l'antiquité tardive à la fin du moyen âge. Actes du Colloque international organisé par le "Ettore Majorana Centre for Scientific Culture"* (Brice, 23–30 septembre 1994). Fédération Internationale des Instituts d'Études Médiévales, Louvain-la-Neuve, 205–252.
- Ernout, A., Meillet, A. (2001) *Dictionnaire étymologique de la langue Latine. Histoire des mots (Etymological Dictionary of the Latin Language. History of Words)*. Klincksieck, Paris, 833 pp. (in French).
- Farooq, S., Wani, S.A., Hassan, M.N., Aalamgeer, S., Kashoo, Z.A., Magray, S.N., Bhat, M.A. (2018) The detection and identification of mixed strains of *Fusobacterium necrophorum* in foot rot lesions of sheep in Kashmir, India. *Austin Immunology*, 3(1), 1015, 5 pp.
- Georges, K.E. (1995) *Ausführliches Lateinisch-Deutsches Handwörterbuch. Erster Band (Elaborate Latin–German Hand Dictionary, Part I)*. Wissenschaftliche Buchgesellschaft, Darmstadt, 3108 Columns (in German).
- Glare, P.G.W. (2016) *Oxford Latin Dictionary*. Oxford University Press, Oxford UK, 2344 pp.
- Glinister, F. (2007) Constructing the past. In: Glinister, F., Woods, C., North, J.A., Crawford, M.H. (eds.) *Verrius, Festus & Paul. Lexicography, Scholarship, & Society*. Institute of Classical Studies, University of London, 11–32.

- Glinister, F., North, J., Woods, C. (2007) Introduction: Verrius, Festus and Paul. In: Glinister, F., Woods, C., North, J.A., Crawford, M.H. (eds.) *Verrius, Festus & Paul. Lexicography, Scholarship, & Society*. Institute of Classical Studies, University of London, 1–9.
- Goetz, G. (1888) *Corpus glossariorum latinorum a Gustavo Loewe inchoatum avspiciis Societatis Litterarum Regiae Saxonicae composuit recensuit edidit Georgius Goetz Vol. II (Latin Glossary Begun by Gustav Loewe Under Auspices of the Literary Society of the Kingdom Saxonia Edited by Georg Goetz Volume 2)*. G. Teubner, Leipzig, 597 pp. (in Latin).
- Grandgagnage, C. (1845) *Dictionnaire étymologique de la langue Wallonne (Etymological Dictionary of the Walloon Language)*. Félix Oudart, Liège, 645 pp. (in French).
- Gregory, N., Craggs, L., Hobson, N., Krogh, C. (2006) Softening of cattle hoof soles and swelling of heel horn by environmental agents. *Food and Chemical Toxicology*, 44, 1223–1227, doi: 10.1016/j.fct.2006.01.018.
- Greifswald Moor Centrum (2016) *Wasserbüffel. Landwirtschaft auf nassen Mooren (Water Buffalo, Husbandry on Wet Mires)*. Greifswald Mire Centre, Greifswald, 8 pp. (in German).
- Guo, D.H., Sun, D.B., Wu, R., Yang, H.M., Zheng, J.S., Fan, C.L., Sun, B., Wang, J.F. (2010) An indirect ELISA for serodiagnosis of cattle footrot caused by *Fusobacterium necrophorum*. *Anaerobe*, 16, 317–320, doi: 10.1016/j.anaerobe.2010.03.007.
- Haillant, N. (1886) *Essai sur un patois Vosgien. Dictionnaire phonétique et étymologique (Essay on a Dialect of the Vosges. Phonetic Dictionary and Etymology)*. Self-published, Épinal, 627 pp. (in French).
- Handeland, K., Boye, M., Bergsjø, B., Bondal, H., Isaken, K., Agerholm, J.S. (2010) Digital Necrobacillosis in Norwegian wild tundra reindeer (*Rangifer tarandus tarandus*). *Journal of Comparative Pathology*, 143, 29–38, doi: 10.1016/j.jcpa.2009.12.018.
- Hewitt Key, T. (1856) On the representatives of the Keltic suffix agh or ach ‘little,’ in the Latin vocabulary. *Transactions of the Philological Society*, 1856, 295–354.
- Holtz, L. (1996) Glossaires et grammaire dans l’Antiquité (Glossaries and grammatica in Antiquity). In: Hamesse, J. (ed.) *Les manuscrits des lexiques et glossaires de l’antiquité tardive à la fin du moyen âge. Actes du Colloque international organisé par le “Ettore Majorana Centre for Scientific Culture”* (Brice, 23–30 septembre 1994). Fédération Internationale des Instituts d’Études Médiévales, Louvain-la-Neuve, 1–21 (in French).
- Howatson, M.C. (1996) *Reclams Lexikon der Antike (Reclam’s Lexicon of Antiquity)*. Philipp Reclam jun. GmbH & Co., Stuttgart, 708 pp. (in German).
- Hulek, M. (2014) *Klauengesundheit & Klauenpflege (Claw Health and Claw Care)*. Leopold Stocker Verlag, Stuttgart, 148 pp. (in German).
- Ilchmann, G. (1993) *Fachwörterbuch Veterinärmedizin Englisch Deutsch Französisch Russisch (Technical Dictionary Veterinary Medicine English German French Russian)*. Verlag Alexandre Hatier, Berlin / Paris, 414 pp. (in English, German, French and Russian).
- Jakob, W., Schröder, H.-D., Rudolph, M., Krasiński, Z.A., Krasińska, M., Wolf, O., Lange, A. Cooper, J.E., Fröhlich, K. (2000) Necrobacillosis in free-living male European bison in Poland. *Journal of Wildlife Diseases*, 36, 248–256, doi: 10.7589/0090-3558-36.2.248.
- Joosten, H., de Klerk, P. (2002) What’s in a name? Some thoughts on pollen classification, identification, and nomenclature in Quaternary palynology. *Review of Palaeobotany and Palynology*, 122, 29–45, doi: 10.1016/S0034-6667(02)00090-8.
- Joosten, H., Couwenberg, J., Moen, A., Tanneberger, F. (2017a) Mire and peatland terms and definitions in Europe. In: Joosten, H., Tanneberger, F., Moen, A. (eds.) *Mires and Peatlands of Europe - Status, Distribution and Conservation*, Schweizerbart Science Publishers, Stuttgart, 65–96, doi: 10.1127/mireseurope/2017/0001-0005.
- Joosten, H., Moen, A., Couwenberg, J., Tanneberger, F. (2017b) Mire diversity in Europe: mire and peatland types. In: Joosten, H., Tanneberger, F., Moen, A. (eds.) *Mires and Peatlands of Europe - Status, Distribution and Conservation*. Schweizerbart Science Publishers, Stuttgart, 5–64, doi: 10.1127/mireseurope/2017/0001-0004.
- Köbler, G. (1989) *Gotisches Wörterbuch (Gothic Dictionary)*. Brill, Leiden, 716 pp. (in German).
- Loewe, G. (1884) *Glossae nominum edidit Gustavus Loewe accedunt eiusdem opuscula glossographica (Glosses on Names Edited by Gustav Loewe; Added are the Same Man’s Works on Glossographs)*. Teubner, Leipzig, 264 pp. (in Latin).
- Mack, R. (1988) *Dictionary for Veterinary Science and Bioscience German–English / English–German with Trilingual Appendix: Latin Terms. Wörterbuch für Veterinärmedizin und Biowissenschaften Deutsch–Englisch / Englisch–Deutsch mit einem dreisprachigen Anhang: lateinische Begriffe*. Paul Parey Publishers / Verlag Paul Parey, Berlin /

- Hamburg, 750 pp. (in English and German).
- Mack, R., Mikhail, B., Mikhail, M. (2002) *Wörterbuch der Veterinärmedizin und Biowissenschaften in Deutsch-Englisch-Französisch. Dictionary of Veterinary Medicine and Biosciences English-French-German. Dictionnaire de médecine vétérinaire et des sciences biologique Français-Anglais-Allemand*. Parey Buchverlag, Berlin, 1693 pp. (in English, French and German).
- Meissner, A.L. (1874) *The Philology of the French Language. Being a New and Corrected Edition of the "Palæstra Gallica"*. Libraire Hachette & Cie, London / Paris, 132 pp.
- Nebbiai-dalla Guarda, D. (1996) Les glossaires et les dictionnaires dans les bibliothèques médiévales (The glossaries and dictionaries in medieval libraries). In: Hamesse, J. (ed.) *Les manuscrits des lexiques et glossaires de l'antiquité tardive à la fin du moyen âge. Actes du Colloque international organisé par le "Ettore Majorana Centre for Scientific Culture"* (Brice, 23–30 septembre 1994). Fédération Internationale des Instituts d'Études Médiévales, Louvain-la-Neuve, 145–204 (in French).
- North, J.A. (2007) Why does Festus quote what he quotes? In: Glinister, F., Woods, C., North, J.A., Crawford, M.H. (eds.) *Verrius, Festus & Paul. Lexicography, Scholarship, & Society*, Institute of Classical Studies, University of London, 49–68.
- Osová, A., Mihajlovičová, X., Hund, A., Mudroň, P. (2017) Interdigital phlegmon (foot rot) in dairy cattle - an update. *Wiener tierärztliche Monatsschrift - Veterinary Medicine Austria*, 104, 209–220.
- Patterson, R.J. (2018) *E lexico Sexti Pompeii Festi de Verborum significatu selectiones: Selections from the Lexicon of Sextus Pompeius Festus, on the Meaning of Words*. Master of Arts thesis, Queen's University, Kingston, Ontario, 63 pp.
- Petrov, K.K., Dicks, L.M.T. (2013a) Footrot in clawed and hoofed animals: symptoms, causes and treatments. *Biotechnology & Biotechnological Equipment*, 27, 3470–3477, doi: 10.5504/BBEQ.2012.0103.
- Petrov, K.K., Dicks, L.M.T. (2013b) *Fusobacterium necrophorum*, and not *Dichelobacter nodosus*, is associated with equine hoof thrush. *Veterinary Microbiology*, 161, 350–352, doi: 10.1016/j.vetmic.2012.07.037.
- Riordan, T. (2007) Human infection with *Fusobacterium necrophorum* (Necrobacillosis) with a focus on Lemierre's syndrome. *Clinical Microbiology Reviews*, 20, 622–659, doi: 10.1128/CMR.00011-07.
- Rydin, H., Jeglum, J. K. (2013) *The Biology of Peatlands*. Second edition, Oxford University Press, Oxford, 382 pp.
- Sayers, G., Marques, P.X., Evans, N.J., O'Grady, L., Doherty, M.L., Carter, S.D., Nally, J.E. (2009) Identification of spirochetes associated with contagious ovine digital dermatitis. *Journal of Clinical Veterinary Microbiology*, 47, 1199–1201, doi: 10.1128/JCM.01934-08.
- Schuermans, H. (1885) Anciens chemins et monuments dans les hautes Fagnes (Ancient paths and monuments in the Hautes Fagnes). *Bulletin de Commissions royale d'art et d'archéologie*, 24, 239–302 (in French).
- Smith, C.W. (2015) *Assessing Ungulates' Role in Riparian Hummocking on Three National Forests in Southern Utah*. MSc thesis, Whitman College, Walla Walla WA, 37 pp.
- Smith, E.M., Green, O.D.J., Calvo-Bado, L.A., Witcomb, L.A., Grogono-Thomas, R., Russell, C.L., Brown, J.C., Medley, G.F., KilBride, A.L., Wellington, E.M.H., Green, L.E. (2014) Dynamics and impact of footrot and climate on hoof horn length in 50 ewes from one farm over a period of 10 months. *The Veterinary Journal*, 201, 295–301, doi: 10.1016/j.tvjl.2014.05.021.
- Strobel, H. (2014) *Klauenpflege Schaf und Ziege (Claw Care Sheep and Goat)*. Eugen Ulmer, Stuttgart, 176 pp. (in German).
- Sweers, W., Horn, S., Grenzdörffer, G., Müller, J. (2013) Regulation of reed (*Phragmites australis*) by water buffalo grazing: use in coastal conservation. *Mires and Peat*, 13, 03, 10 pp.
- Teeuwen, M. (2015) Carolingian scholarship on classical authors: practices of reading and writing. In: Kwakkel, E. (ed.) *Studies in Medieval and Renaissance Book Culture. Manuscripts of the Latin Classics 800–1200*. Leiden University Press, Leiden, 23–50.
- Thewrewk de Ponor, A. (1893) *Codex Festi Farnesianus XLII tabulis expressus (Codex Festi Farnesianus Displayed in 42 Plates)*. Academiae Litterarum Hungaricæ, Budapest, 5 pp. + appendix (in Latin).
- Traina, G. (1988) *Paludi e bonifiche del mondo antico. Saggio di archeologia geografica (Mires and their Reclamations in the Antique World. Geoarchaeological Essay)*. "L'Erma" di Bretschneider, Rome, 159 pp. (in Italian).
- Vossius, G.J. (1662) *Etymologicon linguæ Latinæ præfigitur ejusdem de Literarum permutatione tractatus (Etymology of the Latin Language)*. Ludovicus & Daniel Elzevirios, Amsterdam, 606 pp. (in Latin).
- Walde, A., Hofmann, J.B. (1938) *Lateinisches etymologisches Wörterbuch (Latin Etymological*

- Dictionary*). Carl Winter Universitätsverlag, Heidelberg, 287 pp. (in German).
- Wiegleb, G., Krawczynski, R. (2010) Biodiversity management by water buffalos in restored wetlands. *Waldökologie, Landschaftsforschung und Naturschutz*, 10, 17–22.
- Wiesner, E., Ribbeck, R. (eds.) (2000) *Lexikon der Veterinärmedizin (Dictionary of Veterinary Medicine)*. Enke, Stuttgart, 1630 pp.
- Wilson-Welder, J.H., Nally, J.E., Alt, D.P., Palmer, M.V., Coatney, J., Plummer, P. (2018) Experimental transmission of bovine digital dermatitis to sheep: Development of an infection model. *Veterinary Pathology*, 55, 245–257, doi: 10.1177/0300985817736572.
- Woods, C. (2007) A contribution to the king's library: Paul the Deacon's epitome and its Carolingian context. In: Glinister, F., Woods, C., North, J.A., Crawford, M.H. (eds.) *Verrius, Festus & Paul. Lexicography, Scholarship, & Society*, Institute of Classical Studies, University of London, 109–135.
- Zhou, H., Dobbison, S., Hickford, J.G.H. (2009) *Fusobacterium necrophorum* variants present on the hooves of lame pigs. *Veterinary Microbiology*, 141, 390, doi: 10.1016/j.vetmic.2009.09.014.

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